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POTENTIAL MARKET BARRIERS FOR VOLUNTARY CLIMATE CHANGE MITIGATION MECHANISMS IN THE SOUTH AFRICAN PRIVATE SECTOR

By

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Submitted in full fulfilment of the requirements for the degree
MCom in Business Management

in the

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES

at the

UNIVERSITY OF PRETORIA

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ACKNOWLEDGEMENTS

I would like to express my utmost gratitude to the following people for their support and guidance in the completion of this dissertation:

My supervisor, Prof de Jongh, for his insights, motivation and guidance.

Grania Mackie, for providing me with the sounding board, support and flexibility to complete this during full-time employment.

To the respondents who participated in the study; thank you for your time, inputs and honesty.

To my parents, who have always supported me and gently nudged me to pursue my dreams.

To my daughter, Britta, thank you for your love and patience.

Finally and most importantly to my husband, Markus, for his consistent encouragement and steadfast belief in me, without you this would not have been possible.

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The challenge of the twenty first century is to enable economic growth and increase both the environmental quality and social inclusiveness, while mitigating and adapting to the impacts of climate change. The need for a transition to more sustainable consumption and production patterns is undeniable, and sustainable economic growth must be placed at the heart of future development for all citizens – private and public. The South African private sector is under enormous pressure to remain competitive within the context of the global financial crisis while balancing the interests of society, the environment and its shareholders. It has been suggested that there are discrepancies between what companies say and what they actually do, as they are challenged to move from policy to action. This study aimed to research the role and utilisation of voluntary climate change mitigation mechanisms within the South African private sector, to gain insights into the potential market barriers impeding the large-scale uptake of such mechanisms.

The study was guided by three research objectives:

- To identify thematic clusters of market barriers for voluntary climate change mitigation in the South African private sector.
- To identify potential market barriers for voluntary climate change mitigation in the South African private sector.
- To provide recommendations to increase the implementation of climate change mitigation by the corporate sector in South Africa.

This research process involved exploring market barriers in the climate change mitigation market through a literature review, and developing a questionnaire with experts in the climate change sector. Thereafter, the Johannesburg Stock Exchange (JSE) Sustainability Reporting Investment (SRI) Index 2010 companies were surveyed using the questionnaire, followed by semi-structured interviews to provide further depth to the findings.

The research findings suggest that the South African private sector has adopted a “take position, wait and see approach”. This approach places them in a position to take advantage of, and influence, the opportunities and risks associated with climate change without having a negative impact on the bottom line. The primary barrier to voluntary climate change action concerns the lack of local and international policy frameworks. Additionally, the different rules and resultant uncertainty around local and international frameworks seems to impede consistent and meaningful action. While this uncertainty does not prevent the private sector from taking voluntary action, it does appear to negatively affect the overall scale and type of climate change mitigation efforts. Furthermore, companies are continually improving the quality of sustainability reporting and public disclosure, the challenge still lies in translating these strategies into daily operations and sustainable practice beyond ad hoc actions.

Key Words: Sustainability, Corporate Governance, Mitigation, South Africa, Private Sector, Climate Change, Market Barriers

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POTENTIAL MARKET BARRIERS FOR VOLUNTARY CLIMATE CHANGE MITIGATION MECHANISMS IN THE SOUTH AFRICAN PRIVATE SECTOR

1 BACKGROUND TO THE STUDY

1.1 AN INTRODUCTION TO THE STUDY

Climate change is the "greatest and widest ranging market failure ever seen" with an estimated potential cost of a minimum of 5% of annual global GDP, if action is not taken (Stern, 2006:1). To ensure that organisations remain competitive and profitable, climate change and environmental awareness must be taken seriously and incorporated into business strategies and operations, or they risk losing business from the growing number of environmentally concerned customers and consumers (KPMG, 2009:4).

There are various factors that influence corporate response to climate change, ranging from economic opportunities to moral responsibility (Okereke, 2007:484; Reyers and Gouws, 2010:92). The scale and impacts of the corporate action is, however, limited, as action is voluntary. Although South Africa has a number of principal based reporting mechanisms to ensure disclosure of economic, environmental and social impact, the onus lies on companies to implement climate change mitigation measures. A perception still exists that within boardrooms that sustainability issues are often an afterthought, (Trialogue, 2007:11; Incite Sustainability, 2009:66; Rea, 2012:34) and are often seen "as little more than a peripheral, external issue" (Incite Sustainability, 2009:66).

This study aims to research the role and utilisation of voluntary climate change mitigation mechanisms within the private sector in South Africa. It also aims to further assist the private sector and Government to better understand some of the market barriers that are impeding the large-scale uptake of climate change mitigation mechanisms by the private sector.

1.2 RESEARCH PROBLEM

International research (Cogan, 2008; KPMG, 2008; Okereke, 2007, PricewaterhouseCoopers, 2011) reviews voluntary climate change mitigation and its role and impact within the corporate sector. However, it has been suggested (Incite Sustainability, 2008; Unterlechner, 2007; Reyers, 2009, Rea, 2012) that the South African corporate sector is lagging behind on implementing and utilising voluntary climate change mitigation mechanisms. The rationale for this lack of action is unclear as there appears to be discrepancies between what companies actually do and what they endeavour to achieve.

1.3 PURPOSE STATEMENT

The purpose of this exploratory interpretive design is to identify the extent to which market barriers are present for voluntary climate change mitigation mechanisms in the South African private sector, and thereby provide insight into the perceived lack of climate change mitigation by the private sector.

1.4 SPECIFIC RESEARCH OBJECTIVES

The study was guided by the following research objectives:

- To identify thematic clusters of market barriers for voluntary climate change mitigation in the South African private sector.
- To identify potential market barriers for voluntary climate change mitigation in the South African private sector.
- To provide recommendations to increase the implementation of climate change mitigation by the corporate sector in South Africa.

1.5 METHODOLOGY

The first phase of the interpretive study consists of an exploration of the existence of market barriers in the climate change mitigation market through a literature review, and the

development of a questionnaire with experts in the climate change sector. The second phase follows up on the first phase with the purpose of utilising the questionnaire (developed in Phase 1) to electronically survey the Johannesburg Stock Exchange (JSE) Sustainability Reporting Investment (SRI) Index 2010 companies (74 companies). This was followed by semi-structured interviews to gain further insights into the findings. Table 1.1 further outlines the research design and methods.

Table 1.1: Research design and methods

Details	Phase 1	Phase 2
Sampling		
Target population	Forty Experts with experience and expertise in the climate change and/or sustainable development/corporate social responsibility/corporate governance field.	The target population consisted of the all the members of the Johannesburg Stock Exchange Sustainability Reporting Investment 2010 Index (74 companies).
Sampling method	Purposive sampling was utilised in sampling.	Purposive sampling was utilised in sampling in the survey and semi-structured interviews.
Sample size	Eleven completed questionnaires (28% response rate).	Twenty six completed questionnaires (35% response rate).
Units of analysis	Eleven item clarification questionnaires completed.	Twenty six survey questionnaires completed and analysed – representing managers who are responsible for sustainability reporting within the sample.
Data Collection and Analysis		
Data collection method	The sample consisted of computer literate individuals who have access to email and Internet on a regular basis. The questionnaire was sent individually to the sample via email.	The sample consisted of computer literate individuals who have access to email and Internet on a regular basis. The questionnaire was set up on SurveyMonkey and JSE SRI 2010 companies were personally contacted to inform them of the survey and request participation. The follow up semi-structured interviews were held face to face.
Data collection and storage	Data was collected and stored digitally.	Data was collected and stored digitally.
Data analysis	The results from the questionnaire were analysed by content analysis, thereby systematically evaluating the content of the questionnaire input to identify patterns, themes or biases (Leedy and Ormrod, 2005:142). The researcher used tabulation and statistical analysis to interpret the primary data with the aim to identify emerging themes and thereafter develop the data collection instrument for the survey in Phase 2.	The predominant technique used in the analysis in the survey questionnaire was reviewing the frequency of occurrence and utilising statistics to make a comparison by the establishment of statistical relationships, followed thereafter by statistical modelling. The process was guided by the research statistician and the supervisor. The results from the survey were analysed using an interpretive methodology to identify the relative importance of comparing themes. These findings were further discussed in the semi-structured interviews.

1.6 DELIMITATIONS

The proposed study has several delimitations that should be taken into consideration:

- Data will be collected within South Africa.
- Data in the survey will be limited to senior managers responsible for sustainability reporting under the Johannesburg Stock Exchange (JSE) Socially Responsible Investment (SRI) Index in 2010.
- Data collected in Phase 1 will be conducted with experts in climate change in South Africa and is not limited by geographic region.
- To qualify as an expert within Phase 1 of the study, respondents will need a minimum of 6 years' experience in climate change and should hold knowledge of the industry beyond the average individual.
- The study will not be limited to a particular industry or sector. However, comparative analysis will be based on carbon intensive and non-carbon intensive sectors.
- This study does not take into account any form of ranking for individual companies in terms of implementation.
- No distinction is made between the legal statuses of the companies within the sample size. However, a distinction is made between listed and unlisted companies.
- Dual listings of the same holding company within the sample size will be viewed as a single company.
- The study will be limited to the voluntary climate change mitigation market.
- The literature review will primarily be limited to literature pertaining to corporate voluntary climate change mitigation, including literature on climate change mitigation mechanisms, and corporate governance.

1.7 ASSUMPTIONS

The researcher proposes that the research will be based on a number of assumptions, namely:

- The participants of the survey and the semi-structured interviews will have an understanding of the objectives in the study.

- The participants in the study will have a sufficient understanding of the English language to effectively participate in the study.
- The participants of the survey and the semi-structured interviews will not be biased when answering questions relating to the study.
- Literature on the scientific elements of climate change will only be consulted to give context to the review.

1.8 DEFINITION OF KEY TERMS AND ABBREVIATIONS

The key terms involved in this study are *climate change, mitigation, corporate governance, Kyoto Protocol, sustainable development* and *sustainability reporting*. These key terms are further defined below.

Climate change: The United Nations Convention for Climate Change (UNFCCC) refers to climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods" (IPCC, 2008:812). See Section 4.2 for further information on climate change and Section 4.3 which deals with the relationship between climate change and the corporate sector.

Corporate governance: Corporate governance is a broad and complex concept and incorporates almost every aspect of corporate life (Anand, 2008:77) with the aim of aligning the interests of the company with society (The World Bank, 1999:6). Corporate governance is involved with the "establishment of structures and processes, with appropriate checks and balances that enable directors to discharge their legal responsibilities, and oversee compliance with legislation" (King, 2009:6). See Section 4.1 for a detailed discussion on corporate governance.

Green Economy: The term "green economy" refers to an economy that is low carbon, socially inclusive and resource efficient (UNEP 2011:16),

Sustainable development: The National Environmental Act (107/1998) defines sustainable development as "the integration of social, economic and environmental factors into

planning, implementation and decision making so as to ensure the development serves present and future generations" (South Africa, 1998).

Sustainability reporting: The concept of corporate reporting, beyond the financial impacts of a company and integrating environmental and social dimensions. See Section 4.1 for further discussion on sustainability reporting.

Market barriers: In the context of climate change mitigation, "Market barriers are conditions that prevent or impede the diffusion of cost-effective technologies or practices that would mitigate Greenhouse Gas (GHG) emissions (IPCC, 2008:817). See Section 4.3 for further discussion on market barriers.

Mitigation: The Intergovernmental Panel on Climate Change (IPCC) defines mitigation as "Technological change and substitution that reduce resource inputs and emissions per unit of output. Although several social, economic and technological policies would produce an emission reduction with respect to climate change, mitigation means implementing polices to reduce GHG emissions and enhance sinks" (IPCC, 2008:818). See Section 4.2 for further information of mitigation and mitigation mechanisms.

Kyoto Protocol: The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The Protocol contains binding agreements and targets between 37 industrialised countries and the European community for reducing greenhouse gas (GHG) emissions (IPCC, 2008:8).

Table 1.2 indicates specific abbreviations which are used in the dissertation:

Table 1.2: Abbreviations used in this document

Abbreviation	**Meaning**
AAU	Assigned Amounts Units
CAF	Cancún Adaptation Framework
CDP	Carbon Disclosure Project
CDM	Clean Development Mechanism
CEOs	Chief Executive Officers
CER	Certified Emission Reductions

COP	Conferences of the Parties
CSOs	Civil Society Organisations
EU	European Union
GCD	Global Carbon Disclosure
GHG	Greenhouse Gases
GRI	Global Reporting Initiative
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
JSE	Johannesburg Stock Exchange
MDGs	Millennium Development Goals
OECD	Organisation for Economic Co-operation and Development
SADC	Southern African Development Community
SRI	Socially Responsible Investment
UNEP	United Nations Environment Program
UNFCCC	United Nations Convention for Climate Change
UNGC	United Nations Global Compact
WCED	World Commission on Environment and Development

2 LITERATURE REVIEW

2.1 THE EVOLUTION OF SUSTAINABLE DEVELOPMENT

The world is increasingly recognising the need to move towards sustainable development which meets "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987:51). As the world's economies and populations are growing, the demand for finite natural resources is increasing unsustainably (UNFPA, 2011:2; Lloyd and Subbarao, 2009:237). To maintain the social conditions for growth for future generations, will require investment now however the challenge of sustainable development is to invest enough today to secure and maintain the environment into the future (Burke, 2009:9). This section aims to discuss the evolution of sustainable development and the need to move towards one common future.

2.1.1 Social, environmental and economic pressures in the modern world

In order to meet global social and economic development objectives, the demand for energy and associated services has increased drastically since 1850, primarily through the use of fossil fuels (coal, gas and oil) which has lead to an increase in carbon dioxide (CO2) emissions (IPCC 2011:2-3; Lloyd and Subbarao, 2009:237).

The drawdown of finite fossil fuel resources is approaching (Lloyd and Subbarao, 2009:237; WBCSD, 2011:6). Increasing demand for fossils fuels has come at great expense to the environment as the average global temperature has increased by 5.4% since 1750 (Di Norica, 2008:1). Greenhouse gas (GHG) emissions have increased by 70% due to human activities between 1970 and 2004 (Bernstein *et al*., 2008:36).

In 2011 the world's population was estimated at 7 billion (UNFPA, 2011:2) The world's population had increased two and half times since 1950 to 6.1 billion people in the year 2000 (UNFPA, 2011:2), with a forecasted global population of 9.3 billion people in 2050 (UNFPA, 2011:4; UNEP, 2011:1; WBCSD, 2011:1). Sub-Saharan Africa's population is set to double or treble in the next 40 years (UNFPA, 2011:5). Projected population growth will

result in an increased strain on natural resources, food, energy, and infrastructure. Globally, there are no collaborative solutions relating to food security and fostering the capability to feed 9 billion people by 2050 (WBSCD, 2011:26). Freshwater scarcity is already a problem: 884 million people still lack access to clean drinking water and the number continues to grow (UNEP, 2011:1). The world is in crisis with growing poverty,environmental degradation and resource scarcity, climate change is expected to further exacerbate existing stresses and the need for collective global action is growing (Bernstein *et al*., 2008:49).

2.1.2 The rise of sustainable development

Between 1972 and 1992, the sustainable development framework developed as a result of a number of international conferences (Drexhage and Murphy, 2010:7). The United Nations Conference on the Human Environment in 1972 (also known as the Stockholm Conference) brought together industrialised and developing nations to discuss the environment and its relationship to human activities (Kates, Parris and Leiserowitz, 2005:10). This Conference resulted in a number of recommendations, including the establishment of the United Nations Environment Program (UNEP) (Drexhage and Murphy, 2010:7). UNEP acts as “an advocate, educator, catalyst and facilitator, promoting the wise use of the planet's assets for sustainable development” (UNEP, 2006:2).

In 1983 the United Nations established the Brundtland Commission, formally known as the World Commission on Environment and Development (WCED). The Brundtland Commission was an independent organisation whose purpose was to focus on environmental and developmental problems and solutions, as well as to unite countries in the joint pursuit of sustainable development. In 1987, the Brundtland Report entitled “Our Common Future” (WCED, 1987:51) was released (Drexhage and Murphy, 2010:7). The Report argued that the historical categorisation of economic, social and environmental issues as separate concerns was no longer valid, and that in order to move to a sustainable future, their interconnectedness needed to be acknowledged (WCED, 1987:20). The Report pursued the ideology that the environment and development are not mutually exclusive and needed to be viewed in unison. Brundtland (WCED, 1987:xi) argued that “the 'environment' is where we live; and 'development' is what we all do in

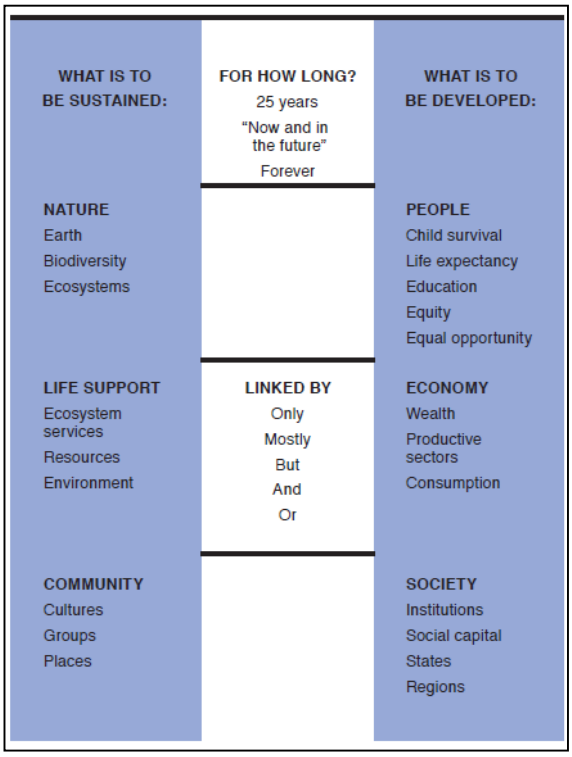
attempting to improve our lot within that abode. The two are inseparable". The Report recognised the need for the world to move towards sustainable development which meets "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987:51). The Report ignited a global realisation that the world's current consumption levels were not sustainable and that collective action needed to be taken. This created the momentum for the 1992 Rio Summit (Drexhage and Murphy, 2010:8). The Rio summit was held in Rio de Janeiro (Brazil) by the United Nations (UN) in 1992 and was the first Conference on the Environment and Development (UNCED, Earth Summit). The Conference saw the adoption of the Rio Declaration on Environment and Development and Agenda 21, which sets out a sustainable development plan of action to be taken globally, nationally and locally by organisations within the UN System, governments, and major groups (Kates *et al.*, 2005:10). At the summit, three environmental instruments were established, the United Nations Framework Convention on Climate Change (UNFCCC), the convention of Biological diversity (BBD) and the Statement of Forest Principles. Late in 1992, the Commission on Sustainable Development was created, as an outcome of the Agenda 21 (Drexhage and Murphy, 2010:8), with the purpose of monitoring and reporting on the implementation of the agreements. The increasing global commitment within these frameworks to move towards a common future resulted in the UN General Assembly adopting some 8 goals concerning peace, development, environment, human rights, the vulnerable, the hungry, and the poor – collectively known as the Millennium Development Goals (MDGs) in 2000 (Drexhage and Murphy, 2010:9). The MDGs were developed out of a need to assist impoverished nations more aggressively and spur development through the improvement of economic and social conditions within these nations.

In 2002, a decade after the Rio Summit, countries met again and reaffirmed their commitment to sustainable development as a central theme of economic development at the World Summit on Sustainable Development (WSSD), held in Johannesburg in 2002 (Kates *et al.*, 2005:10). Sustainable Development as a goal, movement and concept expanded rapidly since the WSSD and the "concept ... enjoys widespread endorsement by international institutions, governments, businesses, and civil society (Drexhage and Murphy, 2010:9)

2.1.3 Sustainable development defined

"Sustainable development was rapidly integrated into global thinking as a concept, goal and ideology" (Kates, *et al.,* 2005:10). Extensive dialogue and research sought to further define what the term "sustainable development" actually means, with no perfect understanding of it (Ciegis, Ramanauskiene and Martinkus, 2009:34; Kates, *et al*, (2005:20). The National Research Council in the United States attempted to bring further clarity to the term in its report "Our Common Journey: A Transition Toward Sustainability" (National Research Council, 1999:22-26), where a division is made between "what is to be developed" (relating to people, economy and society) and "what should be sustained" (relating to nature, life support systems and community) – as illustrated in Figure 2.1.

