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Climate change leadership: A study of climate change corporate governance within the mining sector

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Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Masters of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Venantio Marovha Mzenda

November 2009

Acknowledgments

It has been a great honour to work with Professor Derick de Jongh of the University of Pretoria Centre for responsible leadership. I would like to convey my sincere gratitude to him for his involvement in this study as my academic supervisor. The study involved a difficult task of linking the concepts of 'corporate governance' and 'climate change' at the level of a Masters Degree dissertation.

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I would also like to extend my sincere gratitude to the following people for their assistance, guidance and support through my journey of compiling this thesis:

- Dr Chris Rust, my manager at the CSIR. He was greatly supportive of my study. He allowed me the time to work on my study and provided me with all the materials and moral support I needed. I was inspired to look at the problems of climate change from a corporate view following our visit to a client and our subsequent conversations.
- Mr Donald Gordon for referring me to Prof. D. de Jongh and having an interest in my study topic. His level of interest gave me hope that it was possible to undertake this study.
- Discussions with colleagues helped me to develop a better understanding of the research problem. In that respect, I wish to particularly thank Mr Mduduzi Moyo for asking me probing questions pertaining to many aspects of this study.

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I hoped by placing my gratitude to Ms M Mswela at the end would give it the visibility it deserves. It was a great blessing to have had her around. She inspired me to complete the study during moments I contemplated throwing in the towel and helped me through many aspects of this study – thank you and God Bless!

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Abstract

The purpose of the study was to contribute to the body of knowledge regarding the corporate sectors' ability to operate within a carbon constrained society through the institutionalisation of effective corporate governance principles and practices.

The research attempted to answer the question: **To what extent and under what circumstances should corporate governance influence corporate response to climate change?**

Climate change risks impact on long-term sustainability of businesses and the competitiveness of some nations. The level of impact of climate change risk to a company is subject to a number of factors, including the nature of its business, the impact of local and international legislation, and the company's ability to respond to climate change. South Africa is not isolated from climate change risks. Its mining sector is vulnerable to climate change because it is an energy intense sector, and coal is particularly vulnerable to carbon constrain legislation.

The study was based on a qualitative research methodology where secondary data were sourced from company documents. The study showed that, on average, mining companies need to improve their climate change corporate governance mechanisms and practices. It was also shown that some of the companies have good systems in place.

Chapter 1:

1.1. Introduction

According to the Intergovernmental Panel on Climate Change (IPCC) fourth assessed report (2007) and the Stern Report (2007), scientific evidence indicates that the global climate is rapidly changing in response to the increasing concentration of greenhouse gases (GHG) from human economic activities.

Linked to climate change is the rising global temperature due to the greenhouse (GHG) effect phenomenon IPCC (2007). Climate change is thought to be a direct cause of excessive and rare natural phenomena being experienced globally Europ (2005). Some of the phenomena include a change in rainfall patterns, raising sea levels, cyclones, and prolonged droughts leading to water and food supply shortages. It is estimated with a high degree of certainty that the strength and frequency of occurrence of the climate change related phenomena will disproportionally increase with an increase in GHG concentrations (IPCC 2007; LMTS 2008).

In response, legislation (mainly targeted at companies) and structures such as Carbon Tax, the Emission Trading Scheme (ETS), and the Clean Development Mechanism (CDM) are being introduced at national and multilateral levels in order to control the emission of greenhouses gases (Kyoto, 2009); EU ETS, 2009)). The risks and opportunities associated with climate change have the potential to affect the long term sustainability of business.

Brent, Wise and Hietkamp (2009) show that South Africa's export oriented energy intense sectors are particularly vulnerable to climate change regulatory risks. According to Llewellyn (2007), the firms that will prosper in a climate-changed world will tend to be those that are early to recognise its importance and its inexorability; foresee at least some of the implications for their industry; and take appropriate steps well in advance.

The purpose of this study is to contribute to the body of knowledge on the corporate sectors' ability to operate within a carbon constraint society through the

institutionalisation of effective corporate governance principles and practices.

The mining sector was identified for this study due to its high energy intensity, relatively high carbon footprint, and its exposure to regulatory risk (DOET, 2009; CoM, 2007). The theory in this study is built around the concept of 'climate change' and 'corporate governance'. According to Cogan (2008), corporate governance is critically important in determining how companies respond to climate change.

According to a survey by Deloitte (2009c), climate change has become a business issue because of emerging regulations, increased requirements for reporting and transparency, heightened pressure from investors, energy price volatility and market demands for green products and technologies. In fact it was noted in an earlier study by Llewellyn (2007) that the efficacy at responding to climate change is becoming a competitive attribute while the long-term sustainability of companies that fail to efficiently respond to climate change is questionable. According to Salgado (2009), investors are starting to evaluate businesses on the basis of their level of climate change preparedness. Examples of potential climate change risk include reputational risk, competitor risk, physical risk, and regulatory risk. The sections that follow expand on the various types of climate change risk and their impact on companies and country competitiveness.

The paragraphs that follow introduce the link between climate change and corporate governance. Within the South African context, company leaders are compelled by the King code of corporate governance and the Companies Act (no. 71) of 2008 to thoroughly consider the risks and opportunities of climate change in the conduct of their duty of care, skill and diligence (King III, 2009:11).

According to DiPiazza (2009), company leaders are expected to consider the legislative and physical risks of climate change and opportunities when leading the company. This view is supported by Galbreath (2009), Hoffman (2009) and Cogan (2009) who noted that climate change corporate governance is of great importance to the oversight and strategic direction of corporations. However, according to Galbreath (2009), little is known about the extent to which governance practices are addressing the climate change issue in firms around the world.

By focusing on corporate governance, the study gives particular attention to how corporate executives and boards are addressing their governance systems to minimise climate-related risks and maximise solution-oriented products and services that will help society mitigate and adapt to climate change (Cogan, 2008). According to Deloitte (2009c), in spite of the current global economic crisis the board's role is undoubtedly increasing as there is greater awareness of the business risks and opportunities associated with corporate responsibility, sustainability and climate change. In addition to the above, a corporate governance approach to climate change is relevant and important based on the following:

- According to DiPiazza (2009), the CEO's vision and leadership is a vital component of accelerating a company's collective response to climate change.
- According to Cogan *et al*. (2008), companies that integrate climate change into their board and executive structures, as well as their public reporting mechanisms, are far more likely to maintain the long-term commitment and comprehensive approaches needed to effectively address climate change risks and opportunities across their entire business structure. Following Llewellyn (2007), it can be concluded that such companies are well positioned for long-term sustainability.

Climate change can be a risk to a company. According to King III (2009:77), the board has a duty to demonstrate that it has dealt comprehensively with the issues of climate change risk management. Based on the provisions of the King code and according to Smith and Morreale (2009), the CEO and the Board can be found liable for any avoidable costs to shareholder value. This is against a background where, according to Ceres (2007), shareholder and consumer activism and climate change litigation are increasing. Under these circumstances, climate change is increasingly becoming a business issue of strategic importance.

According to Cogan (2006) and CDP (2009), shareholders and financial analysts increasingly assign value to companies that prepare for and capitalise on business opportunities posed by climate change — whether from greenhouse gas regulations, direct physical impacts, or changes in corporate reputation.

According to Packard and Reinhardt (2000), the solutions to climate change such as cleaner technologies, new carbon markets, and carbon sequestration, will create potential new and lucrative markets. Furthermore, according to the Carbon Trust (2008), the transition to a low-carbon economy will result in the disappearance of existing economic activities and jobs and the emergence of new activities and jobs. In consideration of these authors, climate change is a business issue of strategic importance to companies, implying that the Board should provide leadership through the prevailing governance systems.

The corporate governance framework employed in this study is an adaptation of Cogan *et al*. (2006) and comprises a consideration of the following:

- Board oversight – the Board's oversight responsibility and its role in implementing and monitoring climate change strategy.
- The role of the executive team – in particular the CEO as the champion of climate change response, and the monitoring and implementation of strategy.
- Risk identification – the identification of climate change risks and communication thereto.
- Board structure and climate change policies.
- Public disclosure and communication - public communications offer a comprehensive and transparent presentation of response measures.
- Emissions accounting – the company conducts an annual inventory of direct and indirect GHG emissions and publicly reports the results.
- Strategic planning & performance.
- Climate change product and process innovations

Figure 1.0 illustrates the linkage between climate change and corporate governance as defined by the King III code of corporate governance.

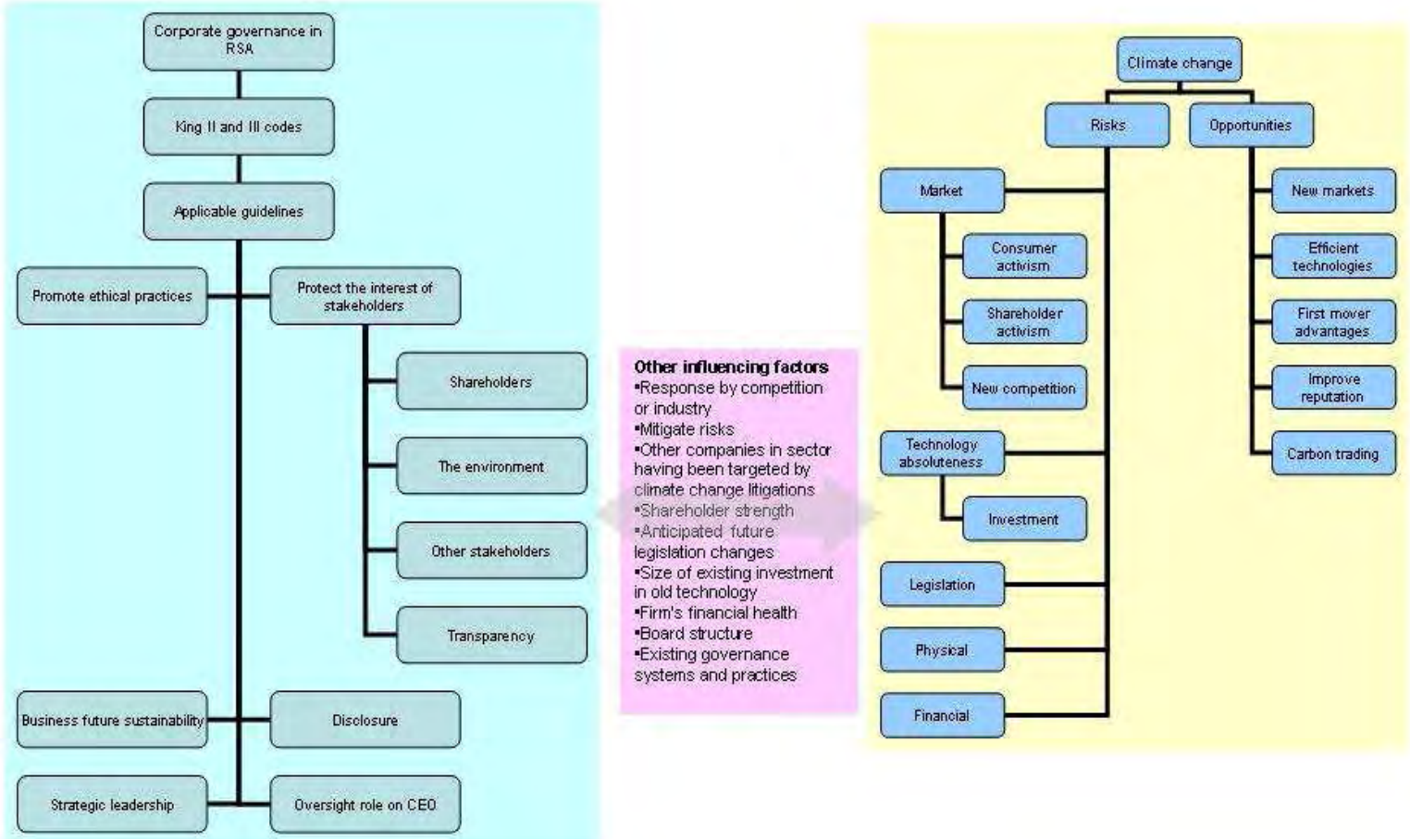


Figure 1.1 Corporate governance and climate change

1.2. The background

The background to this study is provided in respect of the development of the scientific understanding on the climate change phenomenon, the extant knowledge on responding to climate change, South Africa's position on climate change, and the related interventions.

The Kyoto Protocol (1997) signalled a global consensus on the need to monitor, limit and to reduce climate change through targeting the generation of anthropogenic gases. The protocol came about to limit companies from anthropogenic gas emissions by emission reduction targets, emission caps, regulations and market mechanisms in particular the clean development mechanism and the creation of a carbon trading market.

Issues of climate change are rapidly acquiring the attention of global corporate executives. This view is corroborated by several studies including the McKinsey Quarterly (2007) survey amongst C-level executives, corporate-level strategists, and unit or business level managers from which it was concluded that 'a majority of executives believe that climate change matters for their company'. The studies found that:

- 60% of surveyed executives regard climate change as strategically important for things such as product development, investment planning and brand management, in particular, media attention on climate change, corporate reputation, and customer preference.
- More than 36% do not consider climate change in making strategic decisions.
- 61% expect business opportunities to emanate from climate change.
- 82% expect enactment of climate change regulations in home countries within next five years.
- The majority believe that they are managing climate change issues adequately.
- More than 70% executives do not include climate change in their performance measures.

A similar study by Deloitte (2009) showed the growing role and interest of the Board in issues of CSR and climate change. The study found that:

- 79% of directors that responded to their study have a strong or moderate understanding of the business risks associated with climate change.
- 76% have a strong or moderate understanding of the business opportunities associated with climate change.
- 50% of directors think their Boards and management are committed to addressing and climate change.
- 50% of directors think their company's response to CR&S is integrated into business strategy and risk management, while 41% report no such integration.
- 30% of directors reported that their companies have set goals for reducing greenhouse gas emissions; 59% reported no such commitment.
- Almost one-third of directors think there is growing investor interest in their company's response to climate change/business sustainability issues, while 39% do not think there is growing interest.

The findings from the CDP surveys on South Africa are positive (CDP, 2008). In summary the response from South African companies showed that:

- About 61% of the JSE Top 40 responding companies have allocated board level or upper-management responsibility for climate change related issues.
- 29% of the Top 40 JSE responding companies report incorporating climate change into investment decisions.

The South African government has been proactive on matters of climate change. In 1997 it became a signatory to the Kyoto Protocol as an Annexure 2 country. The Inter-Ministerial Committee on Climate Change, supported by an Inter-governmental Committee on Climate Change, expects a National Climate Change Response Policy to be published in 2010. Further details on government initiatives are provided in Chapter 2.

1.3. Motivation for the study

Through affecting the competitiveness of companies, climate change in turn affects the competitiveness of nation. In that regard, the motivation to this study considers extenuating circumstances from a country perspective and also from a business level perspective. The factors behind the motivation for this study have been introduced through out the above sections. This section consolidates and summarises them in a single section.

The findings by the Carbon Trust (2008) that climate change regulations do not have a negative impact on UK companies so long they trade within the EU serves to indicate the importance of regional alliances on matters of climate change. The Carbon Trust (2008) found that regulations affect the EU as a block and in that respect; the negative impact of regulations on business will be levelled out, leaving the competitive landscape unchanged. South Africa could be vulnerable in the event of such a development due to the fact that it is geographically isolated from such regions

The relevance of this study is schematically illustrated in Figure 1.2. The figure shows that South Africa's heavy carbon emitting industries that are reliant on the export markets are faced with the risk of high carbon taxes and penalties. According to CDP (2009), the main source of penalties for most countries in general is expected to emanate from penalties due to Scope 2 carbon emissions. In that regard, climate change is an issue of strategic importance to companies and hence the involvement of the CEO and the Board is regarded as imperative.

1.3.1 Factors why a study on South Africa is important

According to Cogan *et al.* (2008), the impact of climate change on business is making fossil fuels more expensive and thus the drive for energy efficiency, alternative sources of energy, and efficiency improvements. This is a challenge for South Africa since about 93% of its energy is derived from burning fossil fuels (DOET, 2009).

As an example, Brent, Wise and Hietkamp (2009) show that the current South African exports have at least a 129% more associated carbon with a dollar earned on

exports compared with a dollar spent on imports. Their (2009) study also shows that the carbon footprint of the outflows equates to 37% of the total carbon emissions of the economy. In such circumstances, it is logical to conclude that the imposition of punitive carbon tax on South Africa's exports will make its products uncompetitive on the international market.

The relevance and timeliness of this study to South Africa is illustrated by the following extract from a speech by the former Environment and Tourism Minister at the Climate Change Summit (CCS) in 2009:

'..companies whose core business is in emissions-intensive sectors would do well to think about investment in greater energy efficiency and new technology development, and in some instances even diversifying their activities. The fact is that, in a carbon constrained world, there will be winners and losers, and it is up to every CEO and Board Chair to rise to these new challenges and opportunities' (Van Schyck, 2009).

In 2000, energy consumption contributed about 79% of the national greenhouse gas emissions PMG (2009). At a government level, South Africa's challenge is on how to achieve both the growth objective while reducing its greenhouse gas emissions (NCCRP, 2009). South Africa is the number 11 emitter in the world, and is currently exempt as an Annexure 2 developing country. However, based on emission intensities per GDP/Capita, South Africa's figures are higher than those of the world's highest emitter – the USA.

The South African government is a Kyoto signatory and has shown leadership towards assisting companies to respond. As a signatory to the UNFCCC and the Kyoto Protocol, South Africa is compelled to contribute towards efforts to combat climate change while ensuring the sustainability of its economy (Eskom Annual Report, 2009).