Figure 2.1: Definitions of sustainable development



Source: National Research Council, (1999) as depicted in Kates *et al,* (2005:11)

In the years shortly after the Brundtland Report the majority of research was directed toward economic production sectors, with the aim to generate greater levels of employment and wealth. Thereafter the focus shifted to a human rights approach which

centred on values and goals related to equity, education and life expectancy. The focus on human rights evolved further to include the values of security, regions and social capitals (Kates, *et al.*, 2005:11-12). The literature displays a general consensus that "sustainable development" widely implies linking what should be *sustained* with what should be *developed* – but here too the emphasis has often differed from extremes of "sustain only" to "develop mostly", along with various hybrids of "and/or" (Kates, *et al.*, 2005:12).

At the World Summit on Sustainable Development in 2002, there was a shift in discussions from environmental issues to social and economic development, primarily influenced by the Millennium Development Goals (Drexhage and Murphy, 2010:9). The Johannesburg Declaration further developed the term with the inclusion of three interdependent and mutually reinforcing pillars, namely economic development, social development and environmental protection (The Johannesburg Declaration on Sustainable Development, 2002:1). Three broad approaches emerged based on which types of global aspects require further development, namely people, economy or society

In an attempt to define the term, Kates *et al,* (2005:20) examines sustainable development from numerous perspectives, based on values, goals, indicators and practice. Leiserowitz, *et al*, (2006:414) indicate that sustainability ideals usually evoke emotional reactions, in terms of right and wrong, good or bad and these values define and direct us to goals. Sustainability values and attitudes are necessary but do not necessarily result in the achievement of sustainability goals, as barriers may exist between expressed values or attitudes and actual behaviours, (Leiserowitz *et al.*, 2006:439). Kates *et al,* (2005:20) further acknowledges that the interpretive nature of the current term has led to some observers viewing sustainable development as an oxymoron that can be manipulated to fit short-term purposes (Kates *et al.*, 2005:20). Ciegis, Ramanauskiene and Martinkus (2009:28) found that "sustainable development is a complex and multidimensional issue which combines efficiency, equity, and intergenerational equity based on economic, social, and environmental aspects". Furthermore, none of the sustainable development definitions available in literature are inclusive of *all* the aspects describing the concept of sustainable development, which results in an incomplete understanding of it (Ciegis *et al.,* 2009:34; Kates *et al*., 2005:20; Drexhage and Murphy, 2010:9).

The process of conscious evolution of sustainable development over the past 30 years has led to the term developing variable guiding principles and values, although the aims and meanings still seem to be vague (Grist, 2008:786). Sustainable development has been criticised for its lack of power structures, which ultimately reveals an underlying gap between interpretations of its meaning (Grist, 2008:786; Drexhage and Murphy, 2010:9). Despite this, the core definition may still be considered to lie in the Brundtland Commission's standard definition (Kates *et al.,* 2005:10-20).

In the South African context, sustainable development is embedded in the Constitution of the Republic of South Africa (108/1996) and formalised in the National Environmental Management Act (107/1998) as the "integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure [that] development serves present and future generations" (South Africa 1998).

Since the Rio Summit, sustainable development has found a driver in climate change, where responses to the impacts of climate change can find synergy with sustainable development as they share common goals. However, climate change forms a part of the broader sustainable development discourse and challenge (Drexhage and Murphy, 2010:9).

2.1.4 Sustainable development and climate change in South Africa

Given the global impacts of climate change and recognising the need to move towards sustainable development, we are presented with complex issues that offer themselves as both threats and opportunities with regard to their impact on the global environment and the implications of meeting socio-economic development goals (Yohe *et al.*, 2007:814). The IPCC indicated that it is very likely that climate change will impede sustainable development pathways as reflected in the millennium development goals (Yohe *et al.*, 2007:813).

Sustainable development and climate change are not mutually exclusive terms, but rather have a two way relationship which can be mutually reinforcing (Sathaye, J., Najam, C. Cocklin, T. Heller, F. Lecocq, J. Llanes-Reguerio, J. Pan, G. Petchel-held, S. Rayner, J.

Robinson, R. Schaeffer, Y. Sokonan, R. Swart, H. Winkler., 2007:695; Drexhage and Murphy, 2010:9). Climate change influences natural and living conditions, which in turn impacts on social and economic development. At the same time, society and government priorities relating to sustainable development have an impact of GHG emissions (Sathaye *et al*., 2007:695). Grist (2008:785) indicated that the management of climate change falls under the umbrella of sustainable development due to its long-term implications, in addition to its potential for impacts on the social, economic and environmental well-being of future generations.

As a developing country, South Africa is tackling a number of socio-economic challenges, ranging from job creation, poverty reduction and inequality. The South African Government recognises the need to reduce greenhouse gas emissions and mitigate the impact on climate change by weaning itself off its fossil fuel dependence (South Africa, 2011:9). The Government views "climate change as one of the greatest threats to sustainable development and believes that climate change, if unmitigated, has the potential to undo or undermine many of the positive advances made in meeting South Africa's own development goals and the Millennium Development Goals (MDGs)" (South Africa, 2011:9). Research conducted for the Intergovernmental Panel on Climate Change shows that climate policy and development paths determine GHG emissions (Sathaye *et al.*, 2007:701).

South Africa is further faced with the complex challenge of pursuing economic growth while protecting the environment (Stoffberg and Prinsloo, 2009:xii). In 2009, it was estimated that if South Africa continued with a "business as usual" approach, greenhouse gas emissions would quadruple by 2050 (Institute of Directors in Southern Africa, 2009:11). The Government recognises the necessity to separate industrial development and GHG emissions (UNIDO, 2003:9), and considers addressing climate change issues as an integral part of achieving sustainable development (Incite Sustainability, 2008:vii). According to the then Minister of Environment and Tourism (Marthinus van Scalkwyk) "climate change mitigation [for South Africa] is seen as a pro-growth, pro-job and pre-development strategy of the future" (Incite Sustainability, 2008:vii).

2.2 CORPORATE GOVERNANCE

Corporate governance is a broad and complex concept, incorporating almost every aspect of corporate life (Anand, 2008:77) with the aim of aligning the interests of the company with society (The World Bank, 1999:6). Sir Adrian Cadbury, of the Global Corporate Governance Forum for the World Bank, broadly defined governance as “holding the balance between economic and social goals, and between individual and communal goals” (The World Bank, 1999:6). Moreover, corporate governance has an impact on a country's economic stability and growth prospects, due to investors' perceptions concerning how its corporations are governed (Vaughn and Verstegen Ryan, 2006:504).

2.2.1 Corporate governance defined

Corporate governance is involved with the “establishment of structures and processes, with appropriate checks and balances that enable directors to discharge their legal responsibilities and oversee compliance with legislation” (King, 2009:6). However, exactly where the boundaries lie remains debatable (Naidoo, 2009:2; Corina and Roxana: 2011:675). Corina and Roxana (2011:675) indicate that defining corporate governance is based on an organisational perspective, which may be divided into broad or narrow definitions. From a narrow perspective, corporate governance can be viewed as the relationship between a number of participants in determining the direction and performance of companies (Corina and Roxana: 2011:675). The broader definition defines corporate governance as the system by which companies are controlled and directed (Corina and Roxana: 2011:675). Naidoo (2009:3) indicates that corporate governance implies regulation (legal or voluntary) in the use of authority, direction and control within a company to ensure that sustainable shareholder value is achieved. Although corporate governance does not exist separately from the law (Institute of Directors Southern Africa, 2009:6), it is more than a set of rules; namely it is a way of life (Naidoo, 2009:4). Some of the main advantages of corporate governance include improved access to capital and financial markets, reduction in corruption, increase in accountability and transparency, and enhancement of marketability (Corina and Roxana: 2011:675).

In South Africa, corporate governance has been institutionalised through three reports published in 1994 (King I), 2002 (King II) and 2009 (King III). The underlying philosophy of the King Reports primarily concerns effective and ethical leadership that can help steer companies towards achieving sustainable economic, social and environmental goals. The King Reports place South Africa on the "forefront of countries regulating in favour of superior governance standards" (Naidoo, 2009:2) by serving as the cornerstone of corporate governance in the country.

2.2.2 Corporate governance regulatory environment

Globally, there are about 20 codes of corporate governance which regulate the exercise of corporate behaviour (Naidoo, 2009:3). Governance in business can be implemented on a statutory basis, as a code of principles and practices, or a combination of the two. The statutory basis, as implemented in the United States with the Sarbanes-Oxley Act (SOX), follows a "comply or else" approach which can be problematic due to variances across companies and resource intensive costs (Institute of Directors Southern Africa, 2009:5). The implications of this approach offer only limited flexibility on the basis that American companies are required to comply with the principles, or face the penalties for non-compliance. By contrast, all Commonwealth countries (56 nations, including South Africa) and the 27 European Union (EU) states (including the United Kingdom) have adopted a code of principles and practices on a "comply or *explain*" basis (Institute of Directors Southern Africa, 2009:6), providing the opportunity for directors to comply with the principals, or to explain why they have not been applied; thereby following a principal based approach.

The United Nations Governance Code agreed on an "adopt or explain" basis as several world bodies were opposed to the word "comply" – a term that seemed to denote mandatory adherence without any room for flexibility. South African companies have generally followed the international trend of "comply or explain" in the adoption of standards and guidelines as a form of voluntary self-regulation on social, ethical and environmental issues. Naidoo (2009:241) suggests that corporate governance goes beyond satisfying mere legal or regulatory standards; she maintains that corporate governance should further help develop companies as good corporate citizens which are

sensitive to their impact on all their internal and external stakeholders. It could be argued that far-reaching corporate governance could become burdensome to the corporate sector, particularly for developing countries with underdeveloped institutional infrastructure, weak legal and judiciary systems and limited resources (Vaughn and Ryan, 2006:510; Corina and Roxana, 2011:674). Good corporate governance may be crucial for economic development; but rigid standards are arguably less desirable than a balance between sensible standards and unreasonable enforcement (Vaughn and Verstegen Ryan, 2006:508).

Internationally, key governance practices appear to be converging around similar concepts, values and systems. Despite this, international agreement on a single set of corporate governance rules is both unlikely and largely unnecessary, mainly due to idiosyncrasies within different areas that require differentiated models and standards. Nevertheless, basing good governance on international best practice helps enable countries to attract foreign direct investment and gain access to international markets particularly so for developing countries like South Africa (Vaughn and Verstegen Ryan, 2006:509),

2.2.3 The King I, II and III – a South African perspective

Corporate governance was formally introduced and institutionalised in South Africa in 1994 with the release of the King I Report on Corporate Governance. The aim of King I was to promote the highest standards of corporate governance by advocating an integrated governance approach to a range of stakeholders (Naidoo, 2009:32). The Report identifies seven characteristics of good corporate governance, integrating them into a series of principles and guidelines which serve as minimum standards (Vaughn and Verstegen Ryan, 2006:506). The Report does not include any legislative implications, relying instead on voluntary disclosure. However, the Johannesburg Stock Exchange (JSE) later made disclosure a compulsory listing requirement by utilising the principles contained in the King Report (Naidoo, 2009:36).

The initial Report was revised and released as the King II Report in 2002, focusing on guidelines for all companies and emphasising the roles and responsibilities of directors to

provide assurance of transparency and accountability within South African companies. This had the effect of increasing the expectations for companies to function as good corporate citizens and placed South Africa at the forefront of countries regulating on governance standards (Naidoo, 2009:2). In 2003, the JSE listing rules were updated, obliging companies to comply with the recommendations – or explain their lack of compliance (Vaughn and Verstegen Ryan, 2006:506). King II urges companies to adopt triple bottom line practices, where companies are required to "report at least annually on the nature and extent of their social, transformational, ethical, safety, health and environmental policies and practices" (King II, 2002:34-36).

The third report on South African corporate governance (King III) was released in 2009, in response to the New Companies Act (71/2008), along with developments in international governance to ensure that South Africa remains at the forefront of governance internationally (King, 2009:5; PricewaterhouseCoopers, 2009:2). The King III Report places increased emphasis on reporting a company's positive and/or negative effect on the community during the year under review, and how the company intends to enhance positive effects and / or eradicate negative effects in the year to follow (King, 2009:4, PricewaterhouseCoopers, 2009:2). King III has progressed from a board level focus into the broader area of leadership, ethics, integrated reporting and sustainable development (PricewaterhouseCoopers, 2009:3) and applies to *all* entities, regardless of the type of corporation. It has been argued that the King III Code is better suited for commercial entities (through language and meaning) and therefore could have limited implications for companies representing civil society (Henricks and Wyngaard 2010:104). Henricks and Wyngaard (2010:105) further argue that while King III is not legislation, it does create the impression of authority through its "apply or explain" approach. They indicate that this perception could have a negative impact on donor support for companies representing civil society, as non-compliance serves as a gatekeeper to donor support.

The last decade has seen a number of national initiatives that focus on progressing South African corporate governance by institutionalising frameworks for the private and public sector. Some of these are detailed in Table 2.1.

Table 2.1: South African corporate governance frameworks

Companies Act (71/2008) (effective 2011)	In 2011 the New Companies Act (71/2008) was promulgated, replacing the 35-year-old Companies Act No. 61 of 1973. The new Act was designed to bring South African general company and corporate law into line with modern trends and international best practice (Naidoo, 2009:35).
Public Finance Management Act (1/1999)	The Public Finance Management Act (1/1999) promotes good financial management in order to maximise service delivery through the effective and efficient use of the limited resources in the public sector. Compliance with the PFMA is a statutory requirement for public entities (Naidoo, 2009:35).
King Code (I, II or III)	The King Code I, II and III guidelines are entrenched in principals of "fairness, accountability, responsibility and transparency, based on a foundation of intellectual honesty" (King, 2006:123, King 2009:6). The principles recommend the adoption and integration of triple bottom line reporting, also referred to as reporting in the triple context (PricewaterhouseCoopers, 2009: 61). The King Code is largely voluntary, except for JSE listed companies (as defined in King II).
JSE listing requirements	In 2004 the Johannesburg Stock Exchange (JSE) launched the Sustainability Reporting Index (SRI), largely as a response to the King II Report. The SRI index provides a set of criteria to measure triple bottom line practices and therefore acts as a tool for investors to identify companies that implement sustainable practices. The reporting of a number of criteria within King II is a compulsory listing requirement for companies trading on the Johannesburg Stock Exchange, with a "comply or explain" approach to reporting which helps entrench corporate governance practices into the corporate sector (Naidoo, 2009:36).
South African Constitution (108/1996)	The South African Constitution imposes responsibilities upon individuals and juristic persons to support most fundamental rights, including sustainability considerations (Institute of Directors Southern Africa, 2009:11).

Good corporate citizenship is imperative to a company's sustainability and longevity, and remains the source of its "license to operate" (Naidoo, 2009:316). Regardless thereof, the concept has been criticised by some who indicate that the same framework approach cannot be used for all forms of companies, and is challenging to implement for Civil Society Organisations (CSOs) (Henricks and Wyngaard 2010:107). Hendricks and Wyngaard (2010:108) argue that King III views governance from a market-based perspective which does not take into account the unique characteristics of CSOs. Consequently, the Code could overburden and limit the growth of CSOs.

While multiple challenges still remain, the King Committee has received both local and international praise for its contribution to corporate governance and has clearly taken significant measures to improve corporate governance structures.

2.2.4 Corporate sustainability

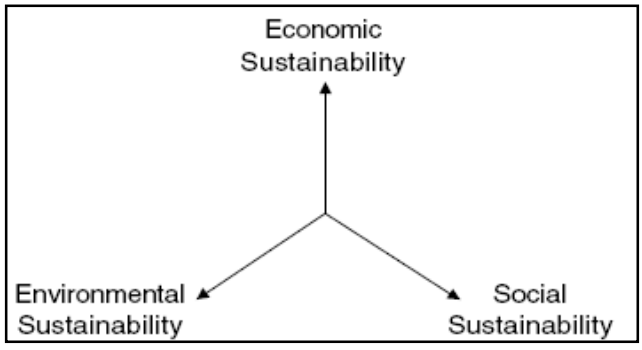
Sustainability serves as the framework within the global development debate as indicated in the Brundtland Report, where the central objective is the continuous satisfaction of

human needs (WCED, 1987: xi). When integrating sustainability into the corporate sector it may be defined as "meeting the needs of a firm's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities) without compromising its ability to meet the needs of future stakeholders as well" (Dyllick and Hockerts, 2002:131). As a result of the ambiguity of the sustainable development definition (as discussed in Section 2), it is still unclear how much needs to be invested, which at times has led to a "sustain only" to "develop mostly" approach by global and national private and public sectors (Kates *et al.,* 2005:12).

The general lack of mainstreaming sustainable development within implementation has resulted in a short-term economic perspective. Dyllick and Hockerts (2002:132) argue that a single-minded focus on economic stability can yield lucrative economic results in the short term. To achieve long-term sustainability, all three sustainability dimensions (economic, environmental and social), as shown in Figure 2.2, must be satisfied simultaneously.

Dyllick and Hockerts (2002:132) identify three key dimensions for corporate sustainability within the triple bottom line, these being 1) integrating the economic, ecological and social aspects, 2) integrating the short-term and long-term aspects and 3) consuming the income and not the capital– as illustrated in Figure 2.2.

Figure 2.2: Three Dimensions of sustainability



Source: Dyllick and Hockerts, (2002:132)

The concept of corporate sustainability (as with sustainability and sustainable development) is a complex term that is subject to much debate. This implies that

companies are both a corporate citizen and an economic entity: two seemingly opposing approaches if viewed from a traditional approach.

Companies generally announce their policies and practices through sustainability reports. Sustainability reporting is the concept of reporting beyond the financial impacts of the company and includes reporting across environmental, social and economic impacts. The report should depict a balanced and fair perspective of an organisation's (positive and negative) impacts through its operations, and should be applied to the organisation's commitments, strategy and management approach for the purposes of benchmarking, demonstration and comparison (Global Reporting Initiative, 2006:3). According to an international KMPG survey (2011:3), more than a third of businesses still do not have a sustainability strategy. Of those that do, only one in three publically reports on their progress. However, almost 50% of respondents believed that sustainability practices would definitely improve their profitability. "A key challenge for leadership is to make sustainability issues mainstream. Strategy, risk, performance and sustainability have become inseparable" (Institute of Directors Southern Africa, 2009:11).

The United Nations Global Compact (2011:10) defines corporate sustainability as "a company's delivery of long-term value in financial, social, environmental and ethical terms", based on the realisation that companies are powerful citizens within their communities. Naidoo (2009:316) indicates that being a good corporate citizen implies that a company conducts its business in a manner which is ethical, socially and environmentally responsible, that the company is transparent in its dealings with stakeholders and is willing to account for both its positive and less positive impacts on society".

2.3 CLIMATE CHANGE

Climate change refers to "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods" (IPCC, 2008:812; United Nations, 1992:2). Climate change is the most formidable challenge facing humanity and holds the potential to be the "greatest and widest ranging market failure ever seen", with an estimated potential cost of a minimum of 5% of annual global

GDP if action is not taken (Stern, 2006:1). Pressure to address climate change issues is intensifying as several politicians, leaders and scientists grow increasingly concerned about the human impact on the environment and the subsequent long-term sustainability of the planet (UNEP 2011:1; Bernstein, *et al*., 2007:30; IPCC, 2007a:3).

2.3.1 An overview of climate change

The environmental and social impact of global economic development over the past 200 years has resulted in an increase in the average global temperature (Bernstein, *et al*. 2007:97), melting of snow and ice, and a rise in the global average sea level (Bernstein, *et al*. 2008:30; Norcia 2008:3; Cogan, 2006:v-1). Climate change will compromise the ability of all types of ecosystems (marine, coastal, freshwater and terrestrial) to function effectively (South Africa. 2011:8) It will lead to an increase in desertification, a decline in water resources, loss of biodiversity and deforestation. From a human perspective, these pressures are leading to global food security concerns. With a rising population (UNFPA, 2011:3) and increasing global poverty, environmental concerns are translating into social and economic impacts and scarcities (UNFPA, 2011:93) that present a direct threat to international peace and security (Masters and Duff, 2011:xxii).

The science of climate change is a complicated and evolving international issue, with massive global impacts that pose significant physical, regulatory and competitive risks which cannot be ignored (Cogan, 2006:11-12). Scientists generally agree that the worst effects of climate change can be avoided if we reduce emissions to an acceptable level (IPCC, 2007a:69). The world's richest half billion people (about 7% of the global population) are responsible for approximately 50% of global carbon dioxide emissions. Current global consumption patterns have shown that it takes the earth one and a half years to regenerate resources consumed in one year, with half the global footprint attributed to 10 countries in 2007 (UNFPA, 2011:93).