1.3.2 The sample

The study was conducted in the mining sector. Briefly, the mining sector is important to study for the following reasons:

- The mining sector is an energy intensive sector. The mining sector is vulnerable to climate change market risks because in excess of 93% of South Africa's energy is generated from coal (DOET, 2009).
- Corporate governance provisions differ from company to company due to factors such as company size, business sector, and organisational culture. Corporate governance structure has certain characteristics or constituent elements which distinguish it from country to country.

Based on the above, undertaking a South African study on corporate governance and climate change is an important exercise. In support of this view, Durisin and Puzone (2009) noted that most articles published on corporate governance are based on a single country setting (USA to be specific) and only a few are multi-national.

The section below describes the boundaries of this study.

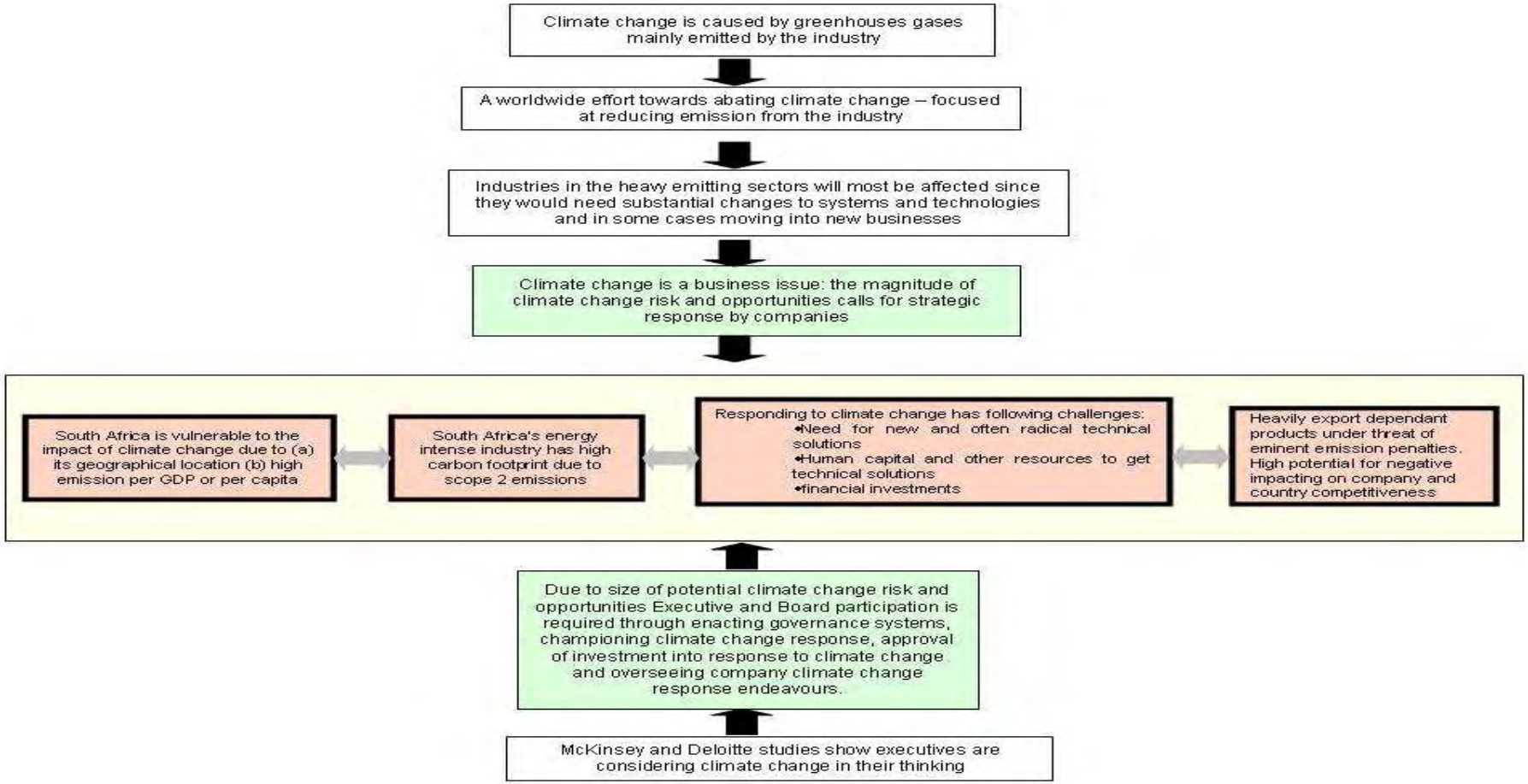


Figure 1.2 Schematic illustration of the relevance of this study

1.4. Scope

This study is limited to an investigation of the climate change related management functions, roles, systems and practices adopted by the Board and the CEO. In that regard, the study is limited to understanding the role which corporate governance plays at outlining a company's response to climate change in the best possible manner.

The interest is at the level of corporate strategy, looking at aspects that influence the Board and the CEO in making the correct decisions. At an operational level, the company could undertake initiatives such as R&D, process improvement, acquisition of new equipment, introduction of new practices, educating employees and the Board on climate change, and adopting practices to improve efficiency. This study does not focus at these initiatives per se, but as explained above on how the climate change business strategy is implemented, the initiatives are one of the instruments.

In summary, the research scope is defined by:

- A focus on studying corporate governance.
- A study of the Board.
- A study of CEO participation on climate change.

The data used in the study were sourced from company documents and the website.

The theoretical framework is guided by two concepts; 'climate change' and 'corporate governance'. The CDP is an important source of secondary data. Even though South African companies only started participating in the CDP surveys in 2007, according to CDP (2008) and CDP (2009), they note that the quality of response has improved with respect to completeness and solid data on emission accounting.

In that respect, the study is limited to companies in the heavy carbon emitters' category which responded to the 6th CDP survey and which provided open access to their submission reports. This limitation is supported by the fact that (a) some of the secondary data on company activities is sourced from the CDP report and hence the

selection of companies is limited to those that provided open online access to the CDP response, and (b) South African companies only started responding to the CDP survey in 2007. Scope limitation based on sample size is described in the section below.

A focus on corporate governance is important because of the following:

- The subjects of interest are the CEO and the Board because they are the crafters and custodians of firm strategies. In that regard, assuming climate change is an issue of strategic importance, they have a duty to enact corporate governance systems to deal with the challenge.
- Corporate governance provides an oversight on firm strategies. The insight includes monitoring the implementation and execution of such strategies.
- Corporate governance is important because it ensures the optimal allocation of resources to maximise return to firm stakeholders (Geabreath, 2009).

1.5. Problem statement

The Kyoto Protocol was the first indication of a global consensus that a worldwide effort to combat climate change is necessary (EU, 2009b). Based on scientific evidence, the Kyoto Protocol seek to reduce the emission of greenhouse gases through the setting of emission reduction targets, the use of market mechanisms, penalties, and an incentive system.

Climate change is increasingly becoming a business issue. According to Llewellyn (2007), businesses are likely to be affected both by climate change itself and by policies to address it through regulatory exposure; physical exposure; competitive exposure; and reputational – including litigational exposure. Even though executives are not unanimous in treating climate change as a business issue, studies such as McKinesy (2008), Deloitte (2009), CDP (2007), CDP (2008) and Llewellyn (2007) indicate the potential value in this approach.

South Africa is vulnerable to climate change because:

- In excess of 93% of its energy demand is derived from coal.

- Coal is the largest source of carbon dioxide.
- The bulk of South Africa's coal reserves are made of low grade coal (Engineering News, 2009).
- The main source of the carbon footprint will come from penalties due to scope 2 carbon emissions (CDP, 2009).

Based on the above assessment of developments within the climate change debate, the research makes the following assumptions:

- Compulsory emission reduction targets for companies will be introduced in the near future.
- Punitive penalties will be introduced for companies that exceed their emission limits.
- It will be compulsory to report on carbon footprint.
- Across the board carbon taxes will be introduced.
- Increasing stakeholder and shareholder activism on climate change.
- Countries with advanced technological abilities and knowledge to respond to climate change will have a competitive advantage.
- The EU will continue to work on climate change solutions as a region and it will introduce its own emission reduction taxes. The implication will be on the competitiveness of imports into the regions.

The core to the underlying research problem is that the current mechanisms in dealing with climate change are inadequate hence the need for more specific governance applications. In order for climate change matters to receive priority, they have to be elevated to the level of the Board. This is in line with Porter and Kramer (2006), and Enkvist and Oppenheim (2008), who state that for a company to gain a competitive advantage from its climate change investments or efforts, such initiatives have to be incorporated into the corporate strategy of the company.

In respect of the above, the leadership of companies are faced with the following challenges (Llewellyn, 2007):

- Integrating climate change into business strategy.
- Securing dedicated resources for responding to climate change.
- Inculcating in management a constructive culture of adaptation to a changing economic landscape.
- Educating employees on climate change.
- Encouraging employees to embrace change, and equipping them to do so.
- Undertaking the requisite research and development for radical innovative solutions.
- Translating this research and development into appropriate investment in physical and human capital.

According to CDP (2009) report, South African companies have not yet fully grasped the management challenges associated with their carbon performance. Only 23% of the JSE Top 100 companies that responded to the 6th CDP survey had specific emissions reduction targets in place (CDP_RSA, 2008). Kolk (2008) noted that voluntary carbon disclosure remains inconsistent and difficult to interpret.

1.6. The research question

To what extent and under what circumstances should corporate governance influence corporate response to climate change?

The above question is an overarching question, and hence sub-questions were designed within the boundaries of climate change and corporate governance.

- What are the governance structures companies employ?
- What are the factors that underpin corporate responses to climate change?
- To what extent do companies report on climate change information?
- What are the risks considered by the company?
- What is the extent of the role of company leadership in climate change response?

- What climate change response initiatives do companies adopt?
- To what extent are firms' corporate governance practices responding to climate change?

1.7. Objectives

The objective of the study is to determine the importance of corporate governance and more specifically, the application of governance practices in dealing with climate change in the SA mining sector.

Chapter 2:

2.1. Introduction

This chapter introduces climate change; its scientific basis, its impact and opportunities, and climate change response initiatives. Lastly, some of the key concepts used in the proceeding, namely climate change risk, mitigation, adaptation and corporate governance, are defined.

Chapter 1 revealed the context within which climate change is an interesting area of study for South Africa's mining sector. According to Stern (2007), understanding the scientific evidence for the human influence on climate is an essential starting point for the economics, both for establishing that there is indeed a problem to be tackled and for comprehending the size of its risks and challenges.

In that regard, Chapter 1 showed that effective response to climate change requires participation and leadership of company CEOs and Boards. Most importantly, it presented an argument that the CEOs and Boards are compelled by the King Code and the Companies Act (no. 71) 2008, to thoroughly consider the risks and opportunities of climate change. Companies' shareholders expect (supported by the King Code) that company leadership will respond to climate change in order to protect and enhance the shareholder value.

The content of this chapter is presented within the context of corporate governance. By focusing on corporate governance, the study gives particular attention to how corporate executives and board directors are addressing their governance systems to minimise climate-related risks and maximise solution-oriented products and services that will help society mitigate and adapt to climate change (Cogan D, 2008). According to Deloitte (2009c), in spite of the current global economic crisis, the Board's role is undoubtedly increasing as there is greater awareness of the business risks and opportunities associated with corporate responsibility, sustainability and climate change.

As demonstrated by the surveys (McKinsey, 2008; Cogan, 2008; Llewellyn, 2007; Deloitte, 2009) company leadership are acknowledging the fact that climate change should be treated as a business issue of strategic importance. According to BRS (2009), companies should focus at initiating management paradigm shifts in the following areas; (a) rethinking basic assumptions about business processes, (b) building strong governance structures, and (c) engaging and involving employees at all levels as contributors.

Figure 1 in Chapter 1 schematically illustrated the linkages between the concept of climate change and corporate governance. The section below describes the basic science of climate change.

2.2. The science of climate change

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (UNFCCC 2007b; Bernstein, 2007)). When defined as based on causation, climate change is the rise in the earth's climate attributable to the rise in the concentration of anthropogenic gases, chiefly carbon dioxide.

This part of the thesis starts by describing the phenomena behind climate change and uses a schematic illustration to show the greenhouse effect. At a high level of abstraction, the constituent elements of climate change are anthropogenic or greenhouses gases, rays of the sun, the atmosphere, and the earth as a reflective medium. The anthropogenic gases, carbon dioxide, methane, nitrous oxide and three groups of fluorinated gases (sulfur hexafluoride, HFCs, and PFCs), are the major greenhouse gases and the subject of the Kyoto Protocol, which came into force in 2005 (GHGs, 2009; Lerner, 2006).

According to the IPPC study (2006), carbon dioxide contributes about 77% of GHGs. The primary source of the increased atmospheric concentration of carbon dioxide since the pre-industrial period results from fossil fuel use, with land-use change providing

another significant, but smaller, contribution Solomon *et al*., 2007). Figure 2.1 shows the world greenhouse gas sources.

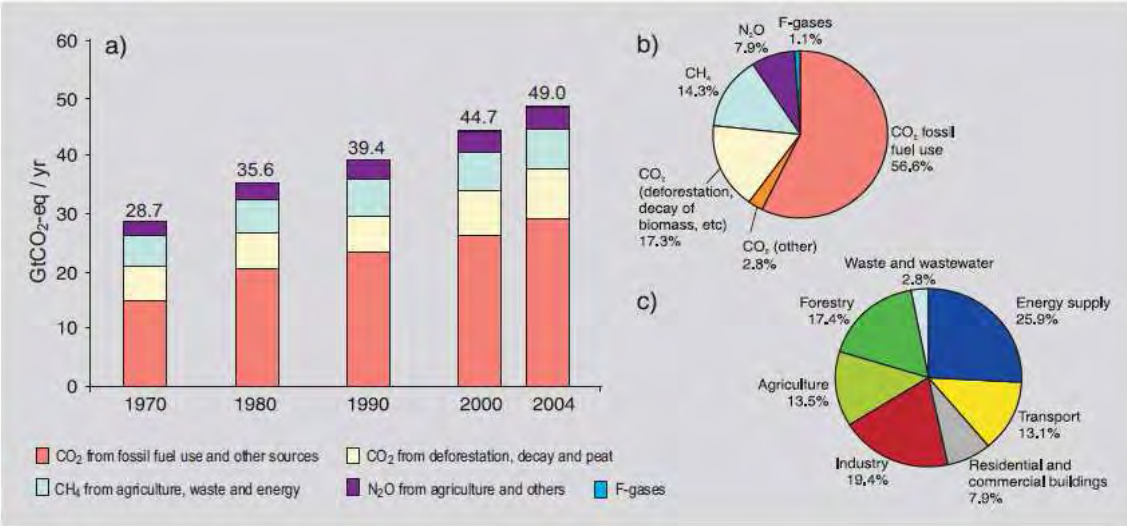


Figure 2.1 Global annual emissions of anthropogenic GHGs from 1970 to 2004.5*

*(b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of CO2-e.q. (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of CO2-e.q (Le Treat *et al*., 2007).

In a greenhouse effect, the rays of the sun are repeatedly reflected back to the earth by a layer of anthropogenic gases in the atmosphere, thereby keeping the earth warm (see Figure 2.2). As a result of human activities, the concentration of these gases has increased, leading to an increased trapping of sun's rays and as a result the globe has become warmer.

Research by the International Panel on Climate Change working group 4 (IPCC, 2006) confirmed that the earth's temperature has been rising faster in the past decade. According to Stern (2007) the year 2000 concentration figures were 430 ppm CO_2 equivalent, compared with only 280 ppm before the Industrial Revolution. According to him, in the event that no legislation and policies are enacted, the concentration will rise to 550 ppm CO_2 equivalent by 2035 (Stern, 2007).

The estimated future concentrations under various scenarios for South Africa were illustrated in the Long Term Mitigation scenario study (LMTS, 2008). The study showed that most of the emissions, and the largest part of the increase, will come from the energy sector. According to the simulation studies, energy related emissions of CO2, CH4 and N20, according to the carbon unconstrained growth, will quadruple by 2050 (LMTS, 2008). .

At this concentration global temperature will rise to about five degrees. Under such circumstances, the physical impact of climate change, such as severe droughts, raising sea levels, tropical cyclones, heavy and persistent rainfall, will be more severe and pronounced. According to O'Brien (2008), climate change is expected to increase the frequency and magnitude of many types of extreme events, including floods, droughts, tropical cyclones, and wildfires.

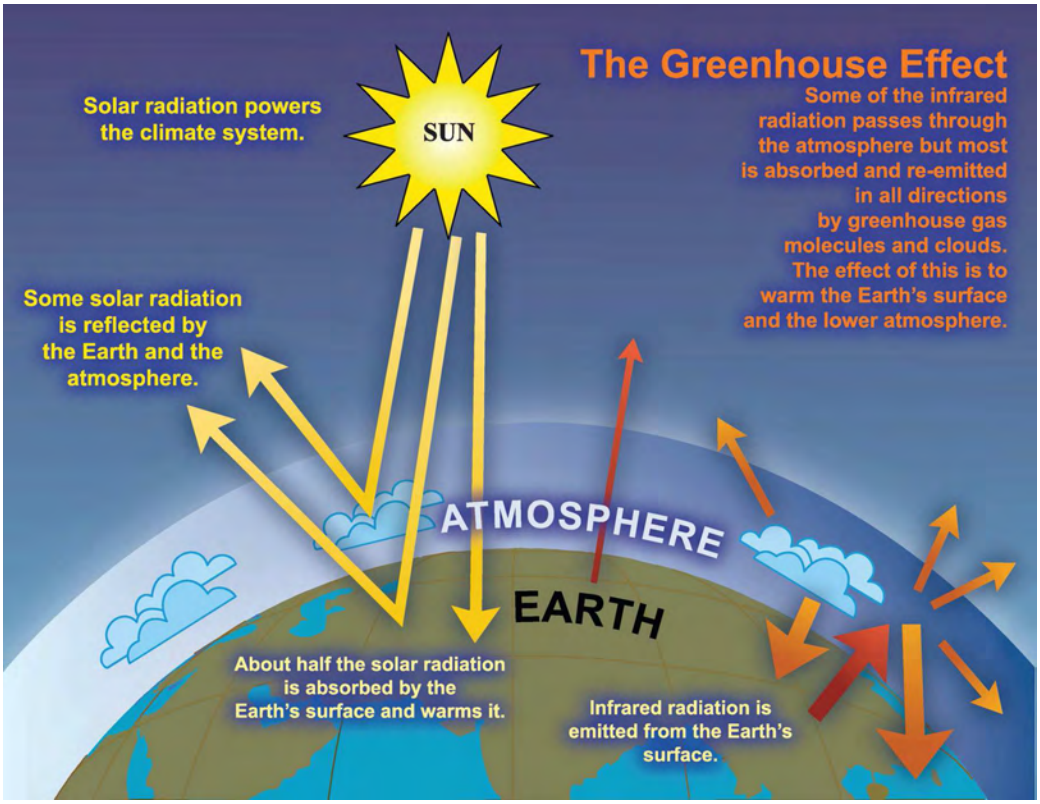


Figure 2.2 The greenhouse effect

Climate change is topical not only because of its impact on business but also because of its broader impact on the ecosystem and quality of life, and the physical risks to human life which is directly attributable to this climate change (Bernstein, 2007). The concepts of business ecosystems, ecosystem services, and sustainable development help at elucidating the symbiotic linkages between business, the climate and the environment (see Figure 2.3). Together with natural climate variability, long-term climate changes are showing clear impacts on development and ecosystems (Vordzorgbe, 2007).

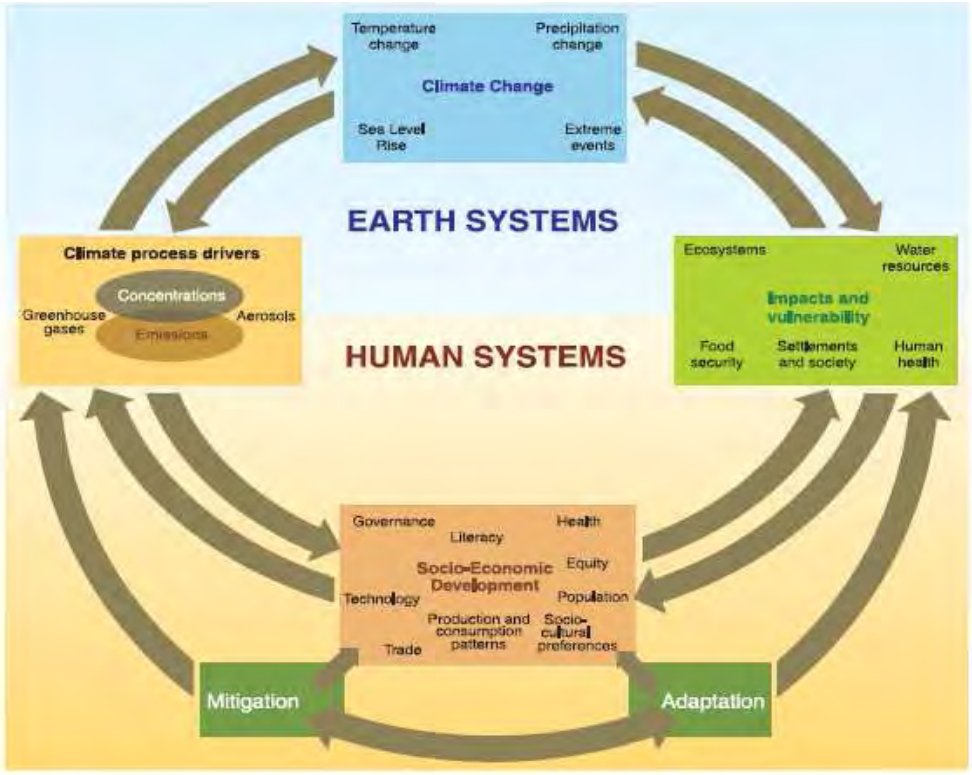


Figure 2.3 Schematic framework representing anthropogenic drivers, impacts of and response to climate change, and their linkages. (Source: Bernstein, 2007)

2.3. Climate change risks

According to Bernstein et al (2007), risk is generally understood to be the product of the likelihood of an event and its consequences. The risks include inefficient business models, uncompetitive products and industrial processes, a fluctuating energy market, loss of institutional investor and shareholder support, liability for contribution to climate

damage, physical impacts of climate change, a bad reputation in the market's consumer base, and high insurance costs (Southworth, 2009). Cogan (2008) puts the risks to companies into three categories of climate change risk: physical, competitive, and regulatory climate change risks. Climate change impact depends on the characteristics of natural and human systems, their development pathways, and their specific locations.

The business risks from climate change include (Cogan, 2008):

- The strong threat of increasingly volatile weather conditions,
- Rising sea levels, and new health impacts;
- Resulting impacts on insurance markets, business resources,
- Personnel, and corporate preparedness;
- Increasing legal and regulatory pressures; and
- Mounting public and shareholder activism.

Climate risk also presents new opportunities for businesses, such as participation in the emerging carbon-trading markets; use and development of new, cleaner energy resources; enhanced reputation; etc. According to Southworth (2009), the opportunities include bottom line improvement through efficiency and alternative energy supply, reduced petroleum dependence and a more reliable energy market, boosting shareholder and investor confidence, preventing or preparing for the physical effects of climate change, improving industry reputation, access to new markets, lowering insurance costs, and preparing or pre-empting restrictive carbon emissions legislation.

The perception of these risks by business has implications for investment, project and operating finance, credit ratings and insurance (Southworth, 2009).

2.4. Response to climate change

The United Nations Framework Convention on Climate Change (UNFCCC) treaty was signed by 192 countries at its inception (UNFCCC, 2009C). The UNFCCC is based on a recognition that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases.

The objective of the UNFCCC is to ‘‘achieve stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system’’ (Scholze, 2006). In 1997 a number of nations approved an addition to the treaty, i.e. the Kyoto Protocol, which has more powerful (and legally binding) measures (UNFCCC, 2009d).

The Kyoto Protocol (1997) signalled a global consensus on the need to monitor, limit and to reduce climate change through targeting the generation of anthropogenic gases. The protocol employs emission reduction targets, emission caps, regulations and market mechanisms, and in particular, the clean development mechanism and the creation of a carbon trading market.

The establishment of the Clean Development Mechanism program with its current portfolio of 1693 projects (UNFCCC, 2009), the adoption of the EU emission reduction targets (EU, 2009), the high expectancy of a USA climate change policy under the new administration (Obama, 2008), the increasing influence of NGOs on matters of climate change (CERES, 2009), annual carbon emission disclosures (CDP, 2009), and the formulation of climate change strategies and policies by several countries to include South Africa (RSA Policy, 2009), are some of the climate change related initiatives and developments aimed at encouraging companies to limit their carbon emissions.

Further details on government’s initiatives since signing the Kyoto Protocol as an annexure 2 country in 1997 is given in NCCRP (2009). Due to the internationalisation of these initiatives, increasing shareholder activism, adoption of practices by global leading companies, and the linkage of market risks facing companies regarding carbon

emissions, it is imperative that South African companies need to respond to climate change in ways that give them a strategic advantage.

The UK is showing international leadership on climate change. A Climate Change Act (2008) was passed with key tasks; to improve carbon management and help the transition towards a low-carbon economy in the UK; and to demonstrate UK leadership internationally, signalling that they are committed to taking their share of responsibility for reducing global emissions in the context of developing negotiations on a post-2012 global agreement at Copenhagen in December 2009. Some of its provisions are the following (DECC 2009):

- Set a legally binding target of at least an 80% cut in greenhouse gas emissions by 2050. The target will be achieved through action in the UK and abroad.
- Set a target of a reduction in emissions of at least 34% by 2020.
- Establish an adaptation Sub-Committee of the Committee on Climate Change, in order to provide advice to, and scrutiny of, the Government's adaptation work.

2.5. Definition of terms

2.5.1 Mitigation

Mitigation refers to limiting global climate change through human interventions to reduce sources, or enhance the risks, of greenhouse gases (Vordzorgbe, 2007). Thus, mitigation aims at improving long-term climate patterns by reducing the hazard of climate change impacts.

2.6. Adaptation

Adaptation is defined as adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects or impacts. Adaptation aims at moderating the adverse effects of climate change by reducing vulnerability to climate effects through a wide range of interventions (Vordzorgbe, 2007).

2.7. Concluding remarks

This chapter showed that there is a universal understanding that climate change is caused by greenhouse gases emitted from human economic activities. Furthermore, it is universally agreed that climate change can only be controlled through ensuring that industry reduces the emission of greenhouse gases through either using alternative sources of fuel, new and more efficient technologies, or through business process innovation.

It was shown that concerned countries are tackling climate change at a global scale where in the instruments and legislations formulated seek to have a universal impact. The chapter attempted linking the climate change science, its impact, and national and international initiatives to corporate governance. As an example, by noting the business risks of climate change, Boards are required to take thorough consideration of such risks. Corporate governance is a strong element of this study. The next chapter discusses corporate governance with a strong reference to climate change.

Even though there is increasing political support to address climate change in South Africa, current policies and strategies are insufficient in ensuring a sustained commitment from the various affected sectors and contributing role-players (CDP 5, 2007).

Chapter 3:

3.1. Introduction

The purpose of this chapter is to describe the literature and theories of relevance to the study on corporate response to climate change. In that respect, the study considers the climate change aspects of corporate governance practices, climate change initiatives and the implementation thereof, the corporate governance codes of practice, board oversight, corporate governance theories, corporate governance models, and board structures.

According to Aguilera *et al*. (2006) corporate governance occurs in a context centred on social interaction between members of the Board, the company, its stakeholders and the company's macro-environment. Climate change corporate governance is considered in this study under the same contextual environment as described by Aguilera *et al.* (2006).

In addition to providing a motivation for this study, Chapter 1 and Chapter 2 outline the following developments and understandings that form the basis of this study:

- That the global climate is changing.
- That the change in climate is largely because of the greenhouse effect.
- That carbon dioxide is the most significant greenhouse gas and that it is mainly derived from burning fossil fuels.
- That climate change is related to the occurrence of phenomena such as hurricanes, droughts, raising sea levels and the melting of glaciers.
- That the global climate is changing much faster in the past decades than ever before (IPCC, 2006).
- That the main source of carbon dioxide is human economic activities.
- That the increased rate of change in climate is correlated to increased emission of greenhouse gases.

- That emission of greenhouse gases can be controlled through using legislation.
- That there is evidence of company executives' involvement and interest at leading their respective companies in a climate change response.

Considering the size of climate change risk and level of investment required at responding to climate change, company executives and the Boards are faced with a challenge in responding to climate change without compromising shareholder expectations (Mille, 2009; Cogan *et al*., 2008; Deloitte, 2009). Within a South African context, the roles and responsibility of executives and Boards are set in the King III code of corporate governance and the Companies Act, 2008 (Act 71 of 2008).

In this study, corporate governance is viewed in respect of the generic function of the chief executive officer (CEO) and the Board, according to King II (2004), King III (2009), Hung (1998) and Jensen (1983). The following functions are considered: (a) controlling, (b) strategic, (c) monitoring (d) linking, (e) maintenance, (f) leading and (g) support. According to King III code of corporate governance, the focal point for corporate governance in a company is the Board (King III, 2009) and the Companies Act, 2008 (Act No. 71 of 2008).

King III (2009) unequivocally states that the Board should (a) play a prominent role in the strategy development process, (b) approve the long-term and short-term strategy for the business of the company, and (c) monitor strategy implementation by the management. It (2009) further states that the Board should identify key performance and risk areas for the company.

The theories considered in this study are based on the concepts of 'corporate governance' and that of 'climate change'. Corporate governance has been researched for several decades; however according to Barclift (2007) and William 2009), various underlying theories such as the agency theory, the stakeholder theory, the role of Boards, institutional theory and stewardship theories remain inconclusive at explaining corporate governance.

According to William (2009), there is no generalisable and accurate theory of corporate governance which can explain and predict corporate governance practices and

outcomes throughout the global economy. This can be explained (according to Gourevitch, 2004) by the fact that different models of corporate governance around the world reflect the nature of local applicable legal and regulatory systems, as well as differing approaches to economic management. In that respect, a multi-theoretic approach to corporate governance is essential for recognising the many mechanisms and structures that might reasonably enhance corporate response to climate change.

Amongst the various theories of corporate governance, three (agency theory, resource dependency theory and stakeholder theory) are considered due to a clear linkage to matters of climate change and their relevance to a South African context.

The identified theories are defined in detail in order to bring a contextual undertone to variables in defining effective firm response to climate changes. At a high level, the agency theory helps to define the role and purpose of corporate Boards. It is embodied by the concepts of agency problem and that of agency costs.

The resource dependency theory presents the Board as a resource to the firm, and in particular highlights the importance of non-executive directors.

The stakeholder theory regards the role of the corporate as that of fulfilling the needs and expectations of its stakeholders. The stakeholder theory advocates ethical business practices, and for companies to consider the long term business and ecosystem sustainability in their business.

In addition to these theories, the effective governance attributes and related interventions such as the prevailing legislation, CEO duality, Board structure, the Board functions, and the role of Board sub-committees are considered as important concepts towards understanding company capacity to respond to climate change.

Cogan (2008), Galbreath (2009) and the CDP survey (2008) consider the following additional attributes as defining climate change corporate governance:

- Public disclosure; as in communicating with stakeholders about company climate change information such as emission reduction targets, carbon footprint, and climate change initiatives
- Emission accounting systems; as in measuring and monitoring company carbon footprint.
- Executive management execution (extent of management involvement, individual performance measurement and incentive system).
- Strategic planning and implementation.
- Innovation related to climate change.
- A focus on stakeholders.
- Board oversight.
- Importance of non-executive directors and women in the board.

The next section outlines the background to corporate governance. Several context specific definitions of corporate governance are presented. The definition of corporate governance ideal to this study is highlighted.

3.2. A background to corporate governance

According to Farrar (2005:3) the origin of the word 'governor' comes from the Latin words *gubernance* and *gubernator*, which refer to steering a ship and to the steerer, or captain of the ship. The word 'governance' comes from the old French word 'gouvernance' and means control and the state of being governed. According to Farra (2005), the words 'corporate governance' could have started being used as early as 1962.

Prior to the work of Durisin and Puzone (2009) which has shown that corporate governance is in fact a stand alone discipline, popular opinion was that it was a subject of multidisciplinary research nature. The later opinion was informed by the fact that corporate governance encompasses contributions from many disciplines including finance, economics, management, law, and accounting. Characteristically, corporate governance has several definitions; some broad and others narrow as given below:

- Sir Cadbury (2008:8) in Maxwell (2008) defines corporate governance as 'the system by which companies are directed and controlled'.
- According to Franklin (2007), corporate governance is the practice of ensuring that firms are run in such a way that society's resources are used efficiently by taking into account a range of stakeholders such as employees, suppliers, customers, shareholders, the ecological environment in general, people in general, future generations. The impact of the stakeholder approach, according to King III, is that it creates trust between the company itself and its internal and external stakeholders, without whom no company can operate (King III, 2009).
- Saravanamuthu (2004) (as cited in Jamali, 2008) views corporate governance as 'an enforced system of laws and financial accounting, where socio-environmental considerations are accorded a low priority'.
- The Organisation of Economic Cooperation and Development (1999) defines it as 'the system by which business organisations are directed and controlled. The corporate governance structure specifies the rights and responsibilities among different participants in the corporation, such as the board, managers, shareowners and other shareholders, and spells out the rules and procedures for making decisions on corporate affairs. By doing this, it also provides for making decisions through which the company objectives are set, and the means of attaining those objectives and monitoring performance'.
- According to King II (2002), 'Corporate governance is concerned with holding the balance between economic and social goals and between individual and communal goals'. King II (2004) describes the challenges of good corporate citizenship as the act to seek an appropriate balance between enterprise and constraints taking into account the expectations of shareowners for reasonable capital growth and responsibility concerning the interests of other stakeholders of the company'.
- Coming after King (II, 2004), King (III, 2009) advocates for ethical business practices. It is focused on the role of directors and added references, highlighting potential legal consequences of non-compliance. According to King III (2009), corporate governance involves the establishment of structures and processes, with appropriate checks and balances that enable directors to discharge their legal responsibilities.

- KPMG (2004) defines corporate governance as, 'The system or process by which corporate entities, exercising accountability to shareowners and responsibility to stakeholders, are directed and controlled to achieve sustainable improvement in shareowner prosperity'. KPMG (2004) proposes that a holistic view of corporate governance needs to account for external governance mechanisms that include the takeover market, the legal system, the competition market, and the market for managerial talent.

In addition to the above, the diversity of definitions of corporate governance reflects its multidisciplinary nature and the fact that its meaning is subject to the context under consideration. The three theories of corporate governance relevant to this study are defined in detail next.