This section aims to discuss climate change from an international and South African perspective, and describe mechanisms and strategies that can be used to reduce the impacts of climate change.

2.3.2 Climate change and South Africa

It is widely acknowledged that the African continent is the smallest contributor of greenhouse gas (GHG) emissions relative to other regions. However, Africa and its people "will increasingly bear the brunt of climate change" (Stoffberg and Prinsloo, 2009:xii). Between 75 million and 250 million African people are projected to be exposed to increased water stress by 2020 (IPCC, 2007b:48), resulting in significant impacts on agricultural production, restricted access to food and subsequent poverty and malnutrition. The projected sea level rise will affect low-lying coastal areas with large populations, where costs will amount to at least 5-10% of GDP (Bernstein, *et al*., 2008:48-50). A primary concern is that climate change is likely "to worsen poverty or burden marginalised and vulnerable groups with additional hardships" (UNFPA, 2011:95).

South Africa is a fossil fuel dependent nation, with approximately 90% of energy derived from low-cost coal (Incite Sustainability, 2011:18). The country's reliance on fossil fuels results in high GHG emissions, amounting to approximately 510 million tonnes of CO2 per annum (Incite Sustainability, 2011:18). South Africa is responsible for 1.1% of global emissions and is currently ranked 19th based on the world's total emissions (Brick and Visser, 2009:1).

South Africa's contribution to global domestic product (GDP) is 0.71% and the population is 0.73% of the global total. In spite of this, the country's energy usage stands at 1.14%, while CO2 emissions are 1.6% of global output (Peter and Swilling, 2011:5). These figures indicate that South Africa is far above the average level for energy consumption and greenhouse gas emissions in relation to population and GDP. In 2000 "the average energy use emissions for developing countries constituted 49% of total emissions, whereas South Africa's energy use emissions constituted just under 80% of total emissions" (South Africa, 2011:26).

South Africa is also vulnerable to the impacts of climate change, based on its socio-economic and environmental context (South Africa, 2011:9). The Government has acknowledged that it must act to mitigate its emissions as it is one of the world's least energy efficient economies (Incite Sustainability, 2011:18). In 2011 the South African

Government approved the National Climate Change Response White Paper which sets out South Africa's transition toward a climate resilient and lower carbon economy and society, committing South Africa to a "fair contribution to stabilising global GHG concentrations in the atmosphere and to protecting the country and its people from the impacts of inevitable climate change" (South Africa, 2011:10).

2.3.3 The Kyoto Protocol and post 2012

Given the extent of the impacts of climate change, global collective action through concerted efforts from all countries appears to be the only effective means of addressing the problem (South Africa, 2011:8; Reyers, 2009:2). The Stockholm Conference was the first notable international conference focused on environmental issues as discussed in 2.1.

In 1992, climate change was introduced as a political agenda, leading to the establishment of the United Nations Framework Convention on Climate Change (UNFCCC). The main objective of the UNFCCC is "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system," (United Nations, 1992:4). GHG stabilisation could be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner (IPCC, 2008:821).

In 1997 the Kyoto Protocol was adopted by the UNFCCC, which acts as a legal instrument under the UNFCCC framework. The Protocol is an undertaking by developed and developing countries to reduce greenhouse gas emissions as a response to the impending impacts of global warming and climate change. In 2005 the Kyoto Protocol was ratified. To date, over 180 countries have recognised the need to stabilise the concentration of greenhouse gases in the atmosphere under the UNFCCC (UNFCCC: 2011:1). Country signatories to the Protocol agreed to reduce their anthropogenic emissions of greenhouse gases by an average of 5% below 1990 levels during the commitment period (2008 to 2012) (UNFCCC: 2011:1). The Protocol recognises that developed countries are largely responsible for current levels of GHG emissions as a result of industrialisation, and therefore places a heavier burden on these countries through differentiated rights and

duties under the treaty (UNFCCC: 2011:1). The South African Government signed the Kyoto Protocol in July 2002. Although the country is not held to any legally binding targets due to its status as a developing nation, South Africa has nonetheless committed to reduce its GHG emissions by 35% below current levels by 2020, and 42% by 2025 (Incite Sustainability, 2011:18). The distinction between the Protocol and the Convention is that the latter encourages industrialised countries to reduce GHG emissions, whereas the Protocol requires a legally binding commitment (UNFCCC: 2011:1).

Climate change actions are broadly divided into compliance and voluntary actions. Compliance actions stem from the Kyoto Protocol, where the primary motivation is regulatory compliance (UNFCCC: 2011:1). The voluntary market, by contrast, is a demand-driven market that stems from a voluntary action to reduce emissions (Reyers, 2009:21). These are further discussed later in the chapter.

Climate change discussions are at a crossroads. Although 180 countries signed the Kyoto Protocol in 1997, very few countries directly tackled emission reduction goals. With Kyoto's term due to end in 2012 (UNFCCC: 2011:1), there is a limited and varied commitment beyond 2012 as the implementation of reduction goals has proved challenging. The ultimate objective of the UNFCCC was to keep the mean temperature increase below two degrees Celsius. While this goal still enjoys extensive support, translating it into the two areas of required action (mitigation and adaptation - section 2.3.4 and 2.3.5), it is proving challenging, particularly in light of the increasing interdependence of the world's economies. Instead, it is likely that future discussions are likely to direct more attention to the development of a green economy that aims to make it economically viable for all economies to work together in order to mitigate climate change with sound economic and social justification (UNEP, 2011:01). The green economy is further discussed in Section 2.3.6.

The Kyoto Protocol is an important first step towards a global GHG emission reduction regime and forms the basis for future agreements on climate change (UNFCCC: 2011:2). It is uncertain if a new international framework will be introduced after 2015, in the interim action seems to be primarily driven by voluntary national governments and led by business (WBCSD, 2011:21).

2.3.4 Adaptation strategies to counter climate change

The developing world faces far greater challenges than the developed world with regard to the impacts of climate change and their ability to effectively respond to it (IPC, 2007b:40-49). There is an increasing focus on adaptation to climate change for countries that are directly affected, in particular less developed countries. Climate change adaptation refers to adjustments made as a result of climate change and seeks to reduce the costs and severity of climate change impacts (Stoffberg and Prinsloo, 2009:17) by reducing the vulnerability of both human and environmental systems (Masters and Duff, 2011:xxi). Even if mitigation measures are successful, “action will be required to prevent large-scale environmental catastrophes” (Masters and Duff, 2011:xxi). Adaptation options range from technological development to behavioural changes amongst both individuals and companies.

Due to developing countries' increased vulnerability to climate change, adaptation has become a crucial element of climate change negotiations (Masters and Duff, 2011:3). The UNFCCC addressed adaptation through multiple approaches, such as forums and frameworks, given how adaptation is not extensively covered in the Kyoto Protocol. One of these frameworks is the Cancún Adaptation Framework (CAF), which emerged from the Conferences of the Parties (COP) 16. Within this framework, party states indicated that adaptation must be addressed at the same level of priority as mitigation (Masters and Duff, 2011:xxiv). Governments in the Southern African Development Community (SADC), lack the capacity (human and institutional), fiscal reserves and the technology required to adjust to climate change impacts. According to Masters and Duff (2011:3), this is further exacerbated by the need to address these countries' pressing socio-economic challenges of poverty, unemployment and inequality. Some may argue (Masters and Duff 2011:3), that these are the more immediate developmental needs, particularly since the region has contributed very little to global warming. The onus is therefore seen to lie on the more developed counties to take up implementation. The reality is that the SADC region, as well as Africa as a whole, is particularly vulnerable to climate change impacts and will bear the brunt of its effects (IPCC 2007b:19; Masters and Duff 2011:3).

2.3.5 Climate change mitigation mechanisms

In responding to climate change, communities can adapt to its impacts by reducing GHG emissions, thereby reducing the rate and extent of change (Bernstein, *et al*. 2007:56). Mitigation is defined by the Intergovernmental Panel on Climate Change (IPCC) as "Technological change and substitution that reduce resource inputs and emissions per unit of output. Although several social, economic and technological policies would produce an emission reduction with respect to climate change, mitigation means implementing polices to reduce GHG emissions and enhance sinks" (IPCC, 2008:818).

The Kyoto Protocol set out three flexible innovative mitigation market mechanisms (UNFCCC 2011:1) which have been developed in an effort to: 1) assist in the cost involved with achieving targets, 2) stimulating sustainable development by technology transfer, and 3) encourage the private sector and developing countries to get involved in emission reduction, thereby creating what is known as the "carbon market" (UNFCCC, 2011:2).

In addition to the global Kyoto Protocol, voluntary domestic and regional trading schemes have been established as policy instruments at a national or regional level. The voluntary carbon offset market has seen significant growth (Carbon Trust: 2006:01; Mizrach, 2011:335) however the market remains unregulated with a plethora of offset services (Carbon Trust: 2006:01). This carbon market is further discussed in section 2.4.5.

National policies and instruments utilised to create incentives for mitigation action have various levels of success and include: 1) integrating climate policies in broader development policies, 2) regulations and standards 3) taxes and charges, 4) tradable permits, 5) financial incentives, 6) voluntary agreements, 7) information instruments and 8) research, development and demonstration (Bernstein, *et al*. 2007:61). Climate change is a global concern and collective action from both the private and public sector is crucial to mitigate the impacts on the environment. However, the required action is lacking due to barriers that are inhibiting climate change mitigation from realising its full potential. Brown, Chandler, Lapsa, and Sovacool (2008) identify a wide range of barriers that impede the commercialisation of climate change mitigation technologies. These barriers are further discussed in Section 4 of the literature review.

2.3.6 The green economy and climate change

The current global economy is characterised by population pressure, vulnerability to rapid changes, resource depletion and a persistent economic crisis. The international community has reacted to pressures associated with climate change and resource depletion and there has been significant growth in the green sector, along with a global shift toward green innovation and technology (Peter and Swilling, 2011:2). The South African Government acknowledged the opportunity and global trends in its New Economic Growth Path for South Africa, where the green sector is identified as a key employment and economic driver. Peter and Swilling (2011:2) recommend that the South African economy moves to a greener economy by supporting sustainability related innovations and investment. These investments will dictate the competitiveness of economies in the future as consumer demand adapts to factors based on evolving market forces, cultural change and regulation. Peter and Swilling (2011:2) further argue that South Africa's energy intensive growth path presents a threat to the sustainability of South Africa's economic growth, further threatened by the economic implications of global resource depletion.

The term "green economy" refers to an economy that is low carbon, socially inclusive and resource efficient), and is strongly linked to sustainable development and poverty reduction (UNEP, 2011:16). The term implicitly recognises that human life should be improved within the boundaries of the environment and that sustainable development should not be replaced by the green economy. Regardless thereof, "achieving sustainability rests almost entirely on getting the economy right" (UNEP, 2011:17). It is estimated that this could be achieved by investing 2% of the global GDP (UNEP, 2011:24).

Although the concept of a green economy has been criticised as a trade-off between sustainability and economic progress, it has been shown that the green economy provides opportunities for growth investment and job creation (Peter and Swilling, 2011:2; UNDP, 2011:16). Some concerns have been raised that the corporate emphasis on green economy is likely to spur greater convergence of corporate power, culminating in a resource grab (ETC, 2011:iv). ETC (2011:40) further stresses the importance of full inter-

governmental debate and involvement from representative organisations and civil society to ensure that the green economy is guided by strong social policies.

2.4 CORPORATE ENVIRONMENTAL STEWARDSHIP

In recent years, companies have made significant strides in developing and implementing frameworks for good corporate governance and sustainable development. Environmental issues, however, are growing in scale and complexity, and traditional corporate environmental practices are unlikely to be sufficient to ensure long-term sustainable development (UNGC and Duke University, 2010:8). In the 21st century global companies have come under increased pressure to become central players in sustainability stewardship (Sathaye *et al.*, 2007:693). Corporate citizenship implies that companies do not operate in a vacuum and should conduct their business in a manner which is ethical, socially and environmentally responsible (Naidoo, 2009:316). Environmental issues have become a crucial factor in the comprehensive management of opportunities and risks in a globalised world (UNGC, 2011:12), and protecting the business from climate change impacts is critical in achieving sustainable and strong shareholder returns (PricewaterhouseCoopers 2011:7).

2.4.1 An introduction to corporate environmental stewardship

The United Nations Global Compact and Duke University (2010:9) defines environmental stewardship as “the comprehensive understanding and effective management of critical environmental risks and opportunities related to climate change, emissions, waste management, resource consumption, water conservation, biodiversity protection and ecosystem services”.

In 2000 the United Nations Global Compact (UNGC) was launched. It is a network of companies and organisations across 100 countries which act as a policy platform and a practical framework to advance social and environmental principles bringing together UN agencies, labour and civil society in order to drive voluntary corporate citizenship through collective action. The UNGC has since grown into the largest corporate citizenship initiative in the world, with over 8,000 participants from 135 countries (UNGC and Duke

University, 2012:31). The private sector is ideally positioned to make a meaningful, necessary and responsible contribution to become environmental stewards in their communities. This section aims to provide further insights into the role of corporate environmental stewardship, global carbon programs, and the corporate strategies and mechanisms required to take meaningful climate change action.

2.4.2 The role of corporate environmental stewardship

The private sector is a fundamental player in environmental stewardship, which is required to take progressive steps in making development more sustainable in the future (Sathaye *et al*., 2007:693; Burke, 2009:5). Research suggests that securing environmental strategy at a governance level of a company is critical to ensure true environmental stewardship is effectively driven, both currently and into the next generation (UNGC and Duke University, 2010:9).

An integral component of environmental disclosure and good corporate citizenship is the development, implementation and disclosure of climate change mitigation and adaptation strategies (Griffiths, Haigh, and Rassias, 2007:1) demonstrated that variances in institutional governance systems impact on, shape and are shaped by corporate responses to climate change. There is general consensus in the global community that environmental stewardship is very important, but few companies have taken meaningful steps toward true stewardship, partly because their managers are not fully empowered to make changes (UNGC and Duke University, 2010:9). Furthermore, environmental stewardship initiatives are often once-off projects that are not aligned with corporate strategy (UNGC and Duke University, 2010:9).

A study conducted by Unterlerchner (2007:1) focused on the integration of sustainability reporting in South Africa in JSE listed companies in 2006. The study demonstrated that a very small percentage of local companies report on climate change incentive mechanisms, and that environmental management was the matter that was the least reported on (Unterlerchner, 2007:iii). In addition Unterlerchner (2007:50) found that adherence is generally focused on compliance, rather than actual implementation.

An area of increased environmental focus is corporate climate change action. This is primarily due to the private sector being responsible for a significant portion of GHG emissions, but also as a result of international debates and impacts of climate change globally. Climate change commands more attention at a managerial level, which results in the development of formal policies and governance programs (Cogan, 2008:3, Incite Sustainability, 2008:31). Despite these developments, South African companies are lagging behind significantly, given the dangers of climate change and the need to address climate change mitigation (Unterlerchner and Malan, 2008:22-23).

The South African "regulatory environment increasingly holds corporations accountable for their carbon footprint" (Stoffberg and Prinsloo, 2009xxii). However, "the corporate response [to climate change] needs to move beyond compliance" (Stoffberg and Prinsloo, 2009:xxii). Significant regulatory, technological and reputational risks and opportunities exist for companies in the strategic management of climate change (Cogan, 2006:11). It is therefore crucial for companies to become proactive rather than reactive. Furthermore, in order to ensure that organisations remain competitive and profitable, climate change and environmental awareness must be taken seriously and incorporated into business strategies and operations (KPMG, 2009:4).

2.4.3 The Carbon Disclosure Project

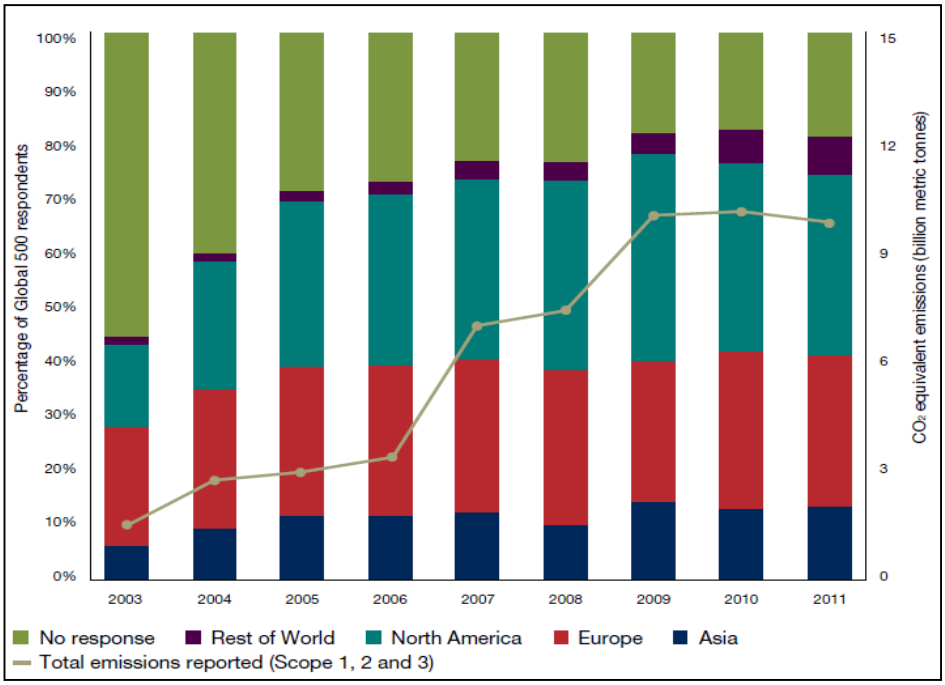
The Carbon Disclosure Project (CDP), launched globally in 2000 (operational in South Africa in 2007), is an international reporting initiative comprising of almost 6,000 of the world's largest companies who report annually on their climate strategies, GHG emissions and energy usage. The CDP is aimed at advancing investment opportunities that reduce the risks posed by climate change (CDP, 2011:2) and challenges companies to measure and report their carbon emissions; and to take climate change action to ensure long-term sustainability (PricewaterhouseCoopers, 2011:10).

The CDPs indices show a strong correlation between higher financial performance and good climate change disclosure (PricewaterhouseCoopers, 2011:9), with 97% (384) of respondents having implemented emissions reduction activities in their operations. In 2010, 94% of South African companies disclosed their greenhouse gas emissions, with 31

companies setting specific targets. In 2011 this increased to 99% of companies disclosing GHG emissions and 40 companies setting targets – indicating a steady increase of companies disclosing GHG emissions and setting reduction targets (PricewaterhouseCoopers, 2011:11).

PricewaterhouseCoopers (2011:9) found that 68% of Global 500 companies that responded to their survey indicated that they were integrating climate change initiatives into their overall business strategy, a dramatic increase from 48% as recorded in 2010. In South Africa, 77% of the responding companies reported that climate change risks and opportunities are integrated into their overall business strategy (Incite Sustainability, 2011:11). Corporate action in terms of disclosure seems to be a growing trend, both globally and in South Africa, as detailed in Figure 2.3:

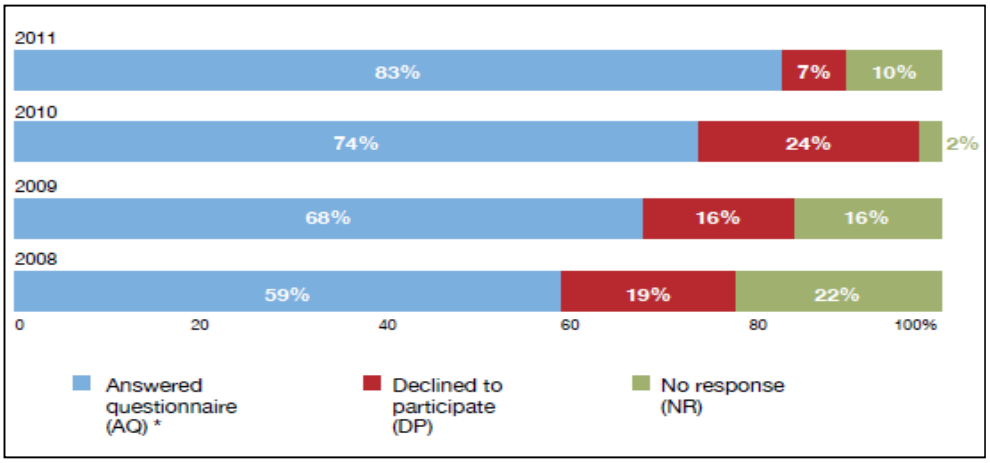
Figure 2.3: Total global response rates and emissions reported over time by geography (all scopes)



Source: PricewaterhouseCoopers, (2011:11)

Figure 2.3 shows the steady growth in global responses from 2003 to 2011, while Figure 2.4 shows South African responses from 2008 to 2011.