3.3. Corporate governance theories

The description of each of the theories is given in the context of their relevance to corporate response to climate change as briefly described above. As noted, the following three theories on corporate governance are used:

- The agency theory.
- The resource dependency theory.
- The stakeholder theory.

Each theory is described in detail showing the relevance of the theory to company response to climate change.

3.3.1 Agency theory

According to Daily (2003), and Filatotchev and Boyd (2009), the overwhelmingly dominant theoretical perspective applied to corporate governance is the agency theory. Similarly, from their review of corporate governance literature between 1993 and 2007 using citation and co-citation analysis, Durisin and Puzone (2009) show that the agency theory dominated corporate governance theory between the years 1993 and

2007. The strength of this theory stems from the fact that it has undergone academic scrutiny for decades.

The roots of the agency theory are found in Berele and Means (1932) who highlighted the separation of ownership and control, and that of Jensen and Meckling (1976) who defined the agency theory as an explanation of how the public corporation could exist given the assumption that managers are self-interested and exist in a context in which the managers do not bear the full wealth effects of their decisions. Berle and Means (1932) (as cited in Tudor, 2006) were among the first who argued that the separation between ownership and control in publicly traded corporations produces an agency problem; i.e. how less informed 'outside' owners could monitor be better informed than 'inside' managers.

The agency theory is concerned with the minimisation of the problems that may arise as a result the separation of ownership and control within companies. Agency theory posits that board independence is critical to protect shareholder interests because independent board members are expected to monitor and control opportunism of inside managers (Galbreath, 2009).

The rise and growth of the modern expansionist corporations and ancillary globalisation phenomenon are key factors leading to the discovery of the agency theory. The risk of managers making decisions that are to their personal benefit instead of that of the stakeholders is the basis of the agency theory.

Jensen and Meckling (1976) define an agency relationship as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent. Ross (1973) (as cited in Tudor, 2009) defines it as a relationship between two or more parties when one designated as the agent acts for or on behalf of, or as a representative for the other designated as the principal, in a particular domain of decision problems.

Perrow (1981) (as cited in Tankiso, 2009) contends that agency theory exaggerates the prevalence of opportunism while it neglects good behaviour, and fails to consider how

organisational slack and promotion policies, which take into account length of service, reduce the effects of adverse selection and moral hazard. Furthermore, an investigation by Galbreath (2009) showed that a highly independent Board does not appear to be the optimal structure; rather he advocates a balanced mix with respect to the composition of board members.

Basing on the above, the agency theory has a linkage to corporate response to climate change in that:

- It outlines the necessity for establishing corporate Boards.
- It provides the expected roles of Boards in corporate governance.
- Considering the risks and opportunities of climate change, the CEO as an agent is expected to respond to climate change for the optimal benefit of a company's stakeholders. Similarly, the board is required to ensure that (a) the company is responsive to climate change, and (b) that the initiatives chosen are of strategic relevance to the company.
- In line with the executive and Board duty of expounded in the King 111 code, the Board, having been established in line with the agency theory, has a duty to monitor the implementation of climate change initiatives and to ensure that such initiatives are aligned with company strategy.

3.3.2 Resource dependency theory

According to Tudor (2006:106), the resource dependence theory is based on the conception of the firm as being embedded in networks of interdependencies and social relationships, wherein attention is focused on powerful individuals or institutions within a society.

In order to be competitive, the firm requires access to these individuals or institutions. In a situation of information asymmetry, the resource dependency theory gives credence to the special role played by non-executive Board members. Since these non-executive Board members are from outside the company, they are in a position to introduce new and radical initiatives such as may be required when responding to climate change. According to Ornstein (1984) (as cited in Hung, 1998), governing

boards are viewed as vehicles that corporations use to control other organisations to coopt threats in their environment from competitors, suppliers, customers and regulatory agencies. Compared with King II (2004), King III (2009) enhanced the significance of the role of the non-executive directors in corporate governance. King III (2009) requires that the Board must be chaired by a non-executive director. It also requires that the audit committee shall be chaired, and in addition be comprised exclusively of non-executive directors.

According to Galbreath (2009), Board independence is important in governing climate change because independence would be expected to inject new insights and perspectives related to environmental and social stakeholders, while challenging existing mental models in decision making that may be focused exclusively on the economic bottom line.

3.3.3 Stakeholder theory

King III presents the 'stakeholder' and 'ethics' as concepts of central importance to defining corporate governance within a South African context. King III (p 56) states that the stakeholders entrust the company with its licence to operate. Freeman (1984) (as cited in Kolk & Pinkse, 2009b) define stakeholders as 'any group or individual who can affect or is affected by the achievement of the organisation's objectives'.

From such a perspective, a company emerges as a nexus of implicit and explicit contracts between various actors with interests that are not always congruent (Hill & Jones, 1992; Kolk & Pinkse, 2009b).

According to these authors the stakeholder is relevant to climate change because:

- It encourages managers to articulate the shared sense of the value they create, and is what brings company core stakeholders together. Thus market performance and financial metrics are used.
- Managers are compelled to outline the type of relationships to be created with stakeholders in order to deliver on its purpose (Hill & Jones, 1992; Kolk & Pinkse, 2009b).

The King II was the first code with particular focus on the stakeholder. King III has increased the emphasis on the stakeholder with a new guideline replacing the sustainability report with integrated sustainability reporting. According to Tudor (2006:138), the stakeholder approaches are central to the integration of corporate governance and sustainability.

3.3.4 Factors that influence corporate governance

Corporate governance theories alone would not provide a succinct description of corporate strategic responses to climate change.

As a system, corporate governance derives relevance and impetus from its prevailing environment, characterised by the corporate itself, the attitude of the Chief Executive Officer (CEO) to climate change, the Board charter on climate change, the climate change oversight roles of the Board, the composition of the Board, and company climate change interventions. Each of these factors is described in more detail bellow.

3.3.4.1 Board oversight

According to Galbreath (2009), Board oversight is largely concerned with the extent to which corporate Boards review the issue of climate change and monitor their firms' progress in implementing strategies. This role is prescribed from the notion of the agency problem (Jansen, 1976; Fam, 1980). Pettigrew (1999) (as cited in Daily, 2003) points to the seemingly universal focus of a direct link between corporate governance mechanisms and financial performance, while research shows no evidence of such linkages (Forbes and Milliken, 1999).

Filatotchev and Boyd (2009) propose that Boards should extend their involvement beyond monitoring and controlling top management to the provision of ongoing advice such as counsel to executive directors on strategic issues. In order that the service role of the Board is effective with reference with the special advice it can provide to the CEO, Filatotchev and Boyd (2009) point out that Board structural features, such as its size and CEO duality, are less important compared with the characteristics residing in the human capital of the Board. In other words, the Board has to have an appropriately

composed and structured human resources team. In that respect, age of its members, the profession and qualifications of its members, and the average tenure of the CEO and members of the Board are important factors.

The linkage between Board oversight and climate change is reflected in the following measures, according to Cogan (2008):

- Board conducts periodic reviews of climate change strategy.
- Board monitors progress in implementing climate change strategies.
- Board exercises explicit oversight responsibility for climate change.

3.3.4.2 Effective corporate governance

According to King III (2009) and OECD (2004), effective corporate governance is when the Board is able to effectively manage, lead, and control the relationships between the management of the company, its Board, its shareholders and other relevant stakeholders in a continuously sustainable manner. Effectiveness in the broadest sense involves the accountability of corporate decision-makers and the legitimacy of decisions with regard to their different economic and non-economic goals and values (Aguilera, 2007).

The foundations to effective corporate governance, according to OECD (2004) are when an appropriate and effective legal, regulatory, and institutional foundation is established reflecting a country's specific circumstances, history and tradition. In addition, the following factors will influence effective corporate governance:

- Clearly defined roles for directors and management.
- Composition of the Board in terms of the quality, experience and composition of its membership.
- A fundamental principle for effective corporate governance is the formal separation of management functions from ownership interests.

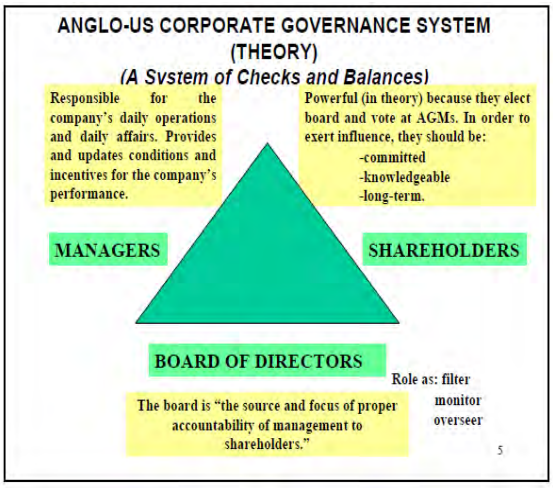
3.4. Corporate governance models

According to Franklin (2007), there are two extreme-end systems of corporate governance, the Anglo-American system **(the narrow view)** and the system used in Japan, Germany, France and several other countries **(the broad view).**

The Anglo-American model is based on shareholder democracy, the prevention of abuse of corporate power, the promotion of allocative efficiency through anti-trust laws that separate the interests of numerous stakeholders and the maintenance of the accountability of corporate managers to corporate owners through the Board of Directors (King I, p1).

The Anglo-American model differs to the German and Japanese system largely in terms of the fact that shareholders are closer to management. Financial institutions are major shareholders and there's significant cross-holding between companies. Due to their large stakes in the companies, shareholders exercise significant interests in the running of the companies.

The two systems are illustrated in Figure 3.1 (A and B) below. Each system has advantages and disadvantages subject to the applicable operating environment. The **narrow view** is focused towards stakeholder satisfaction, while the **broad view** takes the environment into consideration. The later system is more concerned with ensuring that firms are run in such a way that society's resources are used efficiently by taking into account a range of stakeholders such as employees, suppliers, and customers, in addition to shareholders. Franklin (2007) notes that the broad view can lead to a superior allocation of resources than does the narrow view, in cases where markets and institutions are not perfect and competitive.



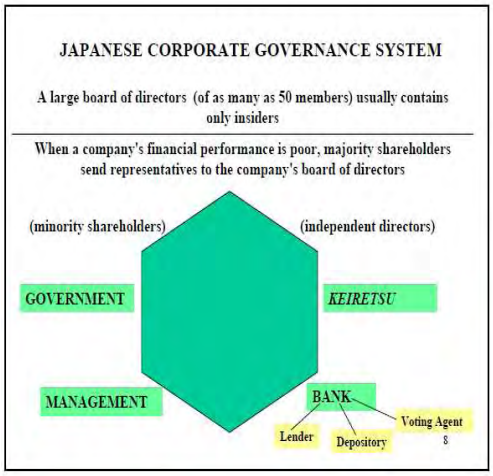


Figure 3.1 A schematic illustration of the two main systems of corporate governance (PFS (2008).

Table 3-1 The Anglo-American, the Germany and Japanese systems compared

	Anglo-American system	**German System**	**Japanese system**
Key players in corporate governance	The key players are management; shareholders; directors. Others are government agencies; stock exchanges; self-regulatory organisations and consulting firms.	German banks and to a lesser extent shareholders. Banks have a multifaceted role as in the Japanese system: shareholder; lender; issuer of equity and debt and voting at AGM. Companies often hold shares in other companies.	Key players are: banks; keiretsu; management and government. Non-affiliated shareholders have little voice in Japanese governance. The bank and keiretsu can replace management when necessary. The average Board contains about 50 members.
Composition of Board	Single-tier Board comprising insiders and outsiders. Insiders are a person employed by the corporation while an outsider a person or entity with no direct relationship with the company. The current trend is on increasing outsiders on the Board. There is no law on Board size. However, the average size as in a 1993 survey was about 13.	Compulsory inclusion of employees/labour on supervisory Boards. Two tier Board structure – supervisory Board and management Board. Role of supervisory Board: appoint/dismiss management; approve major management decisions; and advises the management Board. Role of management Board: daily management of the company; NB: Supervisory Board contains no insiders 'mainly labour and employee representatives", while management Board is composed solely of insiders "executives). The size of supervisory Board is set by law and most representatives are selected by banks and other key stakeholders.	Mainly representatives of keiretsu, government and banks.
Regulatory framework	Laws and regulatory codes define relationship among management, the Board and shareholders. The disclosure requirements are the most	Corporate governance is strongly influenced by both federal and state laws.	Traditionally, the government ministries have influence in formulating industrial policy. Their powers are weakening due to globalisation effect.

	Anglo-American system	**German System**	**Japanese system**
	comprehensive in the world and communication with shareholders is well – regulated.		
Disclosure requirements	Within the Anglo-USA model, the USA disclosure requirements are the stringiest. The disclosure requirements for UK and other countries are less stringent requiring less information than in USA and semi-annual reporting.	The system is strict but not to the extent of the US system. Companies do not have to disclosure share ownership of members of the supervisory Board. Shareholders can submit shareholder proposals following the issuing of an agenda for a meeting.	

3.5. Corporate governance codes

Codes of good governance are manuals that provide a set of best practice recommendations regarding the behaviour and structure of the Board of Directors. Zattoni and Cuomo (2008) consider a corporate governance code as a set of best practices regarding the board of directors and other governance mechanisms. The code of a particular country shapes and describes corporate governance in that country. According to Aguilera and Cuervo-Cazurra (2009), the USA was the first to issue a code in 1978, followed by Hong Kong in 1989. As at mid-2008, 196 countries had issued distinct codes of good governance.

According to Deloitte (2009c) the forces that generally are behind the adoption of codes are globalisation, market liberalisation, markets where there are powerful foreign investors, countries where there have been weak shareholder protection rights, and lastly, encouragement and persuasion from transnational institutions such as the World Bank.

The corporate governance codes, in particular the King III report and the UK Combined Code and stock market listing requirements (for international stock markets in world's leading economies) define director fiduciary responsibilities that entail them to exercise control on companies with possible criminal and damages to personal reputation and careers in cases they do not exercise their fiduciary powers.

3.5.1 Corporate governance in South Africa

The history of corporate governance in South Africa can be traced to the 16th century when the first corporations were established in South Africa (Tankiso, 2008). According to King I (1994), even though documentation of its practice might not be clear, the application of corporate governance intensified with the increase in economic activity following the discovery of minerals towards the end of the 18th century. Corporate governance in South Africa was institutionalised by the publication of the King Report on Corporate governance in 1994 (King II:5).

The King II code was published in year 2002; it was later revised and the new version, King III, was issued in 2009. King III was necessary in order that the code aligns with changes which were expected in the Companies Act (no. 71) 2008. According to King III (2009), King II needed to be revised in order for it to remain relevant to national and international business environments by including some missing best practices. The following two claims by the King III code highlight the level of advancement in corporate governance in South Africa:

- South Africa can be said to be leading in corporate governance amongst developing countries.
- South African listed companies are regarded by foreign institutional investors as being among the best governed in the world's emerging economies (King III 2009:8).

The South African code is built on a number of international codes and practices, as listed by KPMG (2004), and includes the Netherlands Code, the OECD Principles of Corporate Governance, and the UK Combined code.

3.5.1.1 An overview of the King Code

The King II and King III codes are reviewed in respect of their relevance to enabling corporate response to climate change. This review largely centres on the King II code since it was the code in practice during the period of interest in this study. Table 3.2 gives a comparative analysis between King II and King III codes.

According to King III, the Board is the link between the stakeholders and the company. Among its other responsibilities, the Board should collectively provide effective corporate governance that involves managing the relationships between the management of the company, its Board, its shareholders, and other relevant stakeholders. Directors and management have their legal duties grouped into two categories, namely duty of care, skill and diligence; and fiduciary duties (King III:10).

The following aspects of the codes are relevant to climate change:

- The King II (2002) explicitly required companies to implement the practice of sustainability reporting as a core aspect of corporate governance. The main challenge of the code (as noted by Hilb, 2004) pertains to a requirement in competences to manage both intra and inter stakeholder group conflicts. Unique in the King III code is that its reference to the stakeholder goes beyond the shareholder. A content analysis of the 128-page King III (2009) draft code reveals that the word 'stakeholder' was mentioned 180 in the document.
- One of the legal duties of a Board of Directors is to act in good faith (King III:8).
- In order to foster corporations to give high level considerations to matters of sustainability, the King III requires statutory financial information and sustainability reporting to be integrated in a single report – the Integrated Report.
- King III requires that the report on sustainability should be assured by an external party.
- The code's emphasis on stakeholder, ethics and sustainability issues, demonstrates the link between the King III code and matters of climate change.
- King III (2009) code is based on the 'apply or explain' principle. According to King III, the principle has the benefit that in an 'apply or explain' regime, the Board, in its collective decision making, would apply another practice in the event King III provisions would not be to the best possible advantage to the shareholders and its stakeholders. Boards have to comply with their duties such as acting in good faith, and in addition, have to apply their minds in the best interests of the company with regard to any recommended alternative.
- According to Muller (2009), King III calls for risk management to be intrusive and not be viewed only as a reporting process to satisfy governance expectations. This is construed to encompass climate change risks.

However, the following could impact on the effectiveness of the code on corporate response to climate change:

- It is not a legal requirement to comply with the King III code, although the Johannesburg Stock Exchange (JSE) has it as a listing requirement.
- The code is not prescriptive on which committee amongst the sustainability committee, the audit committee and the risk committee is to be responsible for climate change matters. The audit committee is, however, given the responsibility to ensure that the information provided is accurate.
- King II was based on the 'comply or explain' principle. The issue with this principle is that the CEO and the Board could conveniently choose not to comply with the code, opting rather to simply explain why they did not comply with the code.