Figure 2.4: JSE 100 Response rate CDP 2011 vs. CDP 2010, 2009, 2008



Source: Incite Sustainability, (2011:20)

The rising figures indicate that climate change mitigation policies and related sustainable development practices will continue to grow in the next few decades (PricewaterhouseCoopers, 2011:11; Bernstein, *et al*. 2007:44).

2.4.4 Strategies for corporate climate change action

Climate change corporate strategies vary extensively by sector, region and level of commitment. Companies interpret the technical and economic stakes of the climate issue differently, resulting in the adoption of variable strategies (Dunn, 2003:28; Griffiths *et al*., 2007:1).

Cogan (2006:14-15) suggests that companies aiming to successfully face climate change should follow a strategy containing four key elements:

(1) An assessment of the financial impacts and correlations with core business and climate change,
(2) Development and implementation of action plans to manage climate risks and take advantage of climate change related opportunities,
(3) Open dialogue about their climate change strategies with stakeholders,
(4) An adoption from short-term focus toward an emphasis on long-term financial results and building shareholder value.

International companies that have successfully integrated climate change into governance and strategic planning should focus on five main areas of implementation, namely: 1) board oversight, 2) management execution, 3) public disclosure, 4) emissions counting and 5) emissions management and strategic opportunities (Cogan, 2006:3). In an attempt to develop a "corporate measuring stick" and to increase active involvement in climate change in the corporate sphere, the CDP was introduced in 2000. CDP reporting records "the business response to climate change, whether it be risks and opportunities, absolute emissions levels, performance over time or governance" (PricewaterhouseCoopers, 2009:9).

The United Nations Global Compact (2010:11) suggests four universal organisational approaches to environmental stewardship: "1) *Embed* environmental stewardship into all facets of the organisation, 2) *Balance* short-term targets and long-term goals that are both critical to performance and environmental stewardship, 3) *Diffuse* best practices throughout value chains and business networks by collaborating and engaging stakeholders and, 4) *Translate* best practices into processes and practices that are applicable in the diverse geographies in which they operate". The UNGC and Duke University (2010:11) indicate that leading organisations go beyond implementing these approaches by adopting a "comprehensive cyclical approach to management" to ensure high levels of environmental stewardship.

Through the Kyoto Protocol, voluntary domestic and regional trading schemes have been established as policy instruments, both at national or regional levels (Carbon Trust 2006:4). These instruments, schemes and initiatives are constantly developing and although they vary in policy and implementation, this is one of the primary markets for mitigation (Carbon Trust 2006:6).

2.4.5 The carbon market

The goal of reducing GHG emissions and thereby pursuing sustainable development lies at the heart of the carbon market. There is a global move from government to *governance*, with a greater acceptance for market-based and voluntary initiatives *(*Sathaye *et al.*,

2007:708). One such initiative is the voluntary carbon market, which started independently and represents unregulated trading in carbon credits. Corporate climate change strategies in carbon neutrality and offset programmes have driven the development of the voluntary carbon market, attributed to an increase in public awareness of climate change (Carbon Trust, 2006:2) and to reduced transaction costs when compared against the compliance market (Reyers, 2009:20).

The largest emission trading mechanism is the European Union's Emissions Trading System (EUETS): a cap and trade system that emerged during Kyoto, which traded 6,349 million metric tonnes of CO2 in 2009. The most common traded security is the European Union Allowance (EUA) which offsets quotas amongst the Kyoto members. EUA accounts for over 80% of the market (Mizrach, 2011:335). Kyoto also created the Clean Development Mechanism (CDM), designed to assist developing countries to reduce their carbon footprint. Over 2,500 CDM projects have been approved, producing 389 million CERs (Certified Emission Reductions) per annum. Regional cap and trade programmes used primarily in North America have also seen substantial growth, but there is a growing concern regarding the sustainability of these mechanisms. Post-Kyoto discussions have not yielded any further concrete policies, leaving traders in a state of uncertainty with regards to future developments in the market (Mizrach, 2011:349).

"Alongside the compliance market, a voluntary market has emerged" (Carbon Trust, 2006:6). The voluntary carbon market is a potential vehicle to assist companies in the mitigation of climate change. The voluntary market is extremely diverse, complex and is less transparent than the compliance (Kyoto Protocol) market (Carbon Trust, 2006:6). The voluntary carbon market nevertheless plays a much-needed role in the mitigation market (Reyers, 2009:20) and is a useful tool for reducing GHG emissions (Winkler, Marquard, Tyler, Visser, *and* Brick, 2009:3).

2.5 DRIVERS AND MARKET BARRIERS FOR VOLUNTARY CLIMATE CHANGE MITIGATION

Despite South Africa's status as a developing country – and therefore not having any enforceable GHG reduction targets – many companies have chosen to act by reporting

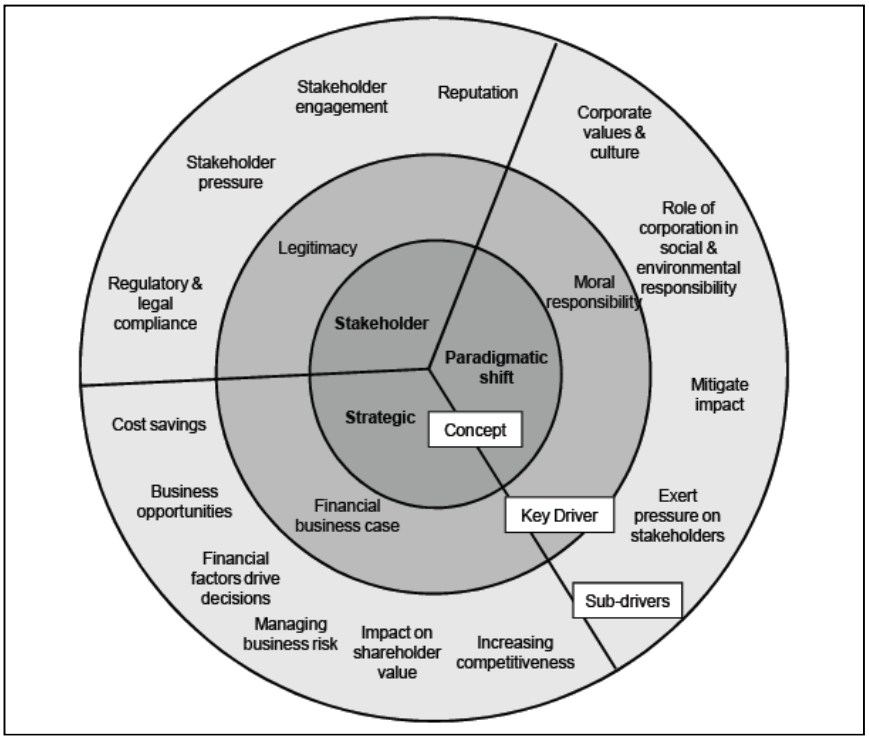
their GHG emissions and pledging to reduce their carbon footprint. The research literature aimed at understanding the drivers, inhibitors and barriers of corporate mitigation actions is limited (Okereke, 2007:475). This section aims to provide an overview of the drivers and motivators for corporate climate change action and to discuss the market barriers to voluntary climate change mitigation based on the available literature.

2.5.1 Drivers and motivators for corporate climate change action

In 2010 the Renewable Energy Energy Efficiency Partnership commissioned a study to identify drivers for corporate investment in promoting energy efficiency and the use and development of renewable energy in Brazil, China, India and South Africa – also known as BASIC countries (REEEP, 2010:3). The overall findings showed that while the majority of investment is driven by regulation, purely business-led considerations are also a driver, followed by cost reduction and energy security (REEEP, 2010:4). In South Africa, energy efficiency was a high priority for companies, in which energy security and cost reduction were key drivers (REEEP, 2010:6). This finding is further supported by the Carbon Disclosure Project, where the greatest focus of emission reduction initiatives lies in energy efficiency projects (PricewaterhouseCoopers, 2011:11).

A greater understanding of motivations driving investment in voluntary climate change mitigation in the South African private sector was researched by Reyers (2010: 1-165). A qualitative analysis of the data revealed three key motivational drivers: legitimacy, the financial business case and moral responsibility. Legitimacy refers to the motivation to take action, because stakeholders expect (or will soon expect) the private sector to do so. Moral responsibility refers to the company regarding voluntary climate change mitigation as the right thing to do, albeit with resource implications (time and / or money). Finally, the financial business case relates to actions taken by the companies that will either make or save them money. This is further supported by a number of sub drivers which provide insights for engagement with companies in developing South Africa's response to climate change (Reyers and Gouws, 2010:105). Reyers and Gouws (2010:105) further proposed a conceptual frame work as illustrated in Figure 2.5.

Figure 2.5: Extended conceptual framework



Source: Reyers and Gouws, (2010:105)

Figure 2.5 highlights the relationships between core concepts, namely: strategic, stakeholders and paradigmatic shift, along with the resultant drivers supporting each concept. In this study it was found that companies that appeared to be accountable and responsible adopted a proactive strategy. Reyers and Gouws (2010:106) suggest that these companies are motivated by competitive positions and branding benefits. They further suggest that reactive companies would respond better to reputational, regulatory and risk signals when motivating them to take corporate action.

CDP reporting in both 2010 and 2011 generally seems to indicate an increase in emission reduction initiatives. The major focus lies in energy efficiency (PricewaterhouseCoopers, 2011:11), followed by behavioural change as the second most common approach (PricewaterhouseCoopers, 2011:27). Under the framework proposed by Reyers (2010:105) and Okereke (2007:479) this suggests that many companies are driven by a financial business case as the key driver.

Okereke (2007:478) proposes that motivation factors alone are not sufficient to elicit organisational action, even in the absence of policy uncertainty. Okereke (2007:481) further indicates that ethical considerations are important. Despite this, ethical actions are only pursued as long as they do not harm profit (2007:479). Okereke (2007:479) lists five main factors that motivate UK-based companies to manage GHG emissions, of which the greatest motivator is profit, followed by competition for credibility and the subsequent leverage in gains within climate policy development circles. The third factor is fiduciary (to act on behalf of) concerns: Chief Executive Officers (CEOs) believe it is their responsibility as leaders to assess the potential impact on climate change on their businesses and take action that would benefit the company in the long term. A desire to steer the company against any potential business risk or loss as a result of inaction is the fourth motivator. The final motivating factor is the ethical consideration, from the perspective that ethics is an integral aspect of business strategy (Okereke 2007:479-480). Okereke (2007:481) further summarises the motivations, drivers and barriers in Table 2.2.

Table 2.2: Summary table of motivations, drivers and barriers

Motivations	Profit Credibility and leverage on climate policy development Fiduciary obligation Guiding against risk Ethical considerations
Drivers	Energy prices Market shifts Regulation and government directives Investors pressure Technological change
Barriers	Lack of strong policy framework Uncertainty about governments action Uncertainly about the market place

Source: Okereke 2017:481

2.5.2 Market barriers to corporate climate change action

Market barriers within the mitigation market are defined as “conditions that prevent or impede the diffusion of cost-effective technologies or practices that would mitigate GHG emissions” (IPCC, 2008:817). Sustainability values and attitudes are necessary but do not

necessarily result in the achievement of sustainability goals, as barriers may exist between expressed values or attitudes and actual behaviours (Leiserowitz *et al.*, 2006:439).

The Global Carbon Disclosure (GCD) Report compiled in 2008 shows large variations in reporting between carbon intensive sectors and non-carbon intensive sectors when reporting on their organisational response to climate change. Low scores were found in both emissions trading and emissions forecasting, regardless of the sector (PricewaterhouseCoopers, 2008:43).

In 2006, KPMG (2006:27) predicted that once potential opportunities within the Clean Development Mechanism (CDM) had been fully explored, disclosure on emission generation, CDM and climate change will become more prominent. This was further supported by PricewaterhouseCoopers (2008:v) and KPMG (2011), who found that companies globally are increasingly taking climate change mitigation more seriously. A survey conducted on the JSE 40 South African companies in 2007 indicated that of the companies surveyed, 36% implemented emission reduction programs with targets, while 43% considered emissions trading opportunities. In contrast, 82% believed that climate change presented commercial risks, while 89% were of the opinion that climate change presented commercial opportunities (Tyler, 2007:32).

Reyers (2009:166) found a “discrepancy between what companies say and what companies ultimately *do* in terms of environmental responsibility”. Although companies are aware of the inherent risks and opportunities of climate change, only three (carbon intensive) companies disclosed projections of their future carbon performance (Incite Sustainability, 2008:64-65). This leads to the perception that companies are increasingly aware of the risks and opportunities of climate change. Chief Executives cite the complexity of integrating sustainability throughout their companies and into their supply chains as a key barrier. Business is challenged to move from execution to strategy, from policy to action (United Nations Global Compact, 2011:7). However, uncertainty around future demand is a still a barrier as the corporate value associated with responding to climate change is undecided (PricewaterhouseCoopers, 2008:iv).

In South Africa, companies are aware of the inherent risks and opportunities of climate change (Incite Sustainability, 2008:64-65). A study conducted by Unterlerchner (2007:iii) focused on the integration of sustainability reporting in South Africa within JSE-listed companies. It was demonstrated that although companies are continually improving the quality of reporting; environmental management was least reported on. However, Unterlerchner (2007:50), points out the increased adherence to corporate governance requirements and sustainability reporting in terms of the King II Report in South Africa – albeit that adherence is focused on compliance rather than actual implementation, with the area of least reporting being climate change.

Limited action is a common finding in two additional South African studies conducted by Unterlerchner (2007:50), and Incite Sustainability (2011:7). This complements the findings from Reyers (2009:165), which suggests that action from companies is motivated from a financially dominated paradigm. Any attempt to motivate corporate action should therefore be driven from a financial perspective rather than a social or environmental perspective. Peter and Swilling (2011:2) indicate that demand-side mitigation efforts alone will not be enough. What is required is normative change, which will result in behavioural change. Incite Sustainability (2009:10) indicates that the awareness of the corporate sector lacks depth of knowledge and that mitigation is not considered a corporate priority thereby resulting in a compliance-driven approach as opposed to one that is pro-active. It may be argued that the large scale and scope of climate change can make corporations feel they are unable to make any meaningful contribution (Stoffberg and Prinsloo, 2009:xxi).

Brown, Chandler, Lapsa and Sovacool (2008:xiii) identify barriers impeding the commercialisation of climate change mitigation technologies and suggest that these barriers are wide ranging. The two largest barriers identified by Brown *et al* (2008:xiii) were the absence of a price on GHG emissions and issues relating to cost effectiveness. Other barriers identified include financial, technical and market risks, infrastructures and supply chain gaps, misplaced incentives, and incomplete information. They further identify six barrier categories, further broken into 50 detailed barriers. These categories are cost effectiveness, fiscal barriers, regulatory barriers, statutory barriers, intellectual property barriers and other barriers (Brown *et al.,* 2008:x). Some may argue that due to the lack of certainty around regulation a “wait and see” approach is being adopted by the corporate

sector with regards to their organisational strategy, sustainability values, finance and internal capacity. The “wait and see” approach has further exacerbated uncertainty in the marketplace, specifically around the future demand for mitigation instruments within the context of corporate value attributed when responding to climate change (PricewaterhouseCoopers, 2008:iv; and Okereke, 2007:483).

Companies are indicate that they require increased certainty of the future market, increased visibility on climate policy, carbon prices, and harmonisation within regulations to reduce the current risk (PricewaterhouseCoopers, 2008:iv), as well as an appropriate, robust and clear international framework of regulations within which companies can plan and invest with confidence (KPMG, 2011:3; WBCDD, 2011:20). Okereke (2007:483) presents similar findings in the UK, where the primary barrier to corporate mitigation is the lack of a clear, long-term robust policy framework. Hoffmann and Kolk (2007:411) argue that the “complexities, uncertainties and fragmentation of the current climate policy seem to be major factors that impede more pro-active business responses”. Uncertainty and fragmentation were also observed by KPMG (2011:3) who indicated the need for common measures and underlying systems that produce credible information (REEEP, 2010:4).

A study conducted in Hong Kong further supports this: Shu and Schroeder (2010:299) identified 11 barriers to voluntary climate change mitigation, with the largest barrier being that it was “not a legal requirement”. Consequently, voluntary action is implemented on an *ad hoc* basis. This lack of legislation can competitively disadvantage companies who do take action Shu and Schroeder (2010:298). High-level legislation shapes internal company policies related to corporate investment decisions. Legislation can be both necessary and useful (REEEP, 2010:4). KPMG (2011:5) recommends strong and clear policy signals from the South African Government, as well as information on how these policies will result in the transition to a low carbon economy. Interestingly, 64% of the companies researched in the REEEP 2010 Report (2010:7) identified current or likely future regulations as a driver for corporate investment in energy efficiency and renewable energy. In this case, future regulation / legislation could be seen as both a barrier and a driver.

In 2006, KPMG (2006:27) predicted that once the potential opportunities within the CDM had been fully explored, the disclosure on emission generation, CDM and climate change

will become more prominent. Although climate change has become increasingly visible on business agendas, CDP indicates that the awareness of the corporate sector lacks depth of knowledge, and that mitigation is not considered a corporate priority (PricewaterhouseCoopers, 2009:10).

The Carbon Disclosure Project (2011:2), researching the JSE 100 in 2011, highlighted that while there is a growing awareness amongst South African companies regarding the opportunities and risks associated with climate change, this is often only at a general level. The Department of Environmental Affairs and Tourism (2008:30) suggests that this lack of awareness is a market barrier for the adoption of renewable energy – a key climate change mitigation tool. It could also be argued that the scientific language and terminology used in climate change discussions and regulations leaves business unable to formulate effective responses (Stoffberg and Prinsloo, 2009:xxi).

Ninety percent of the 2011 South African CDP respondents indicate “having a board committee or executive body with responsibility for climate change (CDP 2011:11). “Forty companies (51% of responding companies) report that they have made provision for monetary management performance incentives relating to the achievement of climate change goals and objectives” (Incite Sustainability, 2011:11). Furthermore, most of the responding companies (77%) report that climate change risks and opportunities are integrated into their overall business strategy, but “few companies articulate what their actual business strategy is” (Incite Sustainability, 2011:28) and only 14% clearly indicate that climate change has influenced their short-term and long-term strategy” (Incite Sustainability, 2011:11).

Uncertainty remains around future demand, as the corporate value attributed to responding to climate change is unclear (PricewaterhouseCoopers, 2008:iv), and exacerbated by correspondingly poor quantitative risk assessment methodologies and business models (Department of Environmental Affairs and Tourism, 2008:30).

Although the corporate sector is increasingly seen to be active in climate change action, the level of action and subsequent impact is unclear. Research indicates that climate change is on the agenda and an important factor, yet action is still limited. UNGC and

Duke University (2010:9).indicate that the lack of environmental stewardship action is due to managers not being fully empowered to make changes and Initiatives are often once-off projects and not aligned with corporate strategy.

The United Nations Global Compact (UNGC) suggests that a systemic market barrier exists relating to corporate climate change action. Furthermore, the UNGC (2011:7) points out a continuous corporate focus on short-term gains and a failure to account for externalities related to environment and other key issues, which resulted in inadequate incentives for companies to act. There is a growing “need for financing solutions that will allow the longer term benefits of sustainability to compete with other programs with a higher short-term payback” (KPMG, 2011:4).

There appears to be an increase in emission reduction initiatives, focusing on energy efficiency (PricewaterhouseCoopers, 2011:27). The Carbon Disclosure Project suggests that this could relate to their short payback periods, with 47% of initiatives having a payback of one year or less (PricewaterhouseCoopers, 2011:27). “In many cases companies claim that what could be regarded as normal business activities, such as optimisation and cost reduction, are driven by climate change” (PricewaterhouseCoopers, 2011:29). Reyers (2009:165) found that action from companies is motivated by a financially dominated paradigm. Therefore, any attempt to motivate corporate action should be driven from a financial perspective and not from a legitimacy perspective.

Furthermore, markets are failing to put a price on greenhouse gas emissions, thereby transferring the costs on to society as a whole (Winker, 2009:1). This is supported by Brown, Chandler, Lapsa, and Sovacool (2008:xiii) who suggest that the two largest barriers are the absence of a price on GHG emissions and issues relating to cost effectiveness.

Market barriers for corporate action have been broadly grouped in five clusters as a broad summary in Table 2.3. It is recognised that there are overlaps between themes as much of the content is not mutually exclusive.