Table 3-2 The differences between King II and King III codes (PwC, 2009)

	King III	**King II**
	Board committees should only comprise members of the Board. External people can be present by invitation	
Rotation of non-executive directors	A programme ensuring staggered rotation of non-executive directors should be put in place. Rotation of Board members should be structured so as to retain valuable skills, to have continuity of knowledge and experience and to introduce persons with new ideas and expertise. At least one third of non-executive directors should retire by rotation at the company's AGM or other general meetings. s	Rotation of non-executive directors not addressed specifically. Regarding rotation of directors in general: There should be an effective programme of continuing rotation of appointments in respect of each individual director. All companies should adopt a process of staggered continuity and re-election of their Boards to ensure continuity of experience and knowledge.
Minimum number of directors on the Board	As a minimum, two executive directors should be appointed to the Board, being the chief executive officer and the director responsible for the finance function. For listed companies, a financial director must be appointed to the Board from June 2009.	Not addressed
Composition of the Board	The Board should comprise a balance of executive and non-executive directors, with a majority of non-executive directors. The majority of non-executive directors should preferably be independent.	The Board should comprise a balance of executive and non-executive directors, preferably with a majority of non-executive directors of whom sufficient numbers should be independent of management.

3.5.2 Other corporate governance systems

The governance systems to be compared with South African King II and III codes are that of the USA and the UK, the Sarbanes-Oxley Act (2002) and the Code respectively. The USA and UK corporate governance codes were selected because of the following:

- The codes arose out of the need to mitigate a repeat of experienced corporate failures.
- South African system falls under the Anglo-American system of corporate governance.
- Certain large corporations and various types of stakeholders belonging in the respective countries pioneered as advocates for climate change interventions.
- Besides several similarities, the USA system is particularly different in that compliance is compulsory.
- Historical reasons; (a) South Africa's colonial masters. In that respect, one would expect that the South African corporate governance should be influence to some extent due to existing business, cultural and political linkages, and (b) the two are South Africa's important trade partners.

3.5.2.1 USA Corporate governance code

The King III (page 9) states that the main corporate governance alternative to the King model is the US model, the reason being that the US model has a strong emphasis on regulation in contrast to the King code. In addition to the above, there are four factors why the USA is an interesting country to consider in this study. Firstly, the USA refused to endorse the Kyoto Protocol regardless of the fact that it is world's largest polluter. Secondly, regardless of the fact that the government refused to endorse the Protocol, its various States started adopting measures to mitigate the effects of climate change. Thirdly, USA has a new President who has adopted the opposite approach to his predecessor. Fourthly, USA climate change activities, NGO, and some companies formed one of the first international associations to fight climate change – the Coalition for Environmentally Responsible Economies (Ceres).

Chandler (1990) and Cheffins (2001) (as cited in Tankiso, 2008) provide a brief history of USA corporate governance. Chandler (1990) notes that as early as the 1930s publicly-owned corporations were already being controlled by professional managers on behalf of a broad set of dispersed shareholders. Events, in particular the 1929 Wall street crash, the 1929 to 1932 great depression, and the immergence of globalisation and the multinational are some of the early events leading to the development of corporate governance.

The passing of the Sarbanes-Oxley Act (SOX) (2002) by the USA congress is the pinnacle of corporate governance in the USA. The passing of this act was largely a result of large scale corporate failures, in particular the collapse of Enron and WorldCom (Kolk & Pinkse, 2009b). Unlike the South African code which is 'apply or explain' the USA act makes it compulsory for stock listed companies to comply with the provisions of the act. The act is not particular with regards to matters of corporate social responsibility and climate change but has the following three provisions of interest:

- A potential fine and/or jail term for those who wilfully certify a statement knowing full well that it does not comply with the Sarbanes-Oxley Act (2002).
- The Security Exchange Control may issue an order to prohibit conditionally or unconditionally, permanently or temporarily, any person to have violated the act and the other acts it is directly linked to.
- Companies that fail to meet provisions of the act would be prevented from listing on any of the securities on US Exchanges.
- The audit subcommittee of the Board has an overarching role.

3.5.2.2 UK Corporate governance code

The UK code of corporate governance – i.e. the Combined Code, is fully incorporated in the London Stock Exchange listing rules. Compliance is not compulsory and it follows the 'comply or explain' principle.

Some of its key provisions relevant to this study are the following (KPMG 2004:9-17):

- CEO duality is discouraged.
- It proposes that the number of executive and non-executive directors should balance.
- The Board is collectively responsible for the success of the company by directing and supervising the company's affairs.

The corporate governance codes, in particular the King II report, the UK Combined Code and stock market listing requirements (for international stock markets in world's leading economies), define director fiduciary responsibilities that entail them to exercise control on companies with possible criminal and damages to personal reputation and careers if they do not exercise their fiduciary powers.

Although the provision of strategic direction is of central importance to corporate governance, in recent decades and in theory and practice, there has been a stronger emphasis on the control dimension (Maxell, 2008). According to Aguilera and Cuervo-Cazurra (2009) the developments and amendments to codes are moving more towards being more prescriptive and stringent. Evidence of this follows:

- The enactment of national legislation such as the Sarbanes-Oxley Act (2002), and the UK's Climate Change Act of 2008.
- The related changes to the South African Company Act of 1973 (2009).
- The subtle reference to potential legal consequences for non-compliance in the King III code.
- As an example, the King III explicitly states that the CEO should not chair the Board, and in addition it is prescriptive with regards to the composition of Board subcommittees.
- King III unequivocally prescribes that the audit committee should comprise 'outsiders' only and that the CEO cannot be the chairman of the Board.

With reference to matters of climate change, the prescriptive route could be the best deal considering that climate change is a public good and some firms may possibly choose to settle their carbon footprint fines instead of reducing emissions.

3.5.3 Comparative analysis of the corporate governance codes

The three corporate governance codes are designed to counter problems such as the agency problem that can arise as evidenced in the high profile corporate failures. In the context of South Africa, its code is also designed to redress its historical imbalances.

Table 3.3 summarises the climate change governance practices promoted by each of the codes. The South African code is unique in that it has a strong reference to the stakeholder, it requires the organisation to produce an integrated sustainability report annually, it has a strong emphasis on promoting ethical business practices, and it is compiled from a synthesis and customisation of best practices given in several international codes.

Based on the above, and information provided in the table below, it would appear that the South African code is more ideal for enabling a corporate response to climate change compared with the SOX and the Code.

Table 3-3 Comparison of corporate governance codes

Climate change governance practice	Corporate governance codes		
	King III	**SOX**	**The Code**
Reference to stakeholder	Strong reference to the stakeholder	No specific reference	No specific reference
Specific reference to climate change	No specific reference	No specific reference	No specific reference
Board composition	The Board should comprise a balance of executive and non-executive directors, with a majority of non-executive directors.		Non-executive and executive directors should balance
Board oversight	Board to ensure accuracy of reported information. Board has no legal liability	Board has legal liability with regards to reported information accuracy	Possible criminal and damage to personal reputation and careers
CEO duality	Not allowed	Not allowed	discouraged
Non-executive directors	Chairs the Board and audit committee		
Board subcommittees	No specific subcommittee assigned to climate change. However, the audit committee has an overarching role.	No specific subcommittee assigned to climate change. However, the audit committee has an overarching role.	No specific subcommittee assigned to climate change. However, the audit committee has an overarching role.
Public disclosure and compliance	Uses the apply or explain principle	Legal obligation to comply	Uses the comply or explain' principle
Sustainability reporting	Audited integrated sustainability reporting required	No reference to sustainability reporting	No reference to sustainability reporting

3.6. Concluding remarks:

The chapter focused on integrating the concept of climate change with corporate governance. In that respect, the relevance to climate change response of the agency theory, the resource dependency theory, and the stakeholder theory, to climate change were described. The chapter outlined the relevance of the King III code to climate change response; it also made a comparative analysis of the King II, the SOX, and the Combined Code.

It was demonstrated that corporate governance and climate change are related concepts. Reference was given to the categories used in the CERES and the CDP surveys to measure and analyse climate change governance. Good governance depends on clearly defined roles for directors and management.

The King III code (2009) brings a new perspective to the subject of good corporate governance by stating that, '…effective leadership is central to good corporate governance because leaders have a duty to define strategy, provide direction and establish the ethics and values that will influence and guide practices and behaviour with regard to sustainability performance.' According to Aguilera (2007), effectiveness in the broadest sense involves the accountability of corporate decision-makers and the legitimacy of decisions with regard to their different economic and non-economic goals and values.

Chapter 4:

4.1. Introduction

The purpose of this chapter is to outline the research methodology used in this study.

Chapter 1 outlined the climate change challenges facing companies and governments. From a government stand point, climate change challenges include formulating legislation effective at reducing greenhouse gas emissions without affecting economic growth, ensuring the national interest is protected at multilateral climate change negotiations, and creating an enabling environment for companies and the public to respond to climate change (CCS, 2009; Media, 2008; DEAT, 2008).

This study is focused at the challenge facing companies. According to van Bergen, Soonawala and Walzholz (2008), the main challenge for companies is to firstly understand the applicable climate change risks and opportunities, comply with climate change legislation, and to respond to climate change effectively. Effective response to climate change relates to a response that gives a company a sustainable competitive advantage.

Chapter 1 highlighted the fact that in order to reduce climate change, a particular focus and onus is being placed on companies to limit their emission of greenhouse gases. As argued in the previous chapters, it is imperative that the executive and company Boards champion and undertake an oversight role in its response to climate change. In that respect the interest in this study is on the corporate governance practices and systems that enable companies in the mining sector to respond to climate change.

Considering that the mining sector is a net exporter, it is imperative that South African companies introduce corporate governance practices that allow effective responses to climate change. For instance, Brent, Wise and Hietkamp (2009) argue that an introduction of climate change legislation, such as carbon tax, in South Africa's export markets will threaten the competitiveness of its products due to a high contribution to their emission footprint by category two emissions.

As stated in previous chapters, the key concepts in this study are 'climate change' and 'corporate governance'. The linkage between the two concepts was schematically illustrated in Chapter 1, Figure 1.2. The theoretical linkages are outlined in Chapter 3.

This chapter outlines the qualitative research techniques used to investigate the factors that influence a corporate governance response to climate change. The qualitative techniques were chosen in order to solicit secondary data on corporate governance practices and systems that address climate change.

According to Flick (2007:ix), a qualitative research technique is designed to understand, describe and explain social phenomena through analysing individuals and documents, and the observation of individuals in their natural environment context of interest. In addition to the attributes of qualitative methodologies stated below, qualitative methodology befits this study because of its narrow focus on a particular industry within an identified economic sector. According to Flick (2007), qualitative research allows the opportunity to inductively generate hypotheses and new theories. The short comings of qualitative research, however, are that it is labour intensive, can be expensive, and is invariably based on a small sample (Exeter, 2009).

The section below describes the research designs used in this study.

4.2. Research design

According to Hofstee (2006), the strength of a study's findings is based on the methodology, the instruments, and the approach used. The research design followed in this study is illustrated in Figure 4.1 below. The content analysis and the case study analysis designs were partially used in the study, hence the doted lines linking to the main "secondary data survey" research design. Further details on the research designs and instruments used are provided in the sections below.

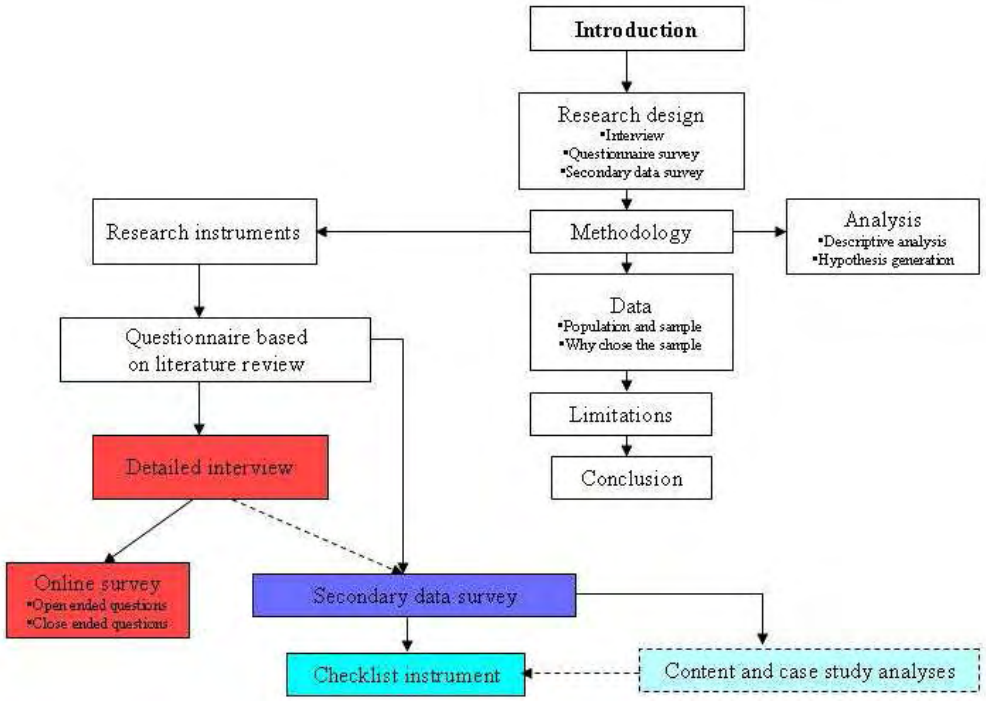


Figure 4.1 A schematic outline of the research design

4.3. Secondary data survey design

The series of logical steps leading to the adoption of the secondary data survey design is schematically illustrated in Figure 4.1 above. The first research design attempted was the qualitative interview design. It was abandoned due to difficulties with accessing interview candidates. The learnings from formulating the interview questions and from two interviews conducted were used as input in formulating the online and the secondary data survey designs. The online survey was later removed from this study due to low response rate. Hence, the study is largely based on the secondary data design. As stated above, the case study and content analysis research designs were partially used to augment the secondary data design.

According to Hofstee (2006:128), secondary data are data collected by previous researchers. The secondary data for this study were obtained from the following company documents; the annual report, the CDP survey, sustainability report, and other documents available on the respective companies' websites.

Within the context of this study, the comparative advantages of secondary to primary data sources are in that it is cheap to collect and that it provides a reflection of events and initiatives that were executed by a company during the period of interest (Eisenhardt, 1989). Furthermore, contrary to primary data designs, secondary data avoids the errors that may arise due to non sampling error (Eisenhardt, 1989).

Related studies where secondary sources have been used include those on the study of corporate governance, corporate response to climate change, corporate response to environment issues, and corporate social responsibility activities (Kolk & Pinkse, 2009b; Galbreath, 2009; Deloitte, 2009; Tankiso, 2008; Tudor, 2006).

The disadvantages of using secondary data are that the data collection process is labour intensive and they do not provide an insight into the thinking behind some of the variables of interest (Eisenhardt, 1989). A comparison of information obtained from interviews (two only) and secondary data collected on the same companies showed that in some instances the information provided in the company documents does not accurately reflect the executives' attitudes towards climate change matters.

The following additional short comings with the secondary data were noted:

- The CDP reports, the annual report, and the sustainability report sources of secondary data may not contain complete information on a company's response to climate change considering that the disclosures of South African companies are lower compared with same sector companies internationally (CDP, 2009).
- Some of the data were sourced from the CDP survey reports. Kolk *et al.* (2008) however, highlighted systematic and methodological limitations of data collected through the CDP surveys. Further details on these limitations are provided in section 4.4.3 below.
- In examining annual reports over the period 1990 to 1993, Deegan and Rankin (1996) (as cited in Jason, Percy & McKinlay, 2006) discovered that 'poor' environmental performers provide more disclosure than other firms but that such disclosure is almost always of a positive, general nature and unrelated to any environmental prosecution or performance. Mitchell *et al*. (2006) confirmed that environmental disclosures in annual reports of violating firms are general in

nature, overwhelmingly positive, and with almost no disclosure of the actual environmental violations.

The above negative findings were considered in the research design. In response, information was obtained from multiple sources, including the online CDP survey reports. The later report was mainly used as a reference source for company climate change risks, to review emission accounting efforts, and to note the emission reduction targets.

The section below describes the merits and demerits of each of the sources of data used for the secondary data survey.

4.3.1.1 The annual report

The annual report is an internationally adopted means of communicating company past performance, expectations of the future, and any other information it would choose to disclose to its shareholders and other stakeholders (Tankiso, 2008). According to Walker (2009), annual reports are used by researchers and by investors for valuing the worth of a company. The King III code, the JSE listing requirements, and the South African Companies Act (no. 71) (2008) prescribe measures to ensure information reported in the annual report is factual and truthful. The key measures are:

- The Board is required to ensure that the content of the annual report is correct before publication.
- The financial reports should be assured by a registered auditing firm.
- Companies are requested to voluntarily produce and publish reports outlining their responsibility to the environment and societies in which they do business. (King III; JSE, 2009).

The focus of this study is on the narrative sections of the annual report. Sections of particular interest are the CEO's letter, the chairperson's letter, the Board minutes, the Board report, and all narratives where the company reports on its climate change initiatives. In that regard, the annual report is a useful resource to extract information on climate change interventions.

4.3.1.2 The sustainability report

Companies report environmental and corporate social responsibility initiatives in the sustainability report. The King II (2004) recommends that a company is expected to report at least once a year on the nature and extent of its social, transformation, ethical, safety, health and environmental management policies and practices.

According to King III (2009), sustainability reporting is based on recognising that a business cannot operate in an economically viable manner over a prolonged period without due regard for long-term sustainability issues. Sustainable business practices require that the needs of the present are met without compromising the ability of future generations to meet their needs (King III, 2009).

The sustainability section has been replaced by an integrated sustainability report. According to the new requirements in King III (2009:61) companies are required to prepare an integrated report annually that conveys adequate information about the operations of the company and its integrated sustainability and financial reporting.

Both King II (2004) and its new version King III (2009), do not prescribe the report structure but give particular reference to the Global Reporting Initiative (GRI) sustainability reporting guidelines. The newly released King III (2009) requires that sustainability reporting is integrated with other aspects of the business process and managed throughout the year. The 'integrated reporting' should be integrated across all areas of performance, reflecting the choices made in the strategic decisions adopted by the board, and should include reporting on economic, social and environmental issues.

According to King III (2009:14), by issuing integrated sustainability reports, a company increases the trust and confidence of its stakeholders and the legitimacy of its operations.

4.3.1.3 The Carbon Disclosure Project (CDP) Survey

The Carbon Disclosure Project (CDP) survey is an investor and policy makers' supported survey designed to provide quality information on company climate change activities. The survey is managed by the Carbon Disclosure Project (CDP) – an independent not-for profit organisation (CDP, 2008). According to Stanny and Ely (2008), the CDP survey was launched in 2000 to achieve two objectives: to inform managers about investors' concerns about climate change, and to inform investors about firms' risks associated with climate change.

The CDP survey uses a standard questionnaire allowing for the comparison of companies globally (2007 CDP Survey Report). According to the National Business Initiative (NBI, 2009), South Africa started participating in CDP surveys in 2007. The 2008 CDP survey questionnaire collected information on four key areas of corporate climate change management and reporting: (a) Climate risks and opportunities, (b) GHG emissions accounting, (c) Performance, and (d) Climate change governance.

In a study on reasons behind companies disclosing climate change information through the CDP survey, Stanny and Ely (2008) confirmed assertions in previous literature vis-à-vis:

- Firms that are in a healthy financial and business position would likely want to disclose information.
- Firms that have newer and cleaner technologies would most likely disclose information.
- Firms that are likely to face scrutiny by sophisticated investors because of (a) their large size and/or because they are in carbon intensive industries are likely to disclose more information.
- Firms that have disclosed to the CDP are likely to continue disclosing information.
- Bigger firms are likely to disclose since the cost of disclosure are lower for them.
- Companies listed on the stock markets are likely to disclose information.

- Because most of the industrialised countries except the US ratified the Kyoto Protocol, it is expected that firms with higher foreign sales face a higher climate risk and will therefore be more likely to disclose.

A review of survey reports by South African mining sector companies (CDP, 2008) indicates the variance to the extent to which companies disclose information. The CDP 5 (2007) noted that:

- The level of emissions disclosure amongst South African companies is generally low in comparison to their international counterparts, particularly amongst the high impact sectors.
- Very few companies have disclosed clear, company-wide emissions reduction targets.

Based on this discovery, it is possible that voluntary disclosures, such as the CDP survey, may not contain a true reflection of a company's response to climate change.

4.3.2 Case study method

The case study method was **partially** used for gathering information differentiating the top performing companies (Exxaro, Anglo-American, Anglo-Plat and BHP) against three that did not perform well (ARM, Harmony and Kumba).

Eisenhardt (1989) defines a case study as a research strategy which focuses on understanding the dynamics present within single settings. The case study research method chosen for this study allowed for the focusing on a single sector of the economy and on particular industries. A focus on a single sector is important because climate change will affect different sectors of the economy to different extents (CDP, 2007).

According to Yin (2008), case study methods are used to probe deeply and intensively to gain insight and understanding of phenomena that are new, not-understood, or unexamined. Yin (2008) further states that case study methods allow researchers to

understand the 'how' and 'why' of contemporary events, and the problems and situations in ways that do not require control over those events or problems.

Eisenhardt (2007) stated that 'a major reason for the relevance of theory building from case studies is that it is one of the best bridges from rich qualitative evidence to main stream deductive research'. Eisenhardt (1989) argued that theory built from case study research is likely to have strengths such as novelty, testability, and empirical validity which arise from the intimate linkage with empirical evidence. According to Eisenhardt (1989) the theory-building research is begun as close as possible to the ideal of no theory under consideration and no hypothesis to test. However, a research question and possible constructs must be constructed in order to provide focus in the study.

Eisenhardt (1989) advises that specific relationships between variables and theories should only be considered once the data analysis process begins. Due to time limitations, this study shall not focus at the generation of new theories.

4.3.2.1 Content analysis

Content analysis was **partly** used to source information for the questions under the 'Innovation' category of the checklist. It was used to investigate an association between 'climate change' and constructs such as 'innovation', 'strategy' and 'investment".

Content analysis is defined in Tankiso (2008) as a study that analyses content of text/documents, speeches and annual reports. The technique enables making inferences by objectively and systematically identifying specified characteristic of messages. Content analysis is the method used most widely for examining social and environmental disclosures in annual reports (Ernst, 1979; Guthrie & Mathews, 1985; Gray, Kouhy *et al.* 1995b). Burritt (1997) states that content analysis is the dominant method used to examine environmental disclosures in annual reports. To be useful, data collected using content analysis should be objective, systematic and reliable (Gray, Kouhy *et al.* 1995b, as cited in Burritt, 1997).

De Vaus (2002) and Tankiso (2008) list a number of weaknesses with the application of the content analysis method:

- It works on one level of meaning – the content of the data texts.
- The coding process may introduce researcher bias and hence the method can lead to superficial and naively realistic findings.
- It is recommended that when a substantial number of documents from the population are missing, the content analysis must be abandoned.
- It is advised that some documents might match the requirements for analysis but are un-codable because they contain passages or ambiguous content.

Data used in content analysis were obtained from the online survey using a semi-structured questionnaire survey and from secondary sources using a checklist (see Table 4.1.

4.3.3 Other research designs

This section comprises the research designs which were used in the early stages of this study but later abandoned. Nevertheless, there is value in describing these techniques in this chapter since some of the learnings from creating respective study instruments were used as input into the secondary survey design.

Furthermore, it is thought that the hurdles encountered; the research instruments and literature gathered would help future studies. The main challenges leading to failure in the use of the interview and online survey techniques were:

- The difficult with accessing Board members.
- Time constraints.
- Low response rate on the online survey.

Additional support for the inclusion of these designs in this thesis is as follows:

- It was noted in one of the interviews that company initiatives on energy efficiency were not entirely driven by a climate change motive but mainly due to the rising costs of energy. It was also noted that the enthusiasm within the company for energy serving initiatives had slowed after the electricity crisis subsided. The secondary data questionnaire was therefore designed to investigate if the company linked innovation to climate change and whether they considered the following risks: technological, regulatory, product, competitor and strategic risk. Questions were also formulated to ask whether companies had a dedicated climate change response budget.
- In one of the companies interviewed it was noted that the internal team working on climate change response never consulted with the existing traditional teams that oversee environment and corporate social responsibility issues.
- The online survey was least used; as only four out of 12 companies responded.

The following were noted as the reasons why the technique failed:

- The survey targeted senior managers responsible for climate change. It was, however, noted that in some instances the responsible manager is not fully knowledgeable about company-wide initiatives, and in particular, the activities and workings of the Board.
- A decision to target managers who helped in compiling the CDP survey response was also found to have limitations since some companies use paid consultancies to complete the CDP surveys.

The above serves to show value in the two research designs. In that regard each of the designs will be described briefly in the sections that follow.

4.3.4 Qualitative interviews

According to Daily *et al.* (2003), in order to advance knowledge on corporate governance, researchers need to gain access to process-oriented data in order to develop an understanding of the effectiveness of corporate governance mechanisms. Within the realms of this study, this entails accessing and interviewing members of the senior management. An interview accords the interviewee the opportunity to probe deeper in order to understand issues being investigated. Kvale (2007) lists subjective impression, the fact that interviews can not be used for testing hypotheses, and that findings cannot be generalisable as potential weaknesses of the technique.

The original (semi-structured) interview questionnaire, as approved by the academic supervisor, was used in interviews with senior managers responsible for climate change. Accessing Board members was made difficult by the following:

- Board members are less inclined to disclose information due to the risk of exposing company competitive information.
- In some instances Board members are gagged from disclosing company information by non-disclosure agreements entered into with the company.

The captured responses formed the foundation for the design of the instruments used in this study, i.e. the online survey questionnaire and the checklist instrument.

4.3.4.1 On-line survey

An online survey is a web-administered questionnaire where candidates are e-mailed a web link to the questionnaire. In this study, the questionnaire was built using an online survey instrument, “Survey Monkey”. According to the University of Texas (UTA, 2009) and the University of Indiana (UI, 2009) web sources, the five advantages of this instrument are:

- Inexpensive to administer.
- Can provide fast results.

- Data is easily manipulated.
- It is a carbon neutral method.
- Aesthetic feel.

According to Yasunaga, Ide, Imamura and Ohe (2006), one of the shortcomings of this methodology is that the use of the website might skew the sample towards the younger generation.

The online survey was designed to complement information derived from secondary sources. Additionally, it was designed to source information on the current thinking within companies on matters of climate change. The questionnaire had three open ended questions.

The limitations of this technique are in that the questionnaire was completed by persons outside the Board, and hence there was the potential risk of misrepresentation of facts, response prejudice, and/or bias. The technique is also limited by the nature of the instrument - the research subjects cannot be probed for more information at the instance when they respond.

4.4. The checklist research instrument

This section describes the merits and demerits of the checklist instrument in collecting secondary data. In order to collect secondary data, a checklist (see Appendix 4 A) was designed based on similar studies (Moloi, 2008; Sullivan, 2009) and the King II Board Effectiveness checklist. Its design also took note of the knowledge gained from the online survey and interview methods as described previously.

According to Berritts (1997), the checklist enables content analysis to be performed in a replicable manner. He (1997) argues that the checklist improves objectivity of measurement and solves a key problem of content analysis - the lack of 'inter-subjective testability' of collected data. The checklist was designed to source data in the following categories:

- Climate change governance
- Climate change policies
- Climate change disclosure and education
- Innovation
- Risk considerations

The information was obtained from the secondary data sources stated above.

4.5. Sampling

The research population comprised South African companies that responded to the sixth Carbon Disclosure Project (CDP) survey (CDP RSA, 2008). The sample for the study was selected using the convenience sampling technique. The five key attributes used for selecting the sample were (1) that the mining and metal sector is energy intensive, (2) mining operations often contribute to large emission of greenhouse gases, (3) considering that about 70% of South Africa's electricity is generated from coal, it follows that on global standards, the carbon footprint of the mining companies will be relatively high when taking secondary emissions into account, and (4) that exports face possible risks from foreign regulations and (5) that the companies gave open online access to their 6th CDP survey reports (CDP, 2007).

The sample comprised 12 mining corporations listed under the metals and mining sector – see Table 4.1. Jenkins and Yakovleva (2006) used a similar sample size in their study of corporate social responsibility in the South African mining sector.

The sample has been limited for the sake of completing this research; however, the research can be expanded on in future studies to include a comparative analysis between the mining sector and a sample from the low carbon emitting sector. It is also recommended that as part of future studies, this study on corporate governance be repeated at intervals in order to deduce how South African companies will be adjusting to the climate change phenomenon, their response to national and international regulations, and their response to competition.

Table 4-1 Heavy carbon emitting companies

Company
BHP Billiton
Gold Fields
AngloGold Ashanti
Exxaro Resources
Impala
Anglo-Plat
Lonmin
Kumba Iron Ore
AngloGold
African Rain Bow Minerals
Harmony
Anglo-American

4.6. Data analysis

The foundations giving strength and significance to this study are sample selection and the choice of the research design. The following analysis methods were used:

- Descriptive statistical analysis
- Graphical analysis
- Content analysis
- Comparative analysis of differentiating attributes between extreme case categories

4.7. Coding

Table 4.2 lists the categorisation codes. Each company was scored on each of the criteria listed. An attribute answered with a "Yes" is scored a "1"; an attribute answered with a "No" is scored "0". The rating methodology used follows that of Sullivan (2009). In order to reduce researcher biases and to customise the weightings to this study, the weightings were obtained from a survey of experts on climate change.

Key category	**Weighting**
Governance	0.35
Policy	0.10
Disclosure and education	0.20
Innovation	0.25
Risk considerations	0.10
Total	**1.0**

4.8. Concluding remarks

The research methodology was designed to address the shortcomings of the secondary sources for climate change information. As a result, secondary data were collected using more than one source. The shortcomings with the secondary data source, i.e. the CDP survey reports, were considered in making this decision. The decision was also informed by Stanny and Ely's (2008) view that in the case of climate change disclosures, firms that are more profitable are in a better position to cope with the costs of climate change and would be likely to want to disclose this more positive outlook to investors. In addition, partly due to the fact that the response to the CDP survey is voluntary and not verified, it was noted that in some instances data provided are inaccurate and often incomplete.

The pilot survey helped in designing research instruments that suit the South African circumstances. The checklist instrument and the online survey were designed to allow for content analysis.

The study benefited from two interviews and responses obtained from the online survey. The findings highlighted the following:

- That an interview or a survey can source additional information not provided in secondary sources.
- That some of the initiatives listed in the CDP survey as climate change initiatives may have been a result of reaction to other factors such as the South African power crisis.
- That only through interviews can one gauge the attitude of interviewees.
- That content provided in the secondary sources may not be accurate.
- That secondary data may no longer be relevant due to change in circumstances and environment.

Chapter 5:

5.1. Introduction

This study is based on an analysis of secondary qualitative data collected using a checklist instrument as introduced in Chapter 4 (see Appendix A4). The data were sourced mainly from the following company documents: the annual report, the sustainability report, and the CDP Survey report. All documents used were available on the company website. The literature review of Chapter 3 and the research methodology described in Chapter 4 together demonstrated the appropriateness of selecting the qualitative research method for this study.

The data obtained from the secondary sources is provided in Appendix A5. The questionnaires were designed to source information on aspects of corporate governance directed at climate change. The research sample comprised 12 mining companies that had responded to the 6th CDP survey. The duty of corporate governance is particularly apparent, considering the Board's duty of care, as given in the King III code of corporate governance and the Companies Act (no. 71) 2008.

This chapter comprises a presentation of the data and information obtained in the survey. The information was recorded as follows: (a) an answer to a question is denoted by 'YES', in the final spreadsheet, a 'YES' is replaced with a '1'; (b) where information is not provided and where the answer is a 'NO', 'zero 0' is used instead.

As stated in previous chapters, the theory base for this study is on the corporate governance body of knowledge. Before the presentation of the findings, a section has been dedicated to describing the elements of each of the variables used in understanding corporate response to climate change. The study uses five key variables to define effective corporate response to climate change; governance, policy, innovation, disclosure and education, and risk considerations. The five variables are schematically illustrated in Figure 5.1 below.

The section below describes the 5 variables defining corporate governance response to climate change.

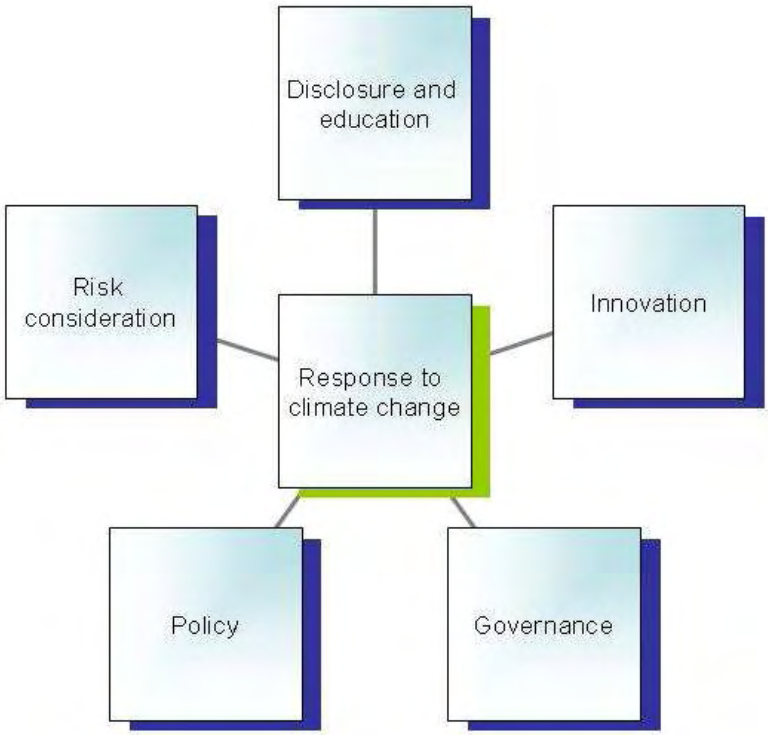


Figure 5.1 Schematic representation of the five variables

5.2. Corporate governance variables

5.2.1 5.1.1 Governance

Within the context of this study, governance is described by the Board structure, its functions, the CEO's role, the Board charter, the climate change position statement, and the content of Board meetings. Questions are asked in order to source descriptive information on each of these elements.

As an example, five questions were asked to describe the Board structure; these questions were aimed at inquiring on CEO duality, the presence of women on the Board, and whether non-executive directors made up the majority of the Board.

Chapter 3 provided literature supporting the relevance of these towards understanding corporate climate change response. The aim was to investigate if a firm's Board was structured to enable an effective response to climate change questions.