Table 2.3: Broad Market Barriers Clusters Summarised

Theme	Barriers
Theme 1: Sustainability values: The sustainability values reflected by the organisations' management commitment to the triple bottom line with a focus on the environment.	• Climate change governance seems to be integrated and reported within governance activities. However, limited action is a seemingly common trend (PricewaterhouseCoopers, 2011:11; Unterlechner 2007:50;) • Peter and Swilling (2011:2) indicate that demand side mitigation efforts alone will not be enough. What is required is normative change which will result in behavioural change • Chief executives cite the complexity of integrating sustainability throughout their companies and into their supply chains as a key barrier. Business is challenged to move from execution to strategy, from policy to action (United Nations Global Compact, 2011:7). • "There is uncertainly around the future demand as the corporate value attributed to responding to climate change is uncertain (PricewaterhouseCoopers, 2008:iv).
Theme 2: Policy frameworks: The local and international regulatory framework within which the climate change science and action (adaptation and mitigation) operates.	• The primary barrier is a lack of a robust, long-term robust policy framework and common measures (Okereke, 2007:483; Hoffmann and Kolk, 2007; REEEP, 2010:6; KPMG 2010; Shu and Schroeder, 2010:299, PricewaterhouseCoopers, 2008; WBSCD 2011,). • Of companies researched in the REEEP 2010 (2010:7) report, 64% identified current or likely future regulation as a driver for corporate investment in energy efficiency and renewable energy.
Theme 3: Knowledge of Green House Gas (GHG) mitigation instruments: The expertise, skills and experience of the organisation in climate change mitigation with a particular focus on climate change mitigation efforts.	• KPMG (2006:27) predicted that once the potential opportunities within the Clean Development Mechanism (CDM) had been fully explored that disclosure on emission generation, CDM and climate change will become more prominent. • Awareness of climate change in the corporate sector lacks depth of knowledge (DEAT, 2008:30; Incite Sustainability, 2009:10). • It could also be argued that the scientific language and terminology used in climate change discussions and regulations leaves business unable to formulate effective responses (Stoffberg and Prinsloo, 2009:xxi).
Theme 4: Organisational strategy: The organisational strategy refers to the corporate plan of action required to achieve and institutionalise corporate climate change action and is closely linked with sustainability values.	• Companies are increasingly aware of the risks and opportunities within climate change, however action is deficient (Incite Sustainability, 2008:64-65; Tyler, 2007:32). • The lack of environmental stewardship action is due to managers not being fully empowered to make changes and initiatives are often once off projects and not aligned with corporate strategy (UNGC and Duke University, 2010:9; Shu and Schroeder, 2010: 299)
Theme 5: Finance: The theme of finance refers to concepts relating to time, money and their interrelationship with risk and climate change mitigation.	• Action from companies is motivated by a financially dominated paradigm. Any attempt to motivate corporate action must therefore be driven from a financial perspective and not from a legitimate perspective (Unterlechner, 2007: 50; Reyers, 2009:165; CDP, 2011: 27). • The two barriers identified were the absence of a price on GHG emissions and issues relating to cost effectiveness (Brown, Chandler, Lapsa,and Sovacool, 2008:xiii; Winker, 2009: 1). • A barrier to mitigation includes inadequate incentives for companies to act (United Nations Global Compact, 2011:7). • A systemic market barrier exists relating to corporate climate change action and a continuous corporate focus on short-term gains (United Nations Global Compact, 2011:7; KPMG, 2011:4)

The five identified clusters are framed based on the available research and is further researched in the primary research in section 3 of this study,

2.6 CONCLUSION

The social, environmental and economic pressures of the modern world have resulted in the need for sustainable development for the future, which meets the needs of the present generation without compromising the ability of future generations to meet their own needs. Globally, there are 2.5 billion people living on less than USD 2 daily and the number of people living in poverty will rise dramatically as another 2 billion people will be added to our existing population by 2050, placing an additional strain on our already stretched resources. The need for a transition to more sustainable consumption and production patterns is undeniable and to preserve ecosystems, fight poverty and promote energy security in the long term, sustainable economic growth must be placed at the heart of future development and policies.

The increase of initiatives, tools and guidelines on sustainability indicate a growing awareness of global sustainability issues as companies are viewed as being corporate citizens with inherent rights and responsibilities. Responsible leaders direct company strategies and operations with a view of achieving sustainable economic, social and environmental performance; however sustainability issues are an afterthought on the boardroom agenda and are not given sufficient priority. A key challenge for leadership is to make sustainability issues mainstream; the leadership must integrate strategy, sustainability and control, and establish the values and ethics that underpin sustainable practices. Corporate leaders play a crucial and challenging role in implementing development in a sustainable manner to the benefit of all stakeholders, as these leaders are challenged to enable economic growth and increase both the environmental quality and social inclusiveness, while mitigating and adapting to the impacts of climate change.

There are various factors that influence corporate response to climate change, ranging from economic opportunities to moral responsibility. The research suggests that while majority of investment is driven by regulation, the private sector is taking action, albeit on a limited scale. There seems to be discrepancies between what companies say and what

they actually do because they are challenged to move from policy to action. There are five broach clusters representing market barriers for climate change namely; sustainability values, legislation, knowledge, organisational strategy and finance. Companies are making investments in renewable energy and energy efficiency and corporate actions seem to be integrated and reported within corporate governance and sustainability frameworks; however the level and action is often questionable as merging environmental elements into the economics of decision making is lacking.

It is clear to the private and public sectors that mainstreaming climate change into sustainable development strategies plays a critical role in ensuring future global climate stabilisation. However many still sit on the fence as they take a “wait and see” approach, while they linger for direction.

UN Secretary General, Ban Ki-Moon stated that “[w]e can and must shape a future where robust markets, sustainable development and a healthy planet become the new status quo. In this pursuit, the greatest contribution by business is the integration of environmental, social and governance issues into their strategies and operations,” (UNGC, 2011:3).

3 RESEARCH DESIGN AND METHODS

3.1 DESCRIPTION OF INQUIRY STRATEGY AND BROAD RESEARCH DESIGN

Sustainability reporting is becoming a mainstream activity for business (PricewaterhouseCoopers, 2008:05; Unterlerchner, 2007:2). However, a number of studies have found that environmental management in the private sector is receiving inadequate attention (CDP, 2008:64-55; Trialogue, 2007:11; Unterlerchner, 2007:iii), while King (2009:9) suggests that South African companies have made insufficient progress towards sustainability. The private sector is lagging behind in respect of being aware of the future dangers of climate change and the need to address climate change mitigation (Unterlerchner and Malan, 2008:22-23).

In order to gain an increased understanding of the market barriers to South African corporate climate change mitigation – and given the general lack of information on the topic – a mixed method approach was adopted as the method of inquiry for this study. A mixed method involves collecting, analysing and combining both qualitative and quantitative data in the research process (Creswell and Plano Clark, 2007:5). Qualitative data is non-numerical or unquantified data (Saunders, *et al.,* 2007:608), and allows the researcher to gain new insights into a specific phenomenon in the context of limited information (Saunders *et al.,* 2007:608). In contrast, quantitative research generates numerical data and is used to "answer questions about the relationships among variables with the purpose of explaining, controlling and predicting the phenomena" (Leedy and Ormrod, 2005:94). When utilising a mixed method approach, the central assumption is that a better understanding can be attained than either method in isolation (Creswell and Plano Clark, 2007:5), thereby maximising the individual strengths of both approaches.

The methodology for this inquiry was split into two phases, each following a mixed methods approach:

- Phase 1 involved an exploration of market barriers to climate change mitigation by reviewing literature, as well as through consultation with climate change experts and suppliers. This allowed the researcher to explore the topic in depth and to develop and test a questionnaire to be used in Phase 2.

- Phase 2 involved using the questionnaire developed in Phase 1 to survey the Johannesburg Stock Exchange (JSE) Sustainability Reporting Investment (SRI) Index 2010 companies, followed by four semi-structured interviews with the sample in order to gain increased insight into the research findings.

This chapter provides a description of the methods used in Phase 1 and 2 of this study, including sampling, data collection, data analysis, data quality issues and research ethics.

3.1.1 Classification of research design decisions

The research design maps out the general plan of how the researcher answered the research objectives. The basic research study was conducted with the aim of making a theoretical contribution (Leedy and Ormrod, 2005:43), where the key consumers are the academic community (Saunders *et al*., 2007:592). However, this study is not only an addition to the existing body of academic research but also has relevance to the private sector.

The purpose of this research was to determine the degree to which organisations have embraced sustainability reporting. Reporting on sustainability issues is still relatively new and the existing knowledge base is currently inadequate to develop effective theoretical propositions. The purpose of the research was therefore exploratory in nature, with the aim to clarify and improve understanding of the topic (Saunders *et al.,* 2007:133).

The time horizon in which the research was conducted was cross sectional, as it was involved at a specific time (Saunders *et al.*, 2005:148) within the survey strategy (Saunders *et al.,* 2005:148). Participants were interviewed once and the data collected represented a specific time period between May 2011 and October 2011.

The study applied empirical research, making use of primary (new) data that was gathered through two phases of primary data collection (see Appendix 2 and 3). Primary data are referred to as data that are purposefully collected for the research study (Saunders *et al*., 2007:607), conducted for the first time by direct observation (Panneerselvam, 2004:13). The primary data were collected using a mixed method, thereby allowing for increased

exploration in the study by utilising both qualitative and quantitative research. Mixed method is both a philosophical assumption and a method of inquiry and is concerned with collecting, analysing and combining both qualitative and quantitative data in the research process (Creswell and Plano Clark, 2007:5). Based on the results of the data collected, an inductive approach was used to develop a particular theory based on observing the empirical data (Saunders *et al.*, 2007:599). This allowed the researcher to use inductive reasoning to draw conclusions on the foundation of the events and occurrences (Leedy and Ormrod, 2005:32).

3.2 THE RESEARCH PROCESS

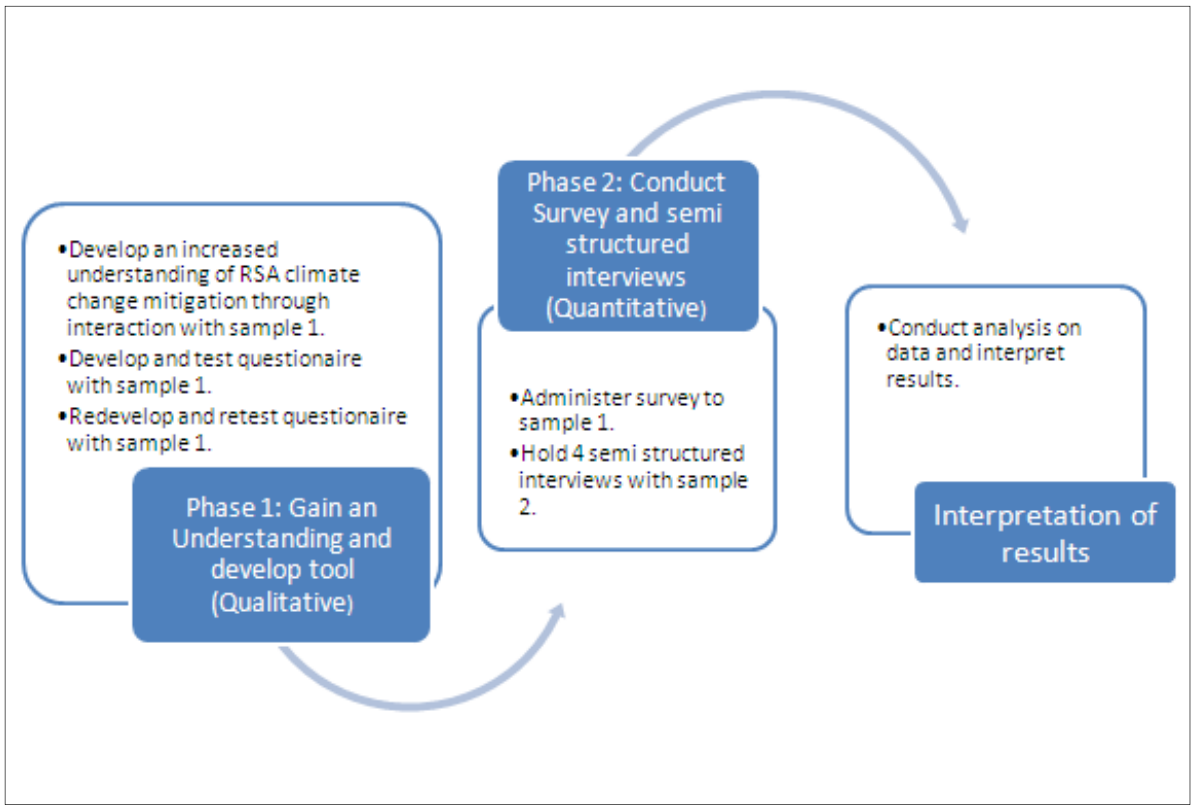
The research process used in the study employed a mixed method approach over two research phases or periods, as represented in Figure 3.1. Phase 1 used primarily qualitative data, while Phase 2 used quantitative primary data – which both contributed to the findings as discussed in chapter 4.

The aim of Phase 1 was to gain further understanding on the topic through consultation with climate change experts and suppliers, to explore the topic in depth, and to develop and test the questionnaire to be used in Phase 2.

Phase 2 involved using the questionnaire developed in Phase 1 when surveying the Johannesburg Stock Exchange (JSE) Sustainability Reporting Investment (SRI) Index 2010 companies. Thereafter, semi-structured interviews were held with four of the sample in Phase 2 to validate the findings. This process is illustrated in Figure 3.1.

Phase 2 relied strongly on the survey as it relied on structured questions utilised to map out reality by observations from a sample obtained from the population. Survey results were converted into data, which in turn were statistically analysed. A survey design is a commonly used method in business, employed to describe incidence, distribution and frequency of a particular population (Leedy and Ormrond, 2005:108). Survey research is used to measure 1) attitudes and preferences, 2) beliefs and predictions, 3) differences between groups and 4) causal proportions (Weisberg, Krosnick, and Bowen, 1996:13-18).

Figure 3.1: Exploratory sequential design



The strengths of a survey design include high measurement reliability and construct validity, while holding the potential to generalise the findings to the population if the sample is a probability sample (Saunders, *et al*., (207:138). An electronic survey can be used to expand geographic coverage, reduce costs and save time. Furthermore, respondents can remain anonymous, which often leads to an increased response rate (Cooper and Schindler, 2003:340). The findings from the survey were then used to in semi-structured interviews held with a subset of the sample (of the JSE SRI 2010 companies) in order to validate the results and to gain a more in-depth understanding of the possible rationale for some of the results. Semi-structured interviews are characterised by a wide range of themes and questions that vary depending on the participants being researched (Saunders *et al*., 2007:314-313). Semi-structured interviews are a qualitative, non-standardised research method, allowing the researcher to gain new insights into a specific phenomenon in the context of limited information (Saunders *et al.,* 2007:608). The initial response rate in Phase 2 was lower than anticipated. Therefore, the researcher conducted follow-up face-to-face semi-structured interviews with four of the sampled units in Phase 2.

The selection of companies to include in Phase 3 was purposively selected to ensure that they were representative within the sample, consisting of companies with high and low environmental impact, as well as representing a variation of sectors (fast moving consumer goods to mining).

The limitations of semi-structured interviews include 1) potential researcher bias, 2) lack of standardisation and 3) the time commitment required from the researcher to conduct individual interviews. In Phase 2 these limitations did not apply; interviews where based on the outcomes of the survey questionnaire, enabling a high level of standardisation. Interviews were also recorded and coded to minimise the potential for bias. Finally, the interviews were held based on the availability of the respondents.

3.3 THE POPULATION AND SAMPLE

The primary data for this study were sequentially collected from two samples, as indicated in Figure 3.1. The sampling plan discussed below includes the target population, sample size, units of analysis and sample method. Note that Phase 2 of the study was dependent on the outcomes of Phase 1.

3.3.1 Target population

A population is the object that is being studied, which could be groups, individuals, organisations or products (Welman and Kruger, 2003:46). Phase 1 of the study was a mixed method exploration of the existence of market barriers in the climate change mitigation market with the aim of developing and testing a questionnaire to be administered in Phase 2 of the study.

The target population in Phase 1 included 40 experts and suppliers of climate change mitigation products in South Africa. Experts and suppliers are defined as persons who are actively involved in climate change for more than six years, representing academia, consultants, suppliers of renewable energy, and public servants from applicable Government departments – such as the Department of Energy, municipalities, and the South African National Energy Research Institute.

Phase 2 followed up on Phase 1, with the purpose of validating and testing the information. In the context of Phase 2, the Johannesburg Stock Exchange (JSE) Sustainability Reporting Index (SRI) 2010 was the target population used for the purpose of this study. The JSE SRI Index was launched in 2004 in response to the global debate around sustainability. The SRI Index is based on a set of sustainability criteria used to measure the triple bottom line, with the goal of compiling a list of those companies that pass criteria requirements. This population was used in the study primarily due to their knowledge and involvement in sustainability and inherent understanding of the topic. The JSE SRI index of 2010 comprised of 74 companies from different industries and correspondingly variable levels of environmental impact (see Annexure 4). The study analysed 26 completed questionnaires, achieving a response rate of 35%. In Phase 2, four follow up interviews were held with the JSE SRI sample after the analysis of the survey was completed to gain further insights in to the findings and thereby increase the rigour of the study.

3.3.2 Sample size, sampling and units of analysis

The size of the population often makes it unfeasible to involve the entire population and therefore a sample is taken (Welman and Kruger, 2003:46, Leedy and Ormrod, 2005:145). The sample is a representation of the population being studied. The sample size refers to the actual numerical value of the subgroup or a section of a larger population (Saunders *et al.*, 2007:610) and the sampling plan representing the sampling units that are selected. The Phase 1 sample size contains 40 experts and suppliers in the field of climate change and mitigation. The sample size in Phase 2 included 74 companies listed on the Johannesburg Stock Exchange Sustainability Reporting Index 2010, thereby implying that all companies in the sampling frame was included in the study. Their suitability was based on the positions held, those being either the Chief Executive Officer (CEO) or Sustainability Manager.

The sampling technique used in Phase 1 of the study was purposive sampling. Purposive sampling is employed when the researcher's own judgement is used to select samples in an effort to best answer the research question (Leedy and Ormrod, 2005:206). The limitation with this method is that it cannot be statistically representative of the total

population (Saunders *et al.*, 2007:230). However, given the nature of the research design, judgemental sampling was used to ensure maximum feedback from the population through testing the questionnaire.

Relating to the survey in Phase 2, Cooper and Schindler (2003:179) emphasise that very careful consideration must be given to sampling in survey research, given that data can easily become unusable if gathered incorrectly, thereby creating an incomplete picture of the phenomenon (Leedy and Ormrod, 2005:145). Generally, the larger the sample, the better the data (Leedy and Ormrod, 2005:207; Welman and Kruger, 2003:46). Attaining representative sample population parameters and sampling procedures are of the utmost importance. Leedy and Ormrond suggest that in small populations it is best to sample the entire population (2005:207). The population in Phase 2 of this study is 74. The researcher therefore sampled the entire population of the Johannesburg Stock Exchange Sustainability Reporting Index 2010, which comprised of 74 companies at the time.

The units of analysis are known as the members or elements of the population (Welman and Kruger, 2003:48). Units of analysis for Phase 1 included experts and / or suppliers in the field of climate change and mitigation. Of the 40 units sampled, eleven responded and were analysed in the study, representing a 28% response rate.

In Phase 2 the units of analysis were senior managers employed by the 74 companies who are responsible for sustainability reporting / climate change mitigation. Of the 74 units sampled, 34 started the survey. However, only 26 completed the entire survey questionnaire and provided usable data. The 26 completed questionnaires used in the study represent a 35% response rate. As the response rate was lower than anticipated the researcher thereafter held additional face-to-face semi-structured interviews with four units to gain further insight and compliment and validate the research findings.

In both phases of sampling the researcher was aware of potential bias in the responses. However, it was assumed that the respondents represent an informed proportion of the population.

3.4 DATA COLLECTION

The reliability of decisions is based on the quality of the data used (Panneerselvam, 2004:17). Therefore, it was essential that data be collected correctly. A number of factors were taken into account when planning the data collection and mode selection. Groves, Fowler, Couper, Lepkowinski, Singer and Tourangean (2004) suggest that the degree of interaction with the respondent, degree of privacy and the use of technology should be carefully considered prior to selecting the collection instrument and mode in a survey (2004:140-142).

After critical consideration and assessment of the research objectives, and appropriate research strategy given the sequential mixed method approach, the researcher selected questionnaires in Phase 1 and a survey questionnaire with follow up semi-structured interviews in Phase 2. For a review of the research problem and selected research strategy, see Table 3.1.

Table 3.1: Basic breakdown of the research problem and the research strategy

No	Research Objective	Research Strategy
1.	What are the thematic clusters of market barriers for voluntary climate change mitigation in the South African private sector?	Literature review, Phase 1 and Phase 2 results (qualitative and quantitative data).
2.	What are the market barriers for voluntary climate change mitigation mechanisms in South Africa?	Questionnaire, survey questionnaires and semi-structured interviews.
3.	What recommendations can be made to increase the implementation of climate change mitigation by the corporate sector in South Africa?	Guided by the outcomes of research objectives 1 and 2.

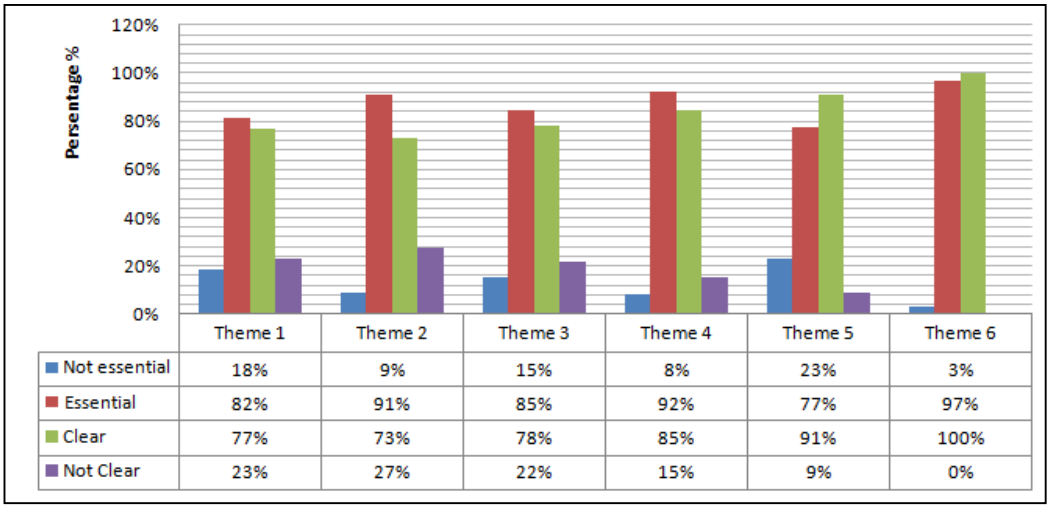
The breakdown in Table 3.1 indicates that questionnaires and semi-structured interviews are used in the research methodology to answer these research objectives. This section details the development of the research tools, the distribution of these tools to the samples, and the storage of collected data.

3.4.1 Questionnaire design for Phase 1 (first draft survey questionnaire)

In Phase 1 of the study a structured questionnaire was developed (see Annexures 1 and 2) based on available literature, including Reyers (2008), Gladwin, Kennelly, and Krause (1995), Okereke (2007), and consultation (relating to coding, layout, order and flow of questions) with the assistance of a research statistician provided by the University of Pretoria. Saunders *et al*. (2007:386) suggest that the researcher should ask an expert or group of experts to comment on the representativeness and suitability of the questions, in addition to allowing for suggestions on structure. Phase 1 respondents were asked to review each of the 60 questions based on their experience, and to indicate whether the questions were clear, essential, and what suggested changes and additions to questions and themes should be included. The sample was also asked for general comments and demographical information.

Five common trends were identified based on questionnaire feedback. These related to the terminology used in the questionnaire, the length, and specificity within the questionnaire. Feedback included numerous suggestions to reword and combine questions, including a general view that there was too much focus on carbon offsets. Sample respondents also expressed a need for an increased focus on finance and financial barriers within the questionnaire. Figure 3.2 reflects the results from Phase 2 of the study, indicating that the majority of questions were essential and clear.

Figure 3.2: Analysis of Phase 1



	Theme 1	Theme 2	Theme 3	Theme 4	Theme 5	Theme 6
Not essential	18%	9%	15%	8%	23%	3%
Essential	82%	91%	85%	92%	77%	97%
Clear	77%	73%	78%	85%	91%	100%
Not Clear	23%	27%	22%	15%	9%	0%

Based on the input from the sample, the researcher developed a gross survey questionnaire including all the suggested changes and newly added questions. The questionnaire was retested on two of the sample participants, resulting in further input from the sample. The primary reason for retesting the questionnaire was an attempt to reduce the length of the questionnaire while examining the need for additional questions. Those questions that were indicated as being “not essential” by both samples were removed from the survey.

The analysis resulted in a reduction of five questions within the survey questionnaire. The total number of questions used for the final draft survey questionnaire was 59 questions. The analysis from Phase 1 is discussed further in Chapter 4.

3.4.2 Clarity and comprehensiveness on themes and questions

The respondents were requested to provide input related to the comprehensiveness and clarity based on the questions asked and themes selected. The feedback indicated that the questionnaire was comprehensive and clear, with qualitative suggestions made related to editing, wording and modifying questions. Respondents submitted 47 qualitative suggestions concerning an increase in the clarity of the questions, of which 40 adaptations were made by the researcher. A further 18 qualitative suggestions were made relating to comprehensiveness, of which 14 were taken into account. Suggestions that were not taken into account were questions that were removed or where conflicting feedback was given. Some of the qualitative inputs are discussed below.

- It was suggested that sentiments around concepts like a steady state economy, over-reliance on growth and certain neoliberal principals should be tested in an attempt to ascertain the participants' tendency to consider alternative paradigms. This was included in the final questionnaire, through questioning the paradigms in which companies’ sustainability values lie and of organisational strategy. However, an additional theme titled “Alternative Economic Systems” was not included, as this suggestion was not supported in the other feedback received.
- It was suggested that a theme focused on “mitigation opportunities” be included, reviewing companies’ perspectives on where the mitigation opportunities lie, in

addition to perspectives on new products, processes and markets. The researcher felt that this was not in the scope of the existing research. However, respondent input was noted, and questions related to internal mitigation were included.

- It was suggested that a theme should be included for reviewing resources and skills within the company to account for and administer climate change products internally. Questions relating to this were included in Theme 3, which deals with skills.
- It was suggested that a theme be included to explore cultural, incentive, process and system barriers to incentivising mitigation and innovation within the company / sector. Questions related to this theme were included in legislation and organisational strategy as sustainability values.
- It was suggested that the theme dealing with finance should be expanded “as this will be the main barrier”. Additional questions were added to the finance section based on this input.
- Numerous suggestions were made related to the length and specificity of the questions, and the terminology used within the questionnaire. The researcher reworded and combined a number of questions to take this input into account.
- Numerous suggestions were made to reduce the focus on carbon offsets. The researcher reduced this focus by rewording the questions to address a wider perspective.

3.4.3 Retesting the questionnaire

Based on the qualitative and quantitative input received from the sample, the researcher developed a comprehensive survey questionnaire by adding 6 more questions, amounting to a total of 63 questions – which include all the suggested changes and newly added questions. This questionnaire was retested on two of the sample, with their input once again requested. The primary reason for retesting the questionnaire was an attempt to reduce the length of the questionnaire and test the need for the added questions. Questions removed from the questionnaire are those where both sample participants indicated that the question was “not essential”. This result was a reduction of 4 questions within the gross survey questionnaire. The final draft survey questionnaire contained 59 questions.

Table 3.2: Analysis in Phase 1, responses to theme input

Response	1	2	3	4	5	6	Total
Phase 1 questionnaire	14	5	6	16	4	12	57
Phase 1 redevelop questionnaire	15	5	8	17	5	12	63
Phase 1 retest findings: Both experts indicate essential	9	5	5	11	6	12	
Phase 1 retest findings. One expert indicates essential, the other not essential	5	0	3	5	2	0	
Phase 1 retest findings. Both experts indicate not essential	2	0	2	1	0	0	
Result Final questionnaire	14	5	10	20	8	2	59

Table 3.2 reflects the analysis in Phase 1, indicating the phases of data collection to develop the questionnaire based on input from the sample. The first phase of Phase 1 developed the questionnaire, consisting of 57 questions. Then this was redeveloped based on sample input to a questionnaire consisting of 63 questions and retested. Theme 6 was renamed as Validation, as they aimed to validate the results of the research for Phase 2. A further 10 questions within Theme 6 were distributed within applicable themes to be better represented. The final result was a questionnaire consisting of 59 questions to be used in Phase 2 of the study.

3.4.4 Questionnaire design for Phase 2

In Phase 2 of the study the survey questionnaire was developed (Annexure 3), based on Phase 1 of the study and through consultation (relating to coding, layout, order and flow of questions) with a research statistician based at the University of Pretoria.

The survey consisted of a set of formulated questions designed to gather responses from the participants (Panneerselvam, 2004:14). The analysis and study suitability for Phase 2 of the research is detailed in Table 3.3, as presented by Saunders *et al*. (2007:358). The sample size and response rate obtained is a limitation in this study. However, the data collection in Phase 3 was deemed to assist in mitigating this disadvantage by validating the results obtained in Phase 2.

Table 3.3: Attributes for Internet survey questionnaires adapted for the study

Attributes	Internet-mediated questionnaire	Suitability for study
Suitability of population based on	The population should be computer literate who	**High**, as senior managers were literate Internet users.

characteristics	can be contacted by email and use the Internet.	
Confidence that targeted person has responded	High, if using email.	**High**, as senior managers had access to email.
Likelihood of contamination or distortion of respondent's answers	Low	**High**, as the population and sample size is small. Due to the low response rate obtained, self-selection bias may have been introduced. Low contamination is therefore preferable.
Size of sample	Large	**Low**, as the sample size was small, requiring limitations to the representativity of the results.
Likely response rate	Research shows 11% or lower should be anticipated.	**Low**, as the sample size was small. Strict controls were therefore employed in the research to ensure maximum response rate.
Feasible length of questionnaire	The fewer screens the better.	**High.** The questionnaire did not exceed three Web pages.
Suitable types of questions	Closed questions, but not too complex.	**High.** Closed questions were used.
Time taken to complete collection	2-6 weeks from distribution.	**High.** The research was cross sectional, allowing for sufficient time to analyse the data and complete the research.
Main financial resource implications	Web page design	**High.** The online medium was preferred by the researcher as responses could be measured and – if needed – provided an opportunity to follow up and remind respondents to complete the survey, which resulted in an increase in the response rate.
Role of interviewer / field worker	None	**High.** The researcher was the only interviewer and bias was consistent across interviews.

Source: Adapted from Saunders *et al*, (2005:358)

It has been found that a good response is dependent on a motivated recipient (Saunders *et al.*, 2007:389). The researcher motivated the participants through personalised cover letters, emails and follow-up requests over the time period which assisted in increasing the response rate. The respondents were given three months to complete the questionnaire from the date of distribution. The SurveyMonkey system automatically saved the data when a questionnaire was completed and ensured that the information was anonymous, whilst preventing multiple responses from more than one respondent.

The first section of the questionnaire relates to the respondent's consent to participate in the survey and background information on the company's environmental impact level. Respondents were requested to mark (digitally) next to the applicable box. In order to maintain the confidentiality of the study, no personal information or company information that enabled the identification of the specific company was requested.

The majority of questions in the survey questionnaire were close-ended questions or forced-choice questions which provided a variety of predetermined answers from which the respondents were requested to select one or more, based on various scales. In cases where the appropriate answer was not available on the scale, an "other" option was included. Saunders *et al*. (2007:368) describe numerous types of close-ended questions as indicated, which were categorised based on the applicable sections in the questionnaire in Table 3.4. These are listed as list type, category type or ranking type.

- List type: a list of items is offered, of which any can be selected.
- Category type: one response can be selected, based on a given set of categories.
- Ranking type: the respondent is requested to arrange options in a preferred order.

Table 3.4: Questionnaire breakdown based on scales used in Phase 2

Section	Details and number of sub questions	Type of question
Biographical: Section 1	Consent	Category type: Yes / No
Biographical: Section 2	JSE SRI Index classification, 1 question with 3 options	List type: Low / Medium / High impact
Questionnaire: Question 1	1 question with 5 options and "other"	List type
Questionnaire: Question 2	1 question with 4 options	List type
Questionnaire: Question 3	8 statements	Category type, 5-point scale: Not important, Minor, Undecided, Reasonably important, Very important
Questionnaire: Question 4	21 statements	Category type, 5 point scale: Strongly agree, Agree, Neither agree or disagree, Disagree, Strongly disagree
Questionnaire: Question 5	1 question with 3 options and "other"	List type
Questionnaire: Question 6	22 statements	Category type, 3-point scale: Yes, No, I don't know
Questionnaire: Question 7	4 statements	Category type, 5-point scale: Not important, Minor, Undecided, Reasonably important, Very important
Questionnaire: Question 8	5 questions with 5 options	Ranking type with scale of 1-5, 1 representing largest, 5 representing smallest

The market barriers as identified in the literature review were broken down into specific questions, listed in the questionnaire in Table 3.5 to further illustrate the questions applicable to each market barrier, and to indicate whether reverse scoring was required in the data analysis.

Table 3.5: Questionnaire breakdown based on market barriers used in Phase 2 and reverse scored if required

Market barrier / constraint	Question number	Reverse Score (if applicable)
Sustainability values: the sustainability values reflected by the organisations' management commitment to the triple bottom line.	Q3.2, Q4.1-4.13	Q4.1, Q4.3, Q4.6, Q4.9, Q4.11-13
Legislation: the regulatory framework within which the climate change science and action (adaptation and mitigation) operates.	Q4.14-4.18	
Knowledge of Greenhouse Gas (GHG) mitigation instruments: the expertise, skills and experience of the organisation in climate change mitigation.	Q6.1-6.7, Q7.2-7.4	Q6.4, Q6.7
Organisational strategy: the corporate plan of action required to achieve and institutionalise corporate climate change action.	Q 2, Q3.1, Q3.4-3.7, Q6.8-6.20	
Finance: concepts relating to costs, risk and their interrelationship with climate change mitigation.	Q3.3, Q3.8, Q4.19-4.21, Q6.21-6.22, Q7.1	Q4.19-4.21, Q6.21
All of the above.	Q5, Q8	

3.4.5 Testing the questionnaire

Pilot testing concerns refining the questionnaire to ensure that respondents can answer the questions posed, understand the meaning of the questions and that content can be improved (Panneerselvam, 2004:25). Pilot testing also allows for some assessment relating to validity (Saunders *et al.,* 2007:386). The questionnaire was tested prior to distributing it to ensure that the instructions and questions were clear and without ambiguity. In the first phase the questionnaire was developed through guidance from the research supervisor and the statistician at the University of Pretoria. Once the questionnaire was in draft format, it was pilot tested on three individuals to ensure clarity and comprehensiveness, and thereafter adapted and administered to the Phase 1 sample. In Phase 2 the questionnaire was again adapted, based on the feedback provided in Phase 1, the research supervisor, the statistician, and approval by the University of Pretoria's ethics committee. Once all the approvals were completed the questionnaire was retested and thereafter administered to the sample in Phase 2.

3.4.6 Questionnaire distribution in Phase 1 and Phase 2

In Phase 1, the questionnaire (Annexure 2) and a cover letter were sent individually to the respondent sample using electronic mail. Over a two-month period the data were

collected, based on sample feedback. Two follow-up emails were sent in the time period which assisted in increasing the response rate.

In Phase 2, the survey questionnaire (Annexure 3) was developed and uploaded to the Internet though the utilisation of an online survey application, SurveyMonkey. An email invitation was sent individually to the respondent sample through electronic mail. The email invitation (Annexure 4) served as a cover letter which included the link to the Web-based questionnaire on SurveyMonkey. The cover letter highlighted the closing date for responses, time taken to complete the questionnaire, an overview of the study and confidentiality.

3.4.7 Data Storage

The researcher retained digital records from each respondent, including questionnaires in both phases, in addition to digitally recording the audio from semi-structured interviews in Phase 2. This includes all emails and correspondence relating to content and logistics. The researcher reviewed 11 responses in Phase 1, 26 completed survey questionnaires in Phase 2, and followed up with four interviews. A backup of all the data are stored digitally as per the University of Pretoria's requirements.

3.5 DATA ANALYSIS

Data analysis involves with the ability to "break down data and to clarify the nature of the component parts and the relationship between them" Saunders *et al.,* (2007:591), thereafter classified and presented in a manner that gives insight into the research questions (Panneerselvam, 2004:31). Credibility of the study findings (internal validity) refers to the extent to which the findings accurately describe the reality (Welman and Kruger, 2003:180) by drawing accurate conclusions about cause and effect and other relationships within the data (Leedy and Ormrod, 2005:97). The identification of specific 1) approaches, 2) methods and 3) techniques which will be used to prepare the data for analysis was guided by the research statistician and the supervisor, which are further discussed in this section.

3.5.1 Response rates

The response rate in Phase 1 was 11 completed questionnaires (28% response rate) from experts with an average of six years' experience in climate change, sustainable development, corporate social responsibility, corporate governance, or a master's degree in these fields. The majority of respondents classified themselves as consultants.

The response rate in Phase 2 was 34 completed questionnaires (46% response rate). However, only 26 questionnaires where complete (35% response rate) and suitable for inclusion in this study. Due to the lower than anticipated response rate the researcher conducted a further four semi-structured interviews within the sample in Phase 2 in an attempt to increase the rigour and depth of the study.

3.5.2 Preparing and data input

In both phases of the study, the raw data collected were captured in a computer software program (Microsoft Excel). Both closed and open-ended questions were coded and categorised as required within the program. In Phase 2, the quantitative data collected in the survey were thereafter exported to statistical analysis software (SAS) to conduct the required statistical analysis and methods discussed in this chapter. The methods used in the analysis phase were guided by the research statistician based at the University of Pretoria. Statistical methods included, amongst others: frequency of occurrence, averages, item analysis and Wilcoxon matched pairs signed-rank test.

3.5.3 Data analysis method in Phase 1

For Phase 1, the data were analysed using content analysis, which is a "detailed and systematic examination of the content of a particular body of material for the purpose of identifying patterns, themes, or, biases" (Leedy and Ormrod, 2005:142). The researcher and statistician used tabulation to interpret the primary data in Phase 1 to develop the final draft survey questionnaire. The predominant technique used in Phase 1 of the study was reviewing the "frequency of occurrence" based on the quantifiable data of the draft

questionnaire. Descriptive data were discussed and analysed in conjunction with the research supervisor to integrate into the questionnaire (where applicable).

3.5.4 Data analysis method in Phase 2

For Phase 2 the predominant technique employed in the analysis in the survey questionnaire was reviewing the "frequency of occurrence" and utilising statistics to make comparisons by the establishment of statistical relationships guided by the research statistician. Inductive reasoning – which is not underpinned by a pre-determined theory – was used to draw conclusions about the sample. Ordinal data (otherwise known as ranked data), which allow the ranking of results based on scales or symbols (Leedy and Ormrod, 2005:26), were collected through a logical categorised questionnaire using a number of varying scales. The ordinal data were thereafter analysed and a number of tabulation techniques were used, as discussed further.

Frequency distribution refers to summarised data, which are organised within a table to allow for specific conclusions to be drawn. In descriptive statistics, this is based on the number of cases (frequency) within each category. Generally, bar charts communicate a more accurate representation (Saunders *et al*., 2007:423). The researcher used this technique during the analysis and to represent the results.

Measures of central tendency (mode, mean and median) are "estimates of the average of a set of observations" (Panneerselvam, 2004:51), which are used extensively in the analysis in combination with the standard deviation. The mean and standard deviation was predominantly used in the analyses chapter to explain to results. The median is a numerical value in the middle of ranked scores separating the higher half of ranked scores from the lower half, also known as the 50^{th} percentile – often used as an ordinal scale of measurement. The mean is the ratio between the sum of the observations and the number of observations, and is the most widely used measure of central tendency (Panneerselvam, 2004:39). The mode represents the variable that occurs most frequently (Saunders *et al*., 2007:602). The standard deviation, otherwise known as variability, describes the amount of spread of data around the mean (Welman and Kruger, 2003:208), thereby measuring variation (Panneerselvam, 2004:57) – whereas the range refers to the

difference between the highest and lowest scores in a set of observations (Panneerselvam, 2004:52).

Rating scaling and item analysis were used in the questionnaire and thereafter in a number of questions as well as in the analysis to gain further insights into the results. The rating scale was used as it evaluated an attitude or behaviour (Leedy and Ormrod, 2005:185). This is usually based on a number of statements, whereby the respondent indicates how strongly the respondent agrees with the statement (Saunders *et al*., 2007:601). This technique was employed in this study as there were a number of composite scales based on sets of statements.