The Board function is described by seven questions aimed at understanding how the Board deals with executing its climate change oversight role. In that regard, the elements describing Board functions are: whether a Board subcommittee was created to deal with climate change, whether it was chaired by the executive, whether the members of such a subcommittee have relevant qualifications, and lastly, whether its members receive training on matters of climate change. The aim was therefore to enquire if the Board is properly positioned to effectively execute climate change governance.

The literature in Chapter 3 notes that the CEO's participation on climate change has the potential to galvanise and motivate the Board and company employees towards responding to climate change. In that regard, the questions asked were whether the CEO makes statements on climate change and if he/she does so by addressing the company and not just through written material.

The Board charter reflects the purpose, aim and key objectives of the Board. The purpose was to investigate if it deals with climate change. In addition, it was investigated whether the company had a position statement on climate change.

Lastly, the minutes of the Board contain a record of its discussions. They were sourced to investigate if climate change was ever discussed during deliberations.

5.2.2 Policy

This question asked whether a company had a policy on climate change. The presence of such a policy would indicate the likelihood that climate change is given strategic executive level attention and hence an indication of the level of engagement within the company on climate change matters.

5.2.3 Disclosure and education

As noted in Chapter 3, there are various factors that influence a firm to disclose its climate change information. Questions were asked if climate change information is disclosed in the annual report and/or the sustainability report. Furthermore, questions were asked to investigate the content of disclosure: cost information, climate change initiatives and activities.

The climate change communication subcategory considered climate change communication aimed at educating company employees and informing investors and other stakeholders. In that regard, questions were asked on whether company communicates its carbon footprint, climate change risks, and the results of its response to the CDP survey on its website. Furthermore, the subcategory sought to investigate if company provided relevant climate change education materials through its website.

5.2.4 Innovation

As explained in Chapter 2, the response to climate change can either be through mitigation or through adaptation. In either case, an innovative approach is required considering the business process, technology and human capital challenges associated with responding to climate change. Here the content analysis technique described in Chapter 4 was used. The coding scheme is indicated in Appendix A5.1. The purpose was to find an association between climate change and the following words; ‘innovation’, ‘investment’, ‘competition’, ‘risk’, ‘strategy’ and ‘regulation’.

5.2.5 Risk consideration

This category listed the various climate change risks a company can face. Each industry sector has particular prominent risks subject to the prevailing business models, impact of climate change on the business, and macro-economic condition. The aim was therefore to investigate if the companies had identified risks and if the risks identified were the most critical for the sector. In addition, this section indicated the risks commonly identified within the mining sector.

5.3. Overview of data description

The analysis comprises the following:

- A graphical and descriptive comparison of the performance of the 12 companies.
- A non-statistical correlation analysis between and amongst related categories and questions.
- Sector analysis for each question and category. As an example; stating the number of companies which have a climate change policy out of the total number of companies that were part of the study.
- A categorisation of top performers and poorest performers.

5.3.1 A review basing on responses to individual questions

5.3.1.1 Board structure

- 11 of the 12 companies in the survey had non-executive directors as the majority in the Board.
- Only two out of 12 company Boards were chaired by the CEO.
- Only one out of 12 company Boards was chaired by an executive director.
- 10 out of the 12 companies had at least two women in their Boards.

5.3.1.2 Board functions

- It was found that seven of the 12 companies have a Board subcommittee assigned responsibility over climate change matters.
- None of the companies had the CEO chairing the subcommittee.
- Four out of 12 companies did not have a Board subcommittee assigned to oversee climate change matters.
- Only one company provided information indicating that the Board received training on climate change.
- None of the subcommittees are chaired by the CEO.

- Chairpersonship of the subcommittees is equally shared between executive and non-executive directors.

5.3.1.3 Executive management

- It was discovered that seven out of 12 CEOs letters in the annual reports mentioned climate change.
- The CEOs of seven out of 12 companies had addressed the company on climate change.

5.3.1.4 Board charter and position statement

- It was noted that five out of 12 companies' Board charters mentioned the climate change responsibility for the Board.
- It was also discovered that seven out of 12 companies had a position statement on climate change.

5.3.1.5 Meetings

It was difficult to get access to Board minutes and hence this variable was not used in the analysis.

5.3.1.6 Policy

This question specifically asked whether a company had a climate change policy. The findings showed that six of out of 12 companies have a climate change policy statement.

5.3.1.7 Integrated sustainability and annual report

- The annual reports of 10 of the 12 companies had a section on climate change.
- The sustainability reports of seven of the 12 companies reported on climate change.
- All 12 companies mentioned climate change initiatives in one of the company documents.

- Only two out of 12 companies mentioned climate change budget and/or costs.
- Seven out of 12 companies mentioned climate change related R&D activities.

5.3.1.8 Climate change communication

- Seven out of 12 companies included climate change in making investment decisions.
- The websites of nine out of 12 companies provide information on climate change.
- Eleven of the 12 companies mention their carbon footprint on their website.
- Nine of 12 companies provide information on their website on emission accounting efforts.
- It was noted that all 12 companies had emission reduction targets.
- Only four out of 12 companies provide information on the CDP survey on their websites.
- Nine of 12 companies outlined their climate change risks on the website.

5.3.1.9 Innovation

- Only in documents of three out of 12 companies were the words ‘innovation’ and ‘climate change’ mentioned in the same paragraph.
- The word ‘climate change’ and ‘competition’ were mentioned in only two of the 12 companies.
- The word ‘regulation’ and ‘climate change’ were mentioned in documents of nine out of 12 companies.
- The word ‘risk’ and ‘climate change’ are mentioned in 11 of 12 companies.
- The word ‘climate change’ and ‘strategy’ are mentioned in eight of the 12 companies.
- The words ‘investment’ and ‘climate change’ are mentioned in nine of the 12 companies.

5.3.1.10 Risks

- All 12 companies mentioned ‘regulatory’ and ‘financial’ risks.
- Physical and product risks were mentioned by 11 out of 12 companies.
- Strategic risk was mentioned by eight of 12 companies.
- Competition risk was mentioned by four out of 12 companies.
- Technological risk was mentioned by six of the 12 companies.
- Regulatory risk was mentioned by seven out of 12 companies.
- Disclosure risk was mentioned by 10 out of 12 companies.

5.4. Corporate governance effectiveness

In this study, corporate governance effectiveness is a subject of the total weighted score for the company’s performance when measured by response to the research questionnaire (see Appendix A4). Table 5.1 gives the total scores for the companies.

Table 5-1 Weighted scores for the 12 companies

Category	Exxaro	ARM	Harmony	Gold-fields	Anglo-Ashanti	BHP	Kumba	Anglo-American	Lonmin	Northam	Impala-Plat	Anglo-Plat
Governance	2.45	1.4	1.05	1.75	1.75	2.8	0.35	2.45	1.4	2.1	2.1	3.15
Policy	0.1	0.1	0	0	0	0.1	0	0.1	0.1	0	0	0.1
Disclosure and education	2	1.2	1.4	1.2	1.6	2.2	1.8	2	1.6	1.6	1.6	1.6
Innovation	1.5	0.25	0.75	0.25	1	1.3	0.25	1.25	1	0.75	1	1.25
Risk consideration	0.6	0.3	0.3	0.8	0.7	0.9	0.9	0.7	0.6	0.8	0.8	0.7
Total	6.65	3.25	3.5	4	5.05	7.3	3.3	6.5	4.7	5.25	5.5	6.8

Exxaro, BHP, Anglo-Americans and Anglo-Plat scored high points for the overall climate change governance score. Figure 5.1 shows that their scores were above a 6.5 /10.15 cut-off point. ARM, Harmony, Goldfields and Kumba were the least performers.

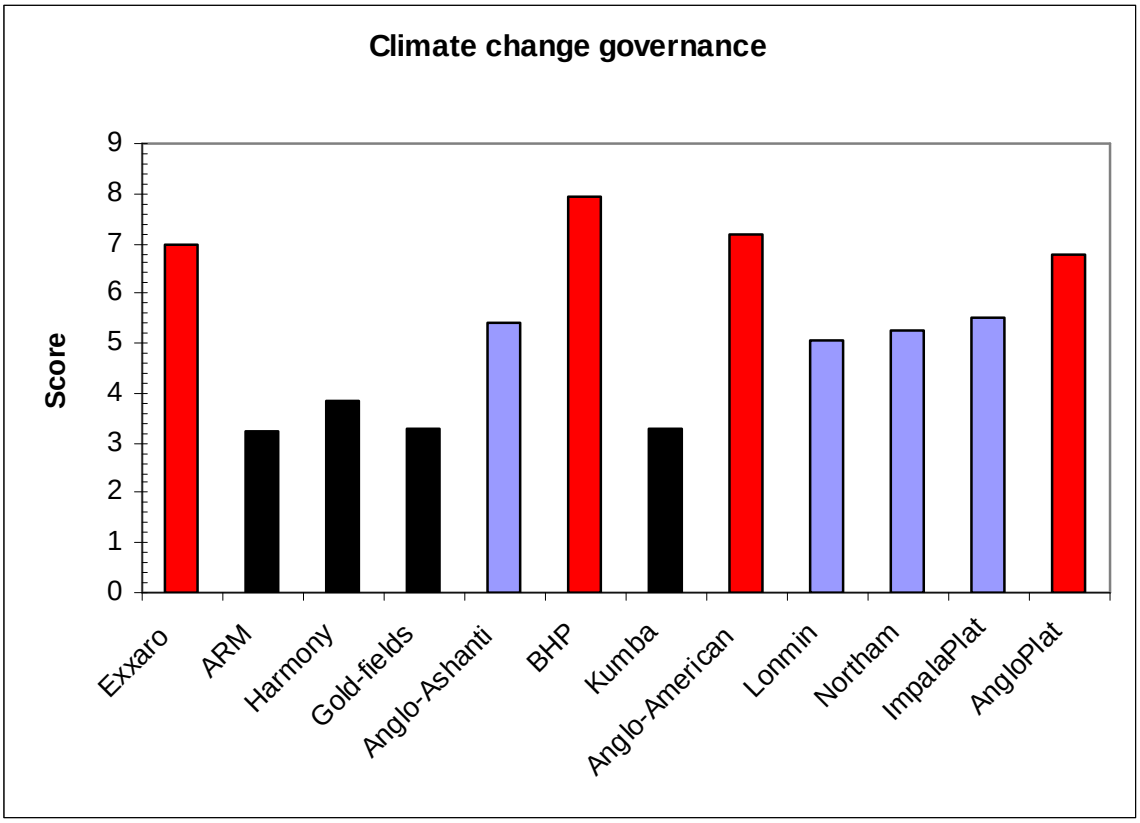


Figure 5.2 Comparative analysis of the overall corporate governance effectiveness

Bar graphs for each of the five variables/descriptors of climate change corporate governance. The purpose was to identify performance profile under each of the categories. Figure 5.3 shows the performance of the various companies under the governance attribute. Poor performing firms are marked in black, while excellent performers are marked in red. The best performer (BHP) scored seven times better than the poorest performer (Kumba).

In terms of disclosure and education, Figure 5.4 shows that ARM, Harmony, and Goldfields were the poorest performers. Kumba, an overall poor performer, scored better in this category than one of the leading scorers, i.e. Anglo-plat.

The innovation measure showed that ARM, Goldfields and Kumba are the worst performers, see Figure 5.5. The top performers are marked in red.

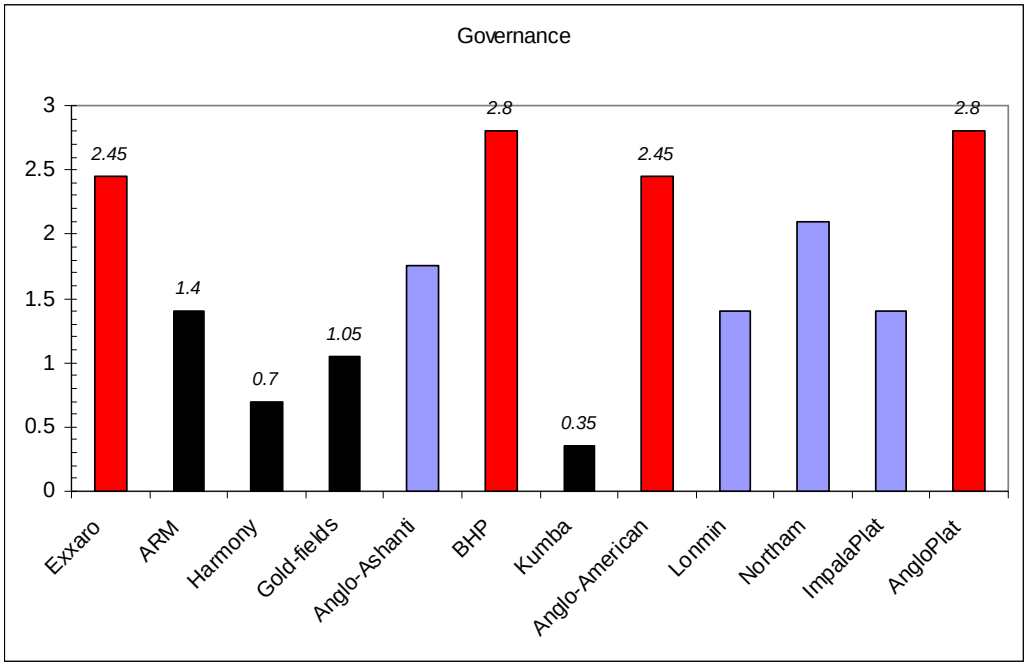


Figure 5.3 A graphical representation of governance scores

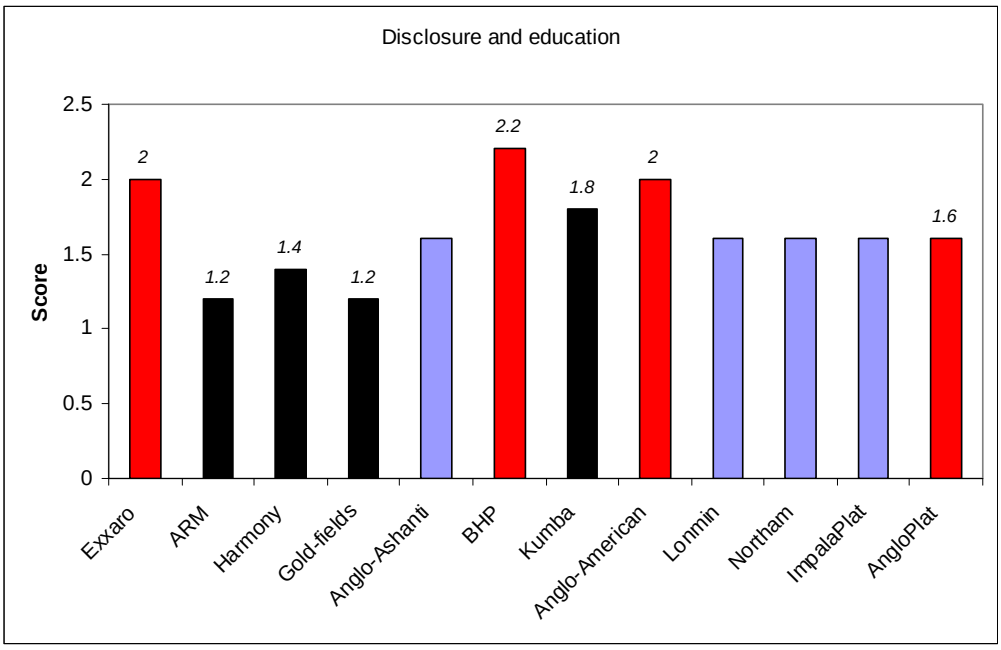


Figure 5.4 A graphical representation of disclosure and education performance scores

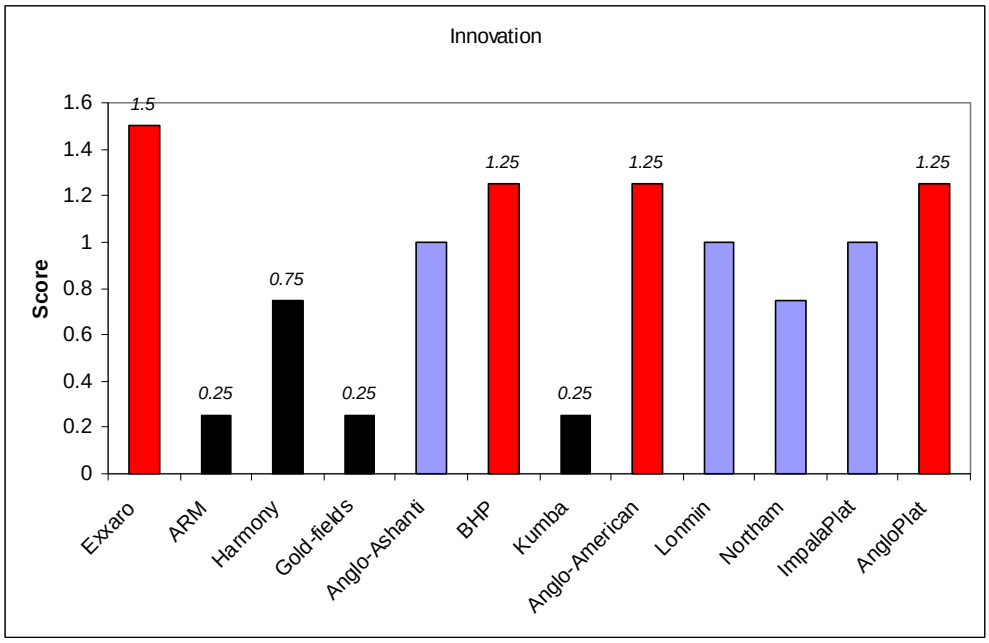


Figure 5.5 A graphical representation of innovation scores

5.5. Concluding remarks

The purpose of this chapter was to present the research findings while avoiding detailed analysis. Dealing with climate change through corporate governance practices is defined by variables shown in figure 5.1 above. Each of these elements (climate change and corporate governance) was discussed to a sufficient level of detail so as to demonstrate its relevance to this study.