Additionally, a comparison of high- and low-impact companies was conducted to determine a correlation, conducted through the Wilcoxon matched pairs method and the Fisher method to establish relationships and frequencies. The Wilcoxon matched pairs signed-rank test was used extensively in the analysis. This method is used to assess differences in populations by means of two related samples or repeated measurements on a single sample (Leedy and Ormrod, 2005:274). For related groups, this technique is considered the nonparametric alternative to the t-test (Welman and Kruger, 2003:205), and is specifically used to determine the magnitude of differences between two groups. In this context the Wilcoxon matched pairs test was used in questions to determine differences between high- and low-impact companies. Where it was not possible to use the Wilcoxon matched pairs test the Fisher exact test method was used instead. This method is used when samples are small (less than 30) and determines whether two variables share a correlation.

3.5.5 Limitations of the study

The use of a questionnaire is one of the most widely used techniques in survey strategy, as the same set of questions are tested on multiple respondents within the sample (Saunders *et al*., 2007:355). It has been argued that questionnaires are not preferable in exploratory research (Saunders *et al.*, 2007:356). The researcher was concerned that the data collected in the survey would lack depth and perspective due to its structured format. The data from a survey can also at times be simplistic, content specific and within a

narrow range (Saunders *et al*., 207:138). Further, at times respondents do not provide truthful answers (Weisberg *et al.*, 1996:20). To overcome this, the researcher adopted a systematic approach to the study which included open-ended questions and semi-structured interviews at the end of Phase 2 with the sample, in order to reduce the surface level analysis and potential lack of depth that is more characteristic of a structured survey study.

Potential technological interferences and glitches may lead to technical problems not encountered within the more traditional methods of data collection (Cooper and Schindler, 2003:340). The researcher conducted a number of tests in an attempt to mitigate any technical problems with the electronic survey before emailing the questionnaire to the sample.

Although the researcher attempted to mitigate limitations in the study, a number of these still remained. Emails which contained the questionnaire were not always sent directly to the CEO, as personal assistants would not allow direct access. Questionnaires were therefore often sent via a third party to the CEOs, which could have had an impact on the low response rate. A number of respondents did not complete the questionnaire due to proprietary reasons and time constraints. In addition, a number of respondents started the survey but did not complete it. Due to the confidential nature of the study it was not possible to trace these incomplete questionnaires to a specific company. Some of the possible reasons for respondents not completing the questionnaire could be due to its length or their lack of capacity and knowledge to answer some of the questions. These incomplete questionnaires were not included in the results.

One of the negative aspects associated with web-based questionnaires is a potentially low response rate, with Saunders *et al*. indicating a response of 11% or less (2007: 358). It has been suggested that the cover letter, questionnaire design and personalisation have a role to play in increasing the response rate. The researcher therefore paid special attention to the flow, design, attractiveness and clarity of the questionnaire. Although a response rate of 35% was achieved which is higher than the aforementioned 11%; the researcher had set a target of a 60% response rate. This is recognised as one of the largest limitations in the study and this has lead the researcher to conduct semi-structured

interviews after the survey to improve the validity of the findings and to increase the rigour of the research.

3.5.6 Verification, evaluation, accuracy and completeness of study

The validity, evaluation, accuracy and completeness of the research were assessed in four interim periods during the study.

- *Review 1:* The first phase of evaluation was conducted after the literature review to validate the interview guide for the Phase 1 research.
- *Review 2:* The second review was conducted to review the outcomes of the Phase 1 research, and the accurateness of the data when developing the survey questionnaire.
- *Review 3:* The third review was conducted by pilot testing the Phase 2 survey questionnaire.
- *Review 4*: The fourth review was based on triangulation, whereby the results of the data received in Phase 2 were cross checked via personal interviews.

3.6 ASSESSING AND DEMONSTRATING THE QUALITY AND RIGOUR OF THE RESEARCH DESIGN

To overcome data quality issues in the study, a number of factors were taken into account – as detailed below:

- *Design:* The design of a questionnaire is crucial to answer the research question and achieve the objectives of the study. The researcher therefore worked in consultation with the statistician provided by the University of Pretoria to ensure the design of the questionnaire was correct.
- *Access*: It is probable that due to the sensitive nature of the data being investigated, some sample respondents were unwilling or unable to engage on the topic. To overcome this barrier, the researcher tried to assure respondents that all responses are anonymous and confidential. The researcher also established credibility through

the Chair in Corporate Leadership at the University of Pretoria and highlighted the possible benefits of this research to the respondents in the cover letter.

- *Response rates:* The completion of the survey questionnaire was completed by a senior manager / CEO within the target group. It has been found that higher response rates are dependent on higher levels of motivation on the side of recipients (Saunders *et al*, 2007:389). The researcher motivated the participants by 1) regular contact with the target group by encouraging the completion of the questionnaire; 2) highlighting the possible benefits of this research to the participant; and 3) ensuring that the questionnaire was as short as possible.
- *Mode effects:* The context and wording of some of the questions may have influenced the response, although a pilot on the questionnaire was conducted to ensure that all items on the questionnaire were clear and that it met the criteria of face validity.
- *Non-observation and measurement error*: The main sources for errors in survey statistics are errors of non-observation and measurement error (Groves *et al*, 2004:241). The data were reviewed by a statistician prior to the pilot test, who was intimately involved in the analysis to minimise data capturing errors.
- *Bias*: Bias refers to any influence that distorts data (Leedy and Ormrod, 2005:208). This could be relevant to the semi-structured interviews held in Phase 2 of the study. The researcher standardised the data collection instruments and ensured sufficient preparation to reduce bias as much as possible.
- Reliability: Reliability refers to the “extent to which the data collection technique or techniques will yield consistent findings, [and that] similar observations would be made or conclusions reached by other researchers” (Saunders *et al.*, 2007:609). To increase the reliability of the study, a systematic consultative research process was followed with consistent communication between the researcher, research statistician the research supervisor and the Department of Business Management at the University of Pretoria.
- Validity and “generalisability”: Validity in research relates to the extent to which the researcher is able to access the interviewee’s knowledge and experience, and can thereafter infer a meaning (Saunders *et al.,* 2007:319). Generalisability refers to the degree to which research findings are valid in other settings (Saunders *et al.*,

2007:598). To increase the validity and generalisability of the study, the researcher applied standardised record keeping procedures and listened carefully to the interviewees by consciously checking the researcher's bias to ensure uniformity over all participants and by recording the interviews digitally. The research instrument was developed through consultation with available literature, the Phase 1 sample, the research supervisor and the University of Pretoria's research instrument designer.

3.7 RESEARCH ETHICS

Research ethics is defined by Saunders *et al.* as the "appropriateness of the researcher's behaviour in relation to the rights of those who become the subject of the research project, or who are affected by it" (2007:610). A number of potential ethical issues were taken into account during this study. These are discussed below with guidance provided by Saunders *et al.* (2007:194).

- Privacy and permissions-related actions taken by the researcher:
  - Companies and participants who were part of the research study provided consent on the foundation of guaranteed anonymity and confidentiality.
  - The researcher communicated that confidentiality and anonymity was guaranteed as much as possible in the survey and cover letters (see Annexure C).
  - All necessary precautions were taken into account by the researcher to ensure that the primary data / information remained anonymous and confidential.
  - Participation in the research study was voluntary and the participant retained the right to exit the study at any stage.
  - In Phase 2 of the research, participants were informed of the utilisation of an audio recording device which was used to record the interviews.
  - The researcher ensured that sufficient credibility was developed with the participant to ensure buy-in and confidence.
- Access-related actions taken by the researcher:
  - Since the study involved sensitive information, no pressure was applied to any participants to gain access to their companies or information.

  - The researcher ensured that informed consent was attained and that information on the study objectives and confidentiality was provided to all participants, in both Phase 1 and 2 of the research.
- Power issues-related actions taken by the researcher:
  - The researchers' behaviour was objective and neutral in the research phase.

Through the implementation of the above standards and precautions, the researcher aimed to ensure the highest possible ethical standards as required by the University of Pretoria in addition to ensuring all the requirements pertaining to an ethical clearance were met. To further support this approach, formal ethical approval of this study was obtained in March 2010 by the Research Ethics Committee of Facility of Economic and Management Sciences at the University of Pretoria.

3.8 CONCLUSION

This chapter provided an overview of the methods used in the study based on the research questions asked. The population and relative sample was defined, a preliminary questionnaire developed and tested, after which a final questionnaire was distributed. The results were captured through an online survey, coded and thereafter analysed. In the following chapter the research findings of the study are presented.

4 RESEARCH FINDINGS

4.1 INTRODUCTION

The previous chapter outlined the research methodology used in this study to contextualise the research findings presented in this chapter. This chapter is divided into two sections relating to the Phase 1 of the study, followed by Phase 2. Table 4.1 briefly summarises the sample size, number of respondents, response rate and description of the sample.

Table 4.1: Summary of research methodology

Details	Phase 1	Phase 2
Sample size	40	74
Responses	11	26
Response rate	28%	35%
Description of sample	6 years' experience in climate change / sustainable development / corporate social responsibility / corporate governance	CEO or responsible person within the companies listed on the Johannesburg Stock Exchange Sustainability Reporting Index 2010

4.2 PHASE 1 RESEARCH PROCESS

In the first phase of the study, a questionnaire was developed and sent to 40 experts in climate change / sustainable development. The researcher received 11 questionnaires representing a 28% response rate as indicated in Table 4.1 with the experts themselves acting as the units of analysis based on their expertise and experience in the sector. Some questionnaires only contained qualitative information. However, given the focus of the study these were included in the analysis to provide an increased insight into the research findings.

The data collected from the sample are graphically represented through the use of frequency charts. Open-ended responses were coded into categories which are also presented graphically in this section. The open-ended questions within the questionnaire reviewed suggested changes and additions to the existing questions and themes. These were further complemented by general comments.

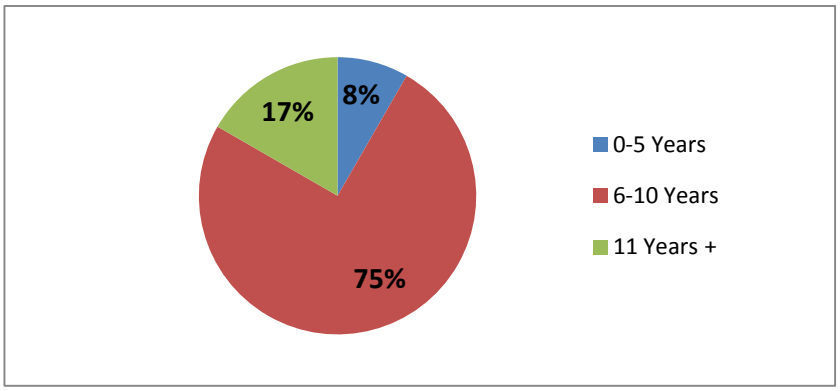
In Phase 1, respondents were requested to assess each of the 60 questions based on their experience. Answers were indicated with a tick in the applicable box, chosen according to whether each particular question was “essential” or “not essential”, and if the question was “clear” or “unclear”. There are instances where respondents erroneously did not tick the applicable box, in this case the response was not included and therefore minor variances based on responses are found.

4.2.1 Biographical data

The respondents were asked to provide biographical information to ensure compliance with the sample requirements. In one case, the respondent was the author of a prior research tool on which the bulk of the questionnaire was based. This respondent did not comply with the classification of an expert (6 years). However, their qualitative input was included due to their extensive knowledge in the sector and the study.

The respondents consisted of 8 (67%) men and 4 (33%) women, of which 9 (75%) had a master's degree. Of the respondents, 92% were between the ages of 33 and 65 years of age, with the majority classifying themselves as consultants in the sector. Figure 4.1 illustrates the number of years the respondents have been involved in the sector, amounting to 11 respondents for 6 years or more. Most respondents (9) had 6–10 of years of sector involvement, while 2 respondents had more than 11 years. In the findings the sample size varies between 10 and 11 responses, as at times not all the answers were clearly marked.

Figure 4.1: Phase 1 – number of years in the sector



4.2.2 Theme 1 findings (sustainability values)

Theme 1 refers to the sustainability values, reflected by the organisations' management commitment to the triple bottom line, with a particular focus on the environment. The theme included 14 questions (see Annexure 2). The Table 4.2 reflects the results from Phase 1, listed per question based on the responses received. In some cases the participants did not answer all the questions and therefore the response rate ranges between 10 and 11 on the questions.

Table 4.2: Theme 1, Phase 1 results

Theme 1	Question	Not Essential	Essential	Clear	Not Clear
Question 1.1	Environmental issues are very important to the management of our company.	1	9	7	3
Question 1.2	Our company is only interested in “ticking boxes” when it comes to environmental compliance.	4	7	10	1
Question 1.3	Our company's management believes that the company’s financial wellbeing is dependent on the environment.	1	10	9	2
Question 1.4	Our company's management believes that financial responsibility to its shareholders, finance providers, customers and employees is more important than responsibility to environmental preservation.	1	9	9	2
Question 1.5	Our company’s management believes that it is difficult to be a profitable company and preserve the environment at the same time.	2	9	11	0
Question 1.6	Our company’s management believes that we have a responsibility to preserve the natural environment.	0	11	11	0
Question 1.7	Our companies’ management believes that environmental concerns should be subordinate to people's needs.	2	8	6	5
Question 1.8	Our companies’ management believes that all costs and benefits of environmental action should only be measured in financial terms.	1	10	10	1
Question 1.9	Our company believes it has a responsibility to preserve the environment for future generations.	2	9	10	1
Question 1.10	Sacrifices on behalf of future generations, nonhuman nature or distantly less fortunate current generations are generally unwarranted, unless market signals dictate otherwise.	6	4	4	7
Question 1.11	The Earth's physical resources are virtually inexhaustible because of infinite human ingenuity in exploiting them or in finding substitutes for emergent shortages.	0	11	8	4

Question 1.12	Nature changes gradually, fast enough to be detected, yet slow enough to be controlled.	5	6	9	3
Question 1.13	There is no cause for undue alarm or drastic action, because environmental dangers are greatly exaggerated.	0	11	9	3
Question 1.14	Globalisation and its trickle down benefits are the key to alleviating poverty, bettering the lives of the poor without sacrifices from the rich.	2	8	6	4

The majority of the questions were found to be clear and essential, with question 1.10 being removed as 6 of the participants indicated it was not essential. The questions reviewed were 1.1, 1.7, 1.12, 1.13 and 1.14. The qualitative input from the sample suggested changes related to grammar, wording, combining questions and question placement within the questionnaire, and the inclusion of additional questions. One of the respondents indicated that the key to understanding sustainability values is ascertaining the degree to which sustainability is linked to shareholder value – and therefore the extent to which it is integrated within the company strategy. The respondent suggested that Theme 1 should therefore have fewer and more direct questions. The researcher took this into account in the review.

4.2.3 Theme 2 findings (regulatory framework)

Theme 2 reflects questions relating to the regulatory framework within which the climate change science and action (adaptation and mitigation) legislation operates. Five questions were included under this theme (see Annexure 2). Table 4.3 reflects the results from Phase 1, per question.

Table 4.3: Theme 2, Phase 1 results

Theme 2	Question	Not Essential	Essential	Clear	Not Clear
Question 2.1	We are hesitant to engage with the global climate change mitigation system because it is too complicated.	1	10	6	5
Question 2.2	We are hesitant to engage with the South African climate change mitigation system because it is too complicated.	0	11	6	5
Question 2.3	Our company believes there will be an emissions cap introduced in South Africa in the future.	3	8	7	4
Question 2.4	Voluntary climate change action to mitigate climate change will not be sufficient and legislative intervention will be needed.	0	11	10	1

Question 2.5	Our company is awaiting the finalisation of the legislative climate change requirements before taking action.	1	10	11	0

Based on the above, questions 2.1, 2.2 and 2.3 were reviewed. The qualitative input from the sample suggested changes related to grammar, wording and the inclusion of additional questions. Respondents indicated that “mitigation”, “emissions cap” and “carbon offset products” are not widely understood terms and should be clarified in the questionnaire. It was also suggested that questions be included relating to the extent to which individuals are aware of the current and anticipated legislation. This theme was adapted and expanded to incorporate respondent suggestions.

4.2.4 Theme 3 findings (knowledge of GHG mitigation)

The third theme represents six questions related to expertise, skills and experience of the organisation in climate change mitigation, with a particular focus on the supply of mitigation products e.g. carbon offsetting, TRECs, or carbon credits. The questions and inputs were reviewed from the sample. Suggested changes relating to grammar and wording were incorporated into the updated questions.

Table 4.4: Theme 3, Phase 1 results

Theme 3	Question	Not Essential	Essential	Clear	Not Clear
Question 3.1	Our company knows where to access options to mitigate our impacts on climate change (example: Trees for Africa to purchase trees to mitigate impact).	4	7	7	4
Question 3.2	Our company has considered buying carbon offsets.	0	11	11	1
Question 3.3	Our company is buying carbon offsets.	1	10	11	1
Question 3.4	Our company does not buy carbon offsets because the voluntary system is too complicated.	1	10	8	4
Question 3.5	Our company has a thorough understanding of the options available to us to mitigate our impacts on climate change.	1	10	10	1
Question 3.6	Our company understands the variations of carbon offset products.	3	8	7	4

The results from the feedback, as shown on Table 4.4 , indicate that all the questions were considered essential, with minor changes required to ensure their clarity. These minor changes involved the terminology: the larger focus lay with carbon offsets, and it was felt

that this was a too narrow perspective on the carbon market. In addition, a number of questions were added to this section, based on respondent input. Changes were made to the questionnaire and thereafter consisted of eight questions which reviewed organisations' knowledge of GHG mitigation instruments.

4.2.5 Theme 4 findings (organisational strategy)

Theme 4 relates to organisational strategy and the corporate plan of action required to institutionalise corporate climate change action internally. This theme consisted of 16 questions.

Table 4.5: Theme 4, Phase 1 results

Theme 4	Question	Not Essential	Essential	Clear	Not Clear
Question 4.1	Our company classifies climate change action as an integral component of good corporate governance.	0	11	11	0
Question 4.2	Our company classifies climate change mitigation as an integral part of our sustainability reporting.	1	10	11	0
Question 4.3	Climate change is clearly featured at a strategic planning level within our company.	1	10	7	4
Question 4.4	Climate change is clearly featured at an operational planning level within our company.	2	9	7	4
Question 4.5	Climate change is clearly featured at a capability level within our company.	1	10	6	5
Question 4.6	Our company believes there will be a future market for climate change action products.	0	11	5	6
Question 4.7	Our company has a detailed understanding of our carbon emissions footprint.	2	9	10	1
Question 4.8	Our company factors the costs for greenhouse gas emissions into major investment and operational decisions.	1	10	10	1
Question 4.9	South Africa investors take climate change action into account when deciding to invest in our company.	1	10	9	2
Question 4.10	International investors take climate change action into account when deciding to invest in our company.	1	10	10	1
Question 4.11	Climate change will have a fundamental impact on our business model.	0	11	11	0
Question 4.12	Our companies' chairperson clearly articulates the company's views on climate change and GHG control measures.	2	9	11	0
Question 4.13	Our companies' board conducts periodic reviews on climate change and monitors progress in implementing strategies.	1	10	11	0
Question 4.14	What do you think will fuel the growth of climate change action products in the future	0	10	9	1

	Please mark with an X a) Demand Side (companies) b) Demand Side (consumers) c) Legislation d) Government e) Other				
Question 4.15	Which of the following statements best describes your companies approach to climate change? **a.** We aim to be leaders in climate change mitigation actions. **b.** We aim to be fast followers in terms of climate change mitigation actions. **c.** We are taking a 'wait and see' approach to climate change mitigation actions and will take action depending on what our stakeholders require from us.	0	10	10	0
Question 4.16	Which department within your organisation is responsible for climate change actions? **a.** Marketing Department **b.** Corporate Social Responsibility Department **c.** Public Relations Department **d.** Top Management **e.** Environmental Department	1	9	9	1

Multiple suggestions were submitted relating to the need for questions concerning internal mitigation opportunities as this is where (according to the feedback) the majority of the current mitigation activity is taking place. Respondent feedback also included a suggestion to reduce the emphasis on carbon offsetting. These changes were made in addition to minor grammatical edits. Table 4.5 shows the results in further detail. With regards to question 4.5, 10 of respondents were of the opinion that it was essential for inclusion, but 6 indicated it was insufficiently clear. The question was reworded. Further, another question was added based on the input received; bringing the number of questions within this theme to 17.