Thereafter, the overall performance of firms on each question for each category were presented. Lastly, the findings were presented in the form of a table and graphs. Graphically, Figure 5.2 to Figure 5.5 show distinct differences between companies that scored high on climate change governance and those that were poor performers. Detailed analysis of the findings is presented in chapter 6.

Chapter 6:

6.1. Analysis and discussion

6.2. Introduction

The purpose of this chapter is to revisit data provided in Chapter 5 and to undertake a detailed analysis in line with the objectives of this study. Data are thus analysed with the expectations of contributing to the body of knowledge on the corporate sectors' ability to operate within a carbon constraint society through the institutionalisation of effective corporate governance principles and practices. The analysis will start with a high level review of the overall climate change corporate governance performance for all companies in the sample. In parallel, individual questions shall be assessed as given in chapter 5.

As indicated in Figure 6.1 below, following an analysis of the overall climate change corporate governance score, the distribution of performance by companies leads to further probing of the performance pattern. Next, firms are assessed on each of the five categories defining climate change corporate governance as given in Appendix A4.0. The highest and lowest performing firms will be reviewed in greater detail. The findings from this analysis are used for generating research propositions which in turn can be used to inform future studies. Lastly, the findings are summarised in the next chapter – the conclusion chapter. The conclusion is a synthesis of the findings to yield policy or legislation suggestions for stakeholders and interested academics.

It is important to reiterate that this study is an explorative qualitative research work. One of the outputs out of this study will be the generation of proposition statements. This approach is in contrast to other forms of research which are designed to test a hypothesis.

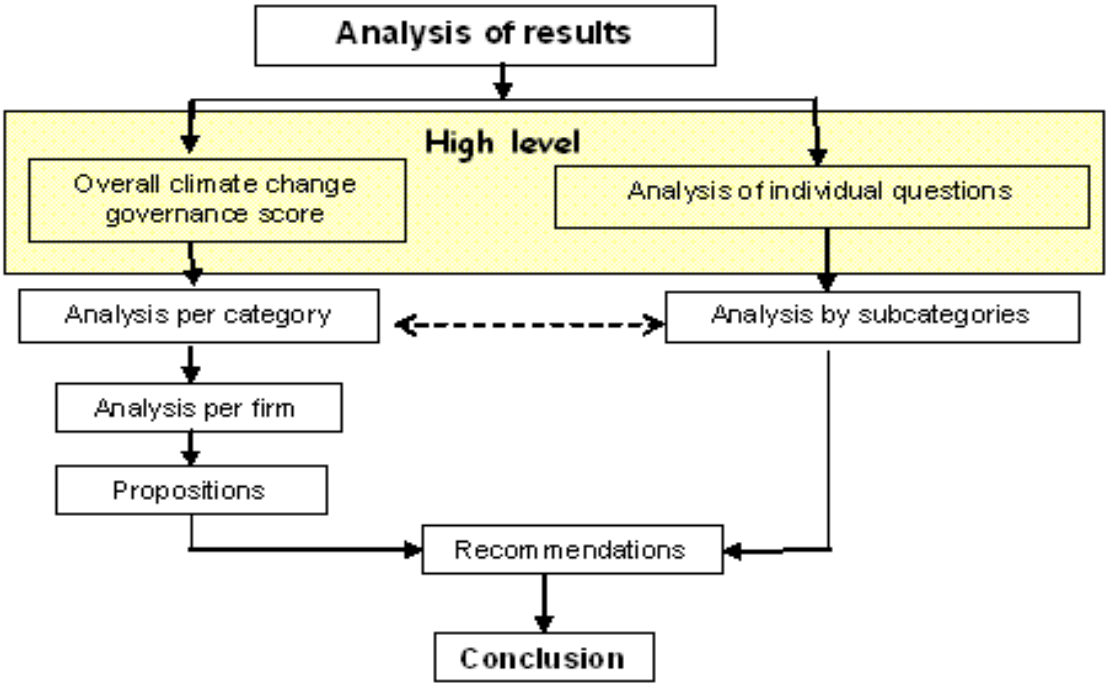


Figure 6.1 A schematic illustration of data analysis leading to final conclusions for Chapter 7

The analysis will try to provide answers to the research question: **To what extent and under what circumstances should corporate governance influence corporate response to climate change?**

Specifically the analysis aims at obtaining answers for the following sub-questions:

- What are the governance structures companies employ?
- What are the factors that underpin corporate response to climate change?
- To what extent do companies report climate change information?
- What are the risks considered by the company?
- The extent of the role of company leadership in climate change response?
- What climate change response initiatives do companies adopt?

The analysis starts with a review of the overall climate change corporate governance performance for the study sample. It is followed by a generalised review of the study

sample. The above two analyses pave the way for in-depth analysis directed at answering the research sub-questions.

An overview of the analysis at each stage

- Overall climate change corporate governance: This analysis focuses at determine the climate change governance score for all firms.
- Analysis per category: This analysis considers the five categories of climate change corporate governance and its aim is to determine the firm performance profile under each category.
- Analysis per firm: This analysis compares the best performing company to the worst performing company.

The key attributes will be noted and interpreted in terms of climate change corporate governance. The purpose of the analysis at this level is to determine any differentiating features and to use those features to try and categorise companies according to performance.

6.3. Overall climate change corporate governance performance

The overall climate change corporate governance analysis is based on performances indicated in Figure 5.1 (see Chapter 5). The graph was plotted using the total weighted scores for each of the 12 companies in the study sample. The graph (Figure 5.1) shows that the bottom performers comprise four companies i.e. ARM, Harmony, Goldfields and Kumba.

The highest scoring companies were BHP, Exxaro, Anglo-American and Anglo-Plat. The difference in performance between the two groups forms the basis of the analysis in this study. The sections that follow focus on identifying the areas in corporate governance where the sampled companies performed well, and the areas where performance was poor. Reasoning is applied to formulate a logical understanding for both the poor and good performances.

Having identified the lowest and highest performing categories, analysis is directed at understanding how the companies performed in each of the five categories defining climate change corporate governance (see checklist – Appendix A4). The weighted corporate governance scores of Figure A6.1 indicate that the sampled companies performed lowest under the 'Governance' category. Companies in the sample scored an average of 39% of the total possible score. The highest performance was obtained under the 'Disclosure and communication' category followed by the 'Innovation' and then the 'Risk consideration' categories. The weighted figures (Table A6.2) reveal a similar trend, indicating that firms perform lowest under the 'Governance 'category and highest under the 'Disclosure and communication' category.

Before undertaking a detailed analysis of the possible factors the performances noted, firstly an overview of governance characteristics of the firms within the mining sector is undertaken.

6.4. Overview of the sector

The additional findings on the sector are given in Table A6.3. The table shows that 75% of sampled companies produce non-coal mineral commodities.

According to Lehn (2003) and Raheja (2005), the size of the Board is a function of firm characteristics and hence is determined endogenously and in ways that conform to value maximization. Lehn (2003) further noted that the size of the Board could be related to the size of the firm. In the case of this study, Appendix 5A.1 shows that the sampled companies had an average board size of 13. The highest figure (21) was for Anglo-Ashanti, a South African multinational mining company. The sample size can not allow for a detailed statistical analysis, however, the data obtained indicates that regardless of their size, the sampled companies have a preference for a Board size of about 13. The average Board size for the top and bottom performing categories was 12.8 and 12.5 respectively. It follows that between these categories, the Board size can not be a significant differentiator.

The King III code of corporate governance specifically recommends that effective boards are characterised by boards that have the following characteristics:

- Non-executive directors make the majority.
- The Board is chaired by a non-executive director.

An analysis of the results given in Table A5.1 shows that 83% of companies have non-executive directors as majority. Equally, 83% of sampled companies had boards chaired by non-executive directors. It can be concluded that sampled companies have good governance practices with regards to the two subcategories. However, the overall score was affected by low performances in other sub-categories of 'Governance' as will be indicated under the section dealing with analysis of categories below.

For a multinational mining company, a presupposition is that its climate change performance will be influenced by legislation applied in some of the regions or countries it operates in. Table A6.3 shows that only 58% of sampled companies have subsidiaries abroad. However, two of the four top performing companies are multinational companies. The exceptions are Exxaro and Anglo-Plat. However, in the case of Exxaro it should be noted that it has a 10% share ownership by Anglo-American. Anglo-American is itself a multinational company and in turn owns Anglo-plat. However, due to sample size limitations, the researcher will not make any conclusions with regards to the impact of the multinational characteristic on climate change corporate governance. Thirty three percent of the sample comprised BEE based mining companies. The correlation of BEE ownership to climate change response needs to be investigated using a larger sample size.

6.5. Analysis per category

This study used five categories to measure climate change corporate governance. The average score for each category was calculated and the difference to the expected total score was determined in percentage form. The average for the overall score on corporate governance was only 63.5% of the possible score.

According to Llewellyn (2007), climate change will define competitive advantage. In that regard, in order to be competitive, companies must score high on all categories. Basing on the 63.5% score, it can be stated that the overall climate change corporate

governance performance of South African companies has substantial room for improvement.

The next analysis looks at the individual categories. The calculations indicate that the sample firms performed the least under the 'governance' category. The firms' average performance was 32% of the possible score. It should also be noted that when considering the individual companies, the highest scoring companies under this category were the leading companies (Exxaro, BHP, Anglo-American and Anglo-Plat).

Furthermore, the average of these companies was only 50% of the total possible score, while the lowest scoring companies made 17% of the score. This result serves to indicate that the overall score of companies for this category is poor. Results indicate that the most significant performance was under 'disclosure and education' category. This score is higher than that for the 'risk consideration' category when taking the weighting factor into consideration. Innovation was second best at 58% of total expected score, while only 50% of the research sample had a climate change related policy.

6.5.1 Analysis on climate change risks

Table 5.1 shows that regulatory, financial; product and physical risks were highly cited. This result is expected since the mining sector is a high impact sector and the advent of any regulations will severely impact on business viability considering that the mining sector is a low margin business (EY 2009).

Firms rated low on competitor and technological risks. Under a climate change environment, competition comes either in the form of firms that use cleaner technologies, firms that use more efficient technologies and processes, or firms that have public good climate change initiatives/programs. In that regard, competitor and technological risks are related but do not imply a firm's propensity to innovative rather than preparedness to adopt new technologies. In addition to the above, product and disclosure risk were being cited because the product risk was highly cited in particular for minerals such as coal, whose use will be affected by legislation. Disclosure risk was also highly cited.

6.5.2 Analysis on innovation

The least performing firms were also the least innovative. In this study it implies that the discourse on climate change is slowly being tackled at strategic level. This category is linked to the 'disclosure and education' category. It is suggested in that regard that firms should be encouraged to disclose as a means to foster further innovation.

Four propositions can be generated from the above analysis.

6.5.2.1 Proposition 1

Climate change disclosure and education is easily adopted compared with other corporate governance practices.

6.5.2.2 Proposition 2:

The type of commodity produced does not have an influence on climate change performance.

6.5.2.3 Proposition 3:

Companies that perform better regarding climate change have a subcommittee responsible for climate change. Using Exxaro as an example, the subcommittee does not necessarily have to be a subcommittee of the Board but must be one comprising operational and senior level management. In a similar case, i.e. Anglo Ashanti, the Board should be made aware of the usefulness of such a subcommittee and should be encouraged to request its feedback from time to time.

6.5.2.4 Proposition 4:

Basing on this proposition, it follows that the initial efforts at instituting good corporate governance practices should focus on requiring companies to disclose their climate

change activities and emissions through company documents and media that include company websites.

Climate change risk, such as litigation and shareholder activism, may in turn compel companies to institute governance practices. This finding could also imply that corporate climate change governance is not entirely initiated from the Board but rather the initiative should emanate from both below and from the top. Senior management level or operational level managers can influence a climate change response.

Chapter 7:

7.1. Conclusions

It was possible, based on the data obtained and by way of the analysis, to provide answers to the research question: **To what extent and under what circumstances should corporate governance influence corporate response to climate change?**

The study has shown that the average weighted climate change corporate governance score for sampled companies is only 52.4% of the possible average score. Considering that (according to Llewellyn. 2007) response to climate change will be a tool for competitive advantage in the future, it can be stated that the sampled companies need to improve their corporate governance systems and practices in order to compete within a carbon constrained market place.

However, as illustrated in Figure 5.1, the performance by companies varied from a low of (3.25 out of 10.15) to a high of (7.95 out of 10.15). It was shown that the two categories in which companies performed highly are in fact covered under the King III code of corporate governance. Where companies performed poorly are on: (a) establishment of a climate change dedicated Board or executive subcommittee and having it chaired by the CEO or a Board member, (b) the Board's position on climate change should be made clearer - it could be made clearer through including climate change in the Board charter, and (c) the participation of the CEO on climate change matters was also low. The CEO would be expected to make statements on climate change and to include them in the annual report, report on the company's climate change position statement, and/or provide an outline of key climate change initiatives. The CEO's visibility and visionary leadership on climate change matters should be seen in his/her address to the company and through the articulation of company climate change initiatives.

On further analysis of the performance scores according to the various categories, it was discovered that even though the performance for the overall climate change corporate governance for the study sample was above average, companies still performed poorly (39% of total possible score) in the most significant category, i.e.

'Governance'. Further analysis of this finding was conducted through reviewing the performance characteristics of the top performing companies and comparing them with the bottom performers. Table A 5.1 shows that the top performing companies did well on all but one category. On the other hand, bottom performers did poorly on all, with the exception of the 'Disclosure and education' category.

A detailed review of the performance of companies regarded as top performers and poor performers showed that these companies basically have to improve on all aspects of climate change governance. Their better score under the 'Disclosure and education' category could be as a result of the fact that these companies participate in the Carbon Disclosure Project survey.

A comparative analysis of the top scoring company and the bottom scoring company can be summarised as follows:

- The top performing company is an Australian based multinational.
- The bottom performing company is a South African based.
- The top performer's South African subsidiary is a coal mine but has businesses in other minerals besides coal outside South Africa.
- The bottom performer is an iron ore mining company.
- Tale A6.1 shows the percentage score per each category. The bottom performer had no climate change policy, and in addition, it performed poorly under 'Governance' and 'Innovation'. However, the top performer had the highest score on 'Governance' and out performed all companies except in the 'Innovation' category.

All the sampled companies noted regulatory and financial risks of climate change. However, the fact remains that only 50% of the companies considered technological risks as an indication of the symptoms identified by Brant *et al.* (2009), whereby companies should start undertaking further processing of mineral commodities before exporting. According to Brant *et al.* (2009) this is one way through which companies will be able to reduce their carbon footprint.

Since the mining sector produces and sell a commodity, they are in that regard immune to consumer activism or consumer boycotts. This could be the reason why only one of the 12 companies mentioned reputational risk.

In summary, this study has generated important knowledge to inform further studies on the field of climate change corporate governance. The assessment showed that on average, the climate change corporate governance for South African mining companies needs to be improved in order to gain a competitive advantage in the globalised business world of today.

7.2. The recommendations

It is ultimately important to nurture good climate change corporate governance practices. However, it would appear that in the case of the mining sector that product, competitor, technological and consider activism is not regarded as high level risks. To encourage good governance it is suggested that the government should introduce legislation that compels companies to disclose their climate change impact in important documents such as the annual integrated sustainability report and company websites.

Furthermore, companies should always consider innovation. In that regard they should indicate how they mitigate their climate change impact, relate their performance on set emission reduction targets, and institute emission accounting methodology. In that regard the Board charter should include a statement on how Boards will tackle climate change, and a subcommittee of the Board should be established and be chaired by a non-executive director.

Companies performed poorly under ‘Governance’ because only 41% of the sample had a statement on climate change, and only 25% had a subcommittee responsible for climate change. This could imply that the Board was not actively informed of climate change matters affecting the company.

The sampled firms performed well in the ‘Non-executive directors’ category; they comprise the majority of the Board, and the Board is chaired by a non-executive director – as stipulated in the King code.

However, firms performed poorly on other factors namely; formation of a Board subcommittee, participation of the CEO, and having a Board charter regarding climate change. It can be concluded that these are not stipulated in the King code and hence there is a need to set direction and formulate guidelines.

In order to encourage innovation in this sector, the government should introduce incentives to encourage further value addition to commodities before they are exported. In that regard, ideal incentives would be those directed towards the adoption of cleaner technologies and processes.

The significance of reputational risk in the mining sector would be enhanced by compelling companies to report on climate change initiatives, introducing climate change legislation, and introducing a climate change disclosure initiative readily accessible to investors and the public.

Based on a comparison of the top and bottom performers, in order to improve the performance of the bottom performer, the company has to focus at improving its 'Governance' systems and at integrating climate change into its business at a strategic and operational level.

There are a number of aspects of corporate response to climate change that need further study. In this regard it is recommended that a further study on climate change corporate governance should be based on a case study of not more than two companies in an energy intense sector. Alternatively, a similar study could be repeated on a larger sample size, and in that case the interviews and the online questionnaires originally designed for this study can be used.

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Appendices