4.2.6 Theme 5 findings (finance)

The theme of finance refers to concepts relating to time, money and their interrelationship with risk and climate change mitigation. There were numerous suggestions to increase the number of relevant questions in this theme as many respondents perceived this as being a key market barrier. The researcher increased the questions based on the input received.

Table 4.6: Theme 5, Phase 1 results

Theme 5	Question	Not Essential	Essential	Clear	Not Clear
Question 5.1	Our company would rather purchase carbon offsets to reduce our carbon footprint if it were cheaper than taking internal action to reduce emissions.	2	9	10	1
Question 5.2	South African customers take climate change action into account when considering purchasing products from us.	3	8	10	1
Question 5.3	International customers take climate change action into account when considering purchasing products from us.	2	9	10	1
Question 5.4	Our company does not buy carbon offsets because it is too expensive.	3	8	10	1

Table 4.6 indicates that the questions were both clear and essential. Based on the feedback received from the respondents, there was a need to expand the number of questions within Theme 5, as finance was perceived as being the main barrier to corporate climate change action. Following respondent input, the next draft questionnaire had 8 questions related to this theme.

4.2.7 Theme 6 findings (motivators and drivers)

Theme 6 represents questions related to the drivers or motivators for companies to invest in sustainability initiatives. These standalone questions were rated as indicated in Table 4.7.

Table 4.7: Theme 6, Phase 1 results

Theme 6	Question	Not Essential	Essential	Clear	Not Clear
Question 6.1	What is the motivation for your organisation to take climate change action? Please rank the following: (5=Very important, 4=important, 3=undecided, 2=minor, 1= Not important).				
Question 6.1a	It is good for our brand	0	10	10	0
Question 6.1b	It is our responsibility	0	10	10	0
Question 6.1c	It increases our profitability	0	10	10	0
Question 6.1d	It helps us retain existing clients	0	10	10	0
Question 6.1e	Our competitors are doing it	1	9	10	0
Question 6.1f	We have to (compliance)	0	10	10	0
Question 6.1g	It makes us more efficient	2	8	10	0
Question 6.1h	It saves us money	1	9	10	0
Question 6.2	If our company purchased carbon offsets, how important would the following				

	elements be? Please rank the following: (5=Very important, 4=important, 3=undecided, 2=minor, 1= Not important)				
Question 6.2a	Price	0	10	10	0
Question 6.2b	Product / source (e.g. wind power, trees)	0	10	10	0
Question 6.2c	Reputation of the provider	0	10	10	0
Question 6.2d	Geographic area where offset occurs	0	9	10	0

Based on the feedback from the sample related to motivators and drivers for climate change action, respondents suggested incorporating this section into other sections and adding a question in the final questionnaire that asks respondents to identify their top five mitigation barriers based on the themes in a ranking scale. These suggestions were taken up by the researcher to gain further insights and to validate some of the findings in the questionnaire in Phase 2. This section is referred to as Validation in Phase 2.

4.2.8 Conclusion: Phase 1

The feedback from the questionnaire based on the analysis and explanations indicated that the questions and themes tested were clear and essential. The major changes involved combining questions, rewording and terminology. This process validated the research conducted in the literature review by identifying themes acting as a market barrier to corporate voluntary climate change mitigation, which was further tested in Phase 2. The survey questionnaire used in Phase 2 is included in Annexure 3.

4.3 PHASE 2 RESEARCH PROCESS

Phase 2 of this chapter presents the findings from the conducted empirical research, presented in the order of the five categorised themes and followed by cross tabulations to establish which relationships (if any) exist between variables (high- and low-impact companies). Research findings are then further examined though a number of questions to validate the results, supported by semi-structured interviews. The final survey questionnaire is in Annexure 4.

The questionnaire was sent to the email address of the 74 JSE SRI 2010 Index companies. Of these, 26 questionnaires were completed and returned, representing a 35%

response rate. The researcher recognised the lower than anticipated response rate and thereafter conducted face-to-face interviews with four of the sample, in order to provide further depth to the research and to assist in validating the results. The face-to-face interview sample selection was made based on the representative sample, containing companies with high environmental impact, low environmental impact, in addition to reviewing a variation of sectors (fast moving consumer goods to mining).

The findings of Phase 2 are based on the analysis of 26 self-administered Web-based questionnaires (n=26) completed by senior managers responsible for corporate climate change mitigation.

In Phase 2, the predominant technique employed in the analysis of the survey questionnaire lay in reviewing the "frequency of occurrence" and utilising statistical relationships to make comparisons. Inductive reasoning, which is not underpinned by a prescribed truth, was used to draw conclusions about the sample. Ordinal data (otherwise known as ranked data), allowed us to rank order the data based on scales (Leedy and Ormrod, 2005:26), collected through a logical categorised questionnaire by using a number of varying scales.

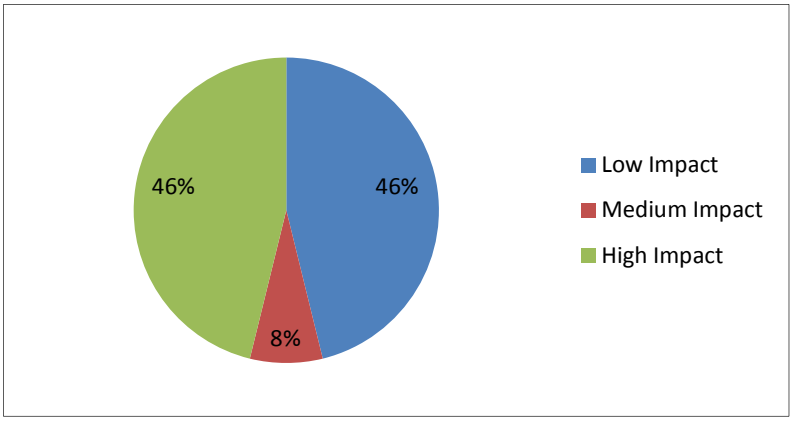
This ordinal data were thereafter analysed and a number of tabulation techniques used, including: frequency distribution, measure of central tendency (mode, mean and median) and rating scales. Additionally, a comparison of high- and low-impact companies was conducted within the sample to determine any correlation based on the results, and to establish whether any relationships / frequencies exist. The comparison was made through the Wilcoxon matched pairs method, the Fisher method, Chi-Squares (x^2) and the Kruskal-Wallis test. To graphically represent the analysis, information will be represented through the use of charts and bar graphs, based on biographical information and thereafter on the themes. Questions asking for additional information was coded and categorised into responses and reported separately.

4.3.1 Biographical information

The respondents were asked to provide biographical information to ensure compliance with the sample requirements and to provide consent to participate in the survey.

As shown in Figure 4.2, the representation of participation in the survey based on environmental classification is 46% (12/26) low-impact, 8% (2/26) medium-impact and 46% (12/26) high-impact companies. Cross tabulation was used to compare the differences in responses based on the companies' specific impact levels. This is discussed within each applicable question. As the response rate was lower than anticipated, the medium-impact results were included in the low-impact classification to allow for the cross tabulation of two groups – rather than present three groups, given that the total number of responses from the medium-impact sample was too small for a representative analysis.

Figure 4.2: Summary of participants' environmental classification



4.3.2 Theme 1 findings (sustainability values)

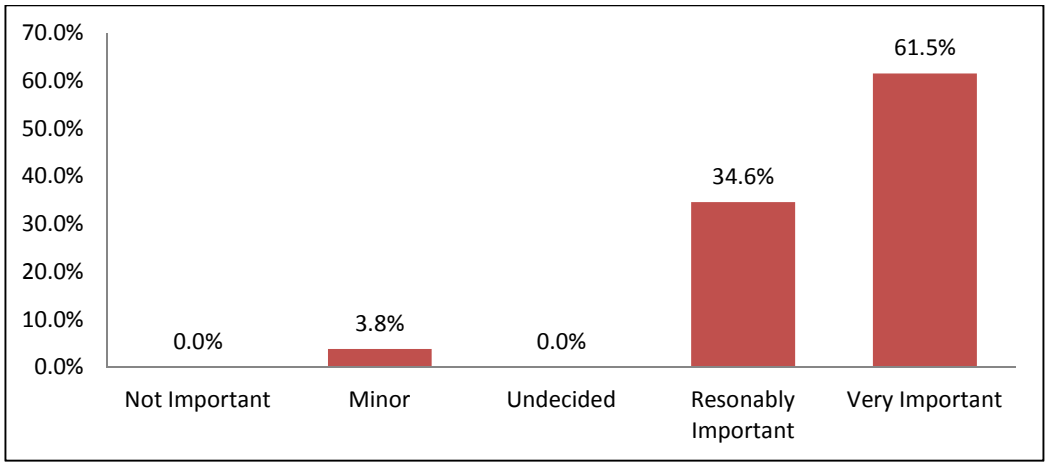
Theme 1 reviews sustainability values reflected by the organisations' management commitment to the triple bottom line. This theme consists of 14 questions, which are discussed in detail below.

4.3.2.1 Motivations for corporate action

Figure 4.3 shows that 96% (25/26) of the companies surveyed indicated that the motivation for companies to take climate change action is that it is "their [companies]

responsibility". The results showed a mean of 4.54 and a standard deviation of 0.71. This finding was further supported in the semi-structured interviews where all the interviewees believed that there was a corporate responsibility to take climate change action based on their institutional impact.

Figure 4.3: Question 3.2



When compared between companies with different levels of environmental impact (high-impact and low-impact) the Wilcoxon two sample non-parametric test was used for the results, as detailed in Table 4.8.

Table 4.8: Question 3.2

Motivation	**Low impact and medium impact (n=14)**		**High impact (n=12)**		**Overall (n=26)**		**Wilcoxon p-value**
	Mean	**Std dev**	**Mean**	**Std dev**	**Mean**	**Std dev**	
It is our responsibility	4.64	0.50	4.42	0.90	4.54	0.71	0.6763

The table indicates that the institutional environmental impact does not have an impact on their motivation, based on the perceived responsibility of the companies that the respondents are representing. No statistical significant difference between two groups was found as all p-values were greater than 0.05.

4.3.3 Organisations commitment to the triple bottom line

The majority of individuals (85%) (22/26) agreed that “Environmental management is seen as critical for the sustainability of our operations.” (Question 4.1, reversed scored). The results showed a mean of 3.04 and a standard deviation of 1.18. When the results are compared between companies with different levels of environmental impact, the Wilcoxon two sample non-parametric test was used for the results, as detailed in Table 4.9.

When questioning respondents about environmental compliance, 11.5% (3/26) of companies indicated that they were “primarily interested in “ticking boxes” when it comes to environmental compliance” (Question 4.2). The results showed a mean of 3.50 and standard deviation of 0.81. This is further supported by 92% (24/26) of companies indicating that they have a responsibility to preserve the natural environment (Question 4.6, reversed scored). The results showed a mean of 2.77 and a standard deviation of 0.86.

The majority of respondents (62%, (16/26)) believe their financial “wellbeing is dependent on the environment” (Question 4.3, reversed scored). The results showed a mean of 4.31 and a standard deviation of 0.74.

The majority of respondents (81% (21/26)) disagreed that it is difficult to be a profitable company and help preserve the environment at the same time (Question 4.5). The results showed a mean of 2.23 and standard deviation of 0.95. Of the companies surveyed, 96% believe they have a responsibility to preserve the environment for future generations (Question 4.9, reverse scored). The results showed a mean of 1.96 and a standard deviation of 0.96.

Of the respondents surveyed, 54% (14/26) did not agree with the statement: “Our company's management believes that financial responsibility to its shareholders, finance providers, customers and employees is more important than responsibility to environmental preservation” (Question 4.4). The results showed a mean of 4.23 and a standard deviation of 0.65.

When questioned regarding whether “Management believes that environmental concerns should be subordinate to people’s needs” (Question 4.7), the results showed that 54% (14/26) disagreed and 35% (9/26) neither agreed nor disagreed. The results showed a mean of 3.39 and a standard deviation of 0.90.

Of the respondents surveyed, 62% (16/26) did not believe that all costs and benefits of environmental action should only be measured in financial terms (Question 4.8). The results showed a mean of 3.46 and a standard deviation of 1.03.

The results showed that the majority of the respondents disagreed (58% (15/26) and 31% (8/26) neither agreed or disagreed with the statement “our company believes that sacrifices on behalf of future generations, non-human nature or distantly less fortunate current generations are generally unwarranted, unless market signals dictate otherwise” (Question 4.10). The results showed a mean of 3.65 and a standard deviation of 0.98.

Question 4.11 asked whether “our company believes that nature changes gradually, fast enough to be detected, yet slow enough to be controlled” (reverse scored). The results showed that 54% (14/26) disagreed and 35% (9/26) nether agreed or disagreed. The results showed a mean of 2.39 and a standard deviation of 0.90.

The majority (88% (23/26)) of respondents disagree that “there is no cause for undue alarm or drastic action, because environmental dangers are greatly exaggerated” (Question 4.12). The results show a mean of 4.39 and standard deviation of 0.85.

Of the respondents surveyed, 54% (14/26) (along with 20% who neither agree nor disagree) "do not believe that in a low carbon future economy, they will survive in their present form” (Question 4.13). The results show a mean of 4.00 and standard deviation of 1.13.

Table 4.9: Question 4.1 – 4.13

Motivation	Low impact and medium impact (n=14)		High impact (n=12)		Overall (n=26)		Wilcoxon p-value
	Mean	Std dev	Mean	Std dev	Mean	Std dev	
4.1: Environmental management is seen as critical for the sustainability of our operations.	3.21	1.12	2.83	1.27	3.04	1.18	0.4150
4.2: Our company is primarily interested in "ticking boxes" when it comes to environmental compliance.	3.57	0.65	3.42	1.00	3.50	0.81	0.8692
4.3: Our company's financial wellbeing is dependent on the environment.	4.29	0.61	4.33	0.89	4.31	0.74	0.5898
4.4: Our company's management believes that financial responsibility to its shareholders, finance providers, customers and employees is more important than responsibility to environmental preservation.	4.21	0.58	4.25	0.75	4.23	0.65	0.8202
4.5: Our company's management believes that it is difficult to be a profitable company and preserve the environment at the same time.	2.57	1.09	1.83	0.58	2.23	0.95	0.0711
4.6: Our company's management believes that we have a responsibility to preserve the natural environment.	2.86	0.86	2.67	0.89	2.77	0.86	0.5691
4.7: Our company's management believes that environmental concerns should be subordinate to people's needs.	3.21	0.80	3.58	1.00	3.39	0.90	0.2863
4.8: Our company's management believes that all costs and benefits of environmental action should only be measured in financial terms.	3.29	1.07	3.67	0.99	3.46	1.03	0.3903
4.9: Our company believes it has a responsibility to preserve the environment for future generations.	2.00	0.78	1.92	1.17	1.96	0.96	0.4944
4.10: Our company believes that sacrifices on behalf of future generations, non-human nature or distantly less fortunate current generations are generally unwarranted, unless market signals dictate otherwise.	3.71	1.07	3.58	0.90	3.65	0.98	0.5733
4.11: Our company believes that nature changes gradually, fast enough to be detected, yet slow enough to be controlled.	2.071	0.92	2.75	0.75	2.39	0.90	0.0681
4.12: Our company believes that there is no cause for undue alarm or drastic action, because environmental dangers are greatly exaggerated."	4.57	0.51	4.17	1.12	4.39	0.85	0.3746
4.13: Our company believes that in a low carbon future economy, our company will survive in its present form.	4.00	0.79	4.00	1.48	4.000	1.13	0.3617

Results achieved for Questions 4.1 – 4.13 as listed in Table 4.9 indicate that there are no differences based on the high versus the medium to low institutional environmental impact responses received. Hence, there were no statistically significant differences between the two groups of companies as all p-values were greater than 0.05, with the exception of Questions 4.5 and 4.11. For these two questions, the results were significant at a 10% level of significance. Companies with a high environmental impact indicated that it is difficult to be a profitable company and to help preserve the environment at the same time, when compared to companies with a lower environmental impact. Question 4.11 also indicated a statistically significant (10%) difference between the low and high environmental impact companies, where lower impact companies disagreed significantly with the statement "Our company believes that nature changes gradually, fast enough to be detected, yet slow enough to be controlled", whereas the high environmental companies took a more neutral position.

4.3.4 Theme 2 findings (legislation)

Theme 2 reviews the regulatory framework in which climate change science and action (adaptation and mitigation) operates. In Theme 2 there were 5 questions reviewing legislation as a barrier to voluntary climate change mitigation. Results are summarised in Table 4.10 and discussed further.

4.3.4.1 Private sector perspective to climate change regulatory frameworks

The results showed that 42% (12/26) of respondents surveyed neither agreed nor disagreed, and 42% (12/26) agreed that they are "hesitant to engage with the international carbon trading schemes as it is too complicated" (Question 4.14). The results showed a mean of 3.50 and standard deviation of 0.81 with no statistical difference found between the two groups. Similar results were found for Question 4.15, where 42% (12/26) of respondents surveyed neither agreed nor disagreed, and 39% (10/26) agreed that they are "hesitant to engage with the South African carbon trading schemes as it is too complicated". The results showed a mean of 4.08 and standard deviation of 1.02.

When Question 4.15 was compared between companies with different levels of environmental impact, the Wilcoxon two-sample non-parametric test was used, as detailed in Table 4.10. A statistical difference was found between the two groups as p-value showed a 10% confidence level. The results indicate that companies with a low environmental impact are less hesitant to engage with South African carbon trading schemes, compared to companies with a high environmental impact.

Table 4.10: Question 4.14 – 4.18

Motivation	**Low impact and medium impact (n=14)**		**High impact (n=12)**		**Overall (n=26)**		**Wilcoxon p-value**
	Mean	**Std dev**	**Mean**	**Std dev**	**Mean**	**Std dev**	
4.14: We are hesitant to engage with international carbon trading schemes as it is too complicated.	3.71	0.83	3.25	0.75	3.50	0.81	0.1777
4.15: We are hesitant to engage with South African carbon trading schemes as it is too complicated.	4.36	0.84	3.75	1.14	4.08	1.02	0.0974
4.16: We believe there will be a carbon tax introduced in South Africa in the future.	3.21	0.89	3.25	1.06	3.23	0.95	0.8227
4.17: Voluntary climate change efforts to mitigate climate change will not be sufficient and legislative intervention will be needed.	3.50	1.09	3.25	1.06	3.39	1.06	0.5396
4.18: We are awaiting the finalisation of the legislative climate change requirements before taking action.	4.43	0.65	3.67	1.23	4.08	1.02	0.1309

The large majority of respondents (88% (23/26)) are of the view that a carbon tax will be introduced into South Africa in the future (Question 4.16). The results showed a mean of 3.23 and standard deviation of 0.95, with no statistical difference found between the two groups.

The majority of respondents 77% (20/26) agree that “Voluntary climate change efforts to mitigate climate change will not be sufficient and legislative intervention will be needed” (Question 4.17). The results showed a mean of 3.39 and standard deviation of 1.06, with no statistical difference found between the two groups.

When questioning respondents regarding whether they are awaiting the finalisation of the legislative climate change requirements before taking action, 77% (20/26) indicated that they were not waiting (Question 4.18). The results showed a mean on 4.08 and standard deviation of 1.02, with no statistical difference found between the two groups.

Table 4.10, representing the results for Questions 4.14–4.18, indicates that there is no correlation between the questions asked and the organisations' environmental impact. The results reflect that there are no statistical significant differences between two groups of companies as all p-values were greater than 0.05, with the exception of Question 4.15 where a 10% (or 0.1) confidence level was attained.

4.3.5 Theme 3 findings (knowledge of greenhouse gas (GHG) mitigation)

Theme 3 reviews respondents' knowledge of greenhouse gas (GHG) mitigation instruments as a barrier to climate change mitigation. In this theme, the questions review the expertise, skills and experience of the organisation in climate change mitigation.

4.3.5.1 Corporate climate change mitigation products

A comparison between companies' environmental impact was tested using the Fisher p-value for Questions 6.1 to 6.7, with no statistical difference found between the two groups.

A large majority (85% (22/26)) of respondents indicated that they knew where to access options or products to mitigate the impacts of climate change (Question 6.1) and 69% (18/26) indicated that they have a thorough understanding of the GHG mitigation instruments available to them to mitigate their impacts on climate change (Question 6.5).

A very large majority (92% (24/26) of respondents indicated that they were not purchasing carbon offsets (Question 6.3) and 62% (16/26) had not considered purchasing GHG emission reduction instruments on the carbon market (Question 6.2). To complement this, 65% (17/26) of companies indicated that they had not explored the option of purchasing South African renewable energy certificates (RECs).

The majority of respondents (73% (19/26)) indicated that the reason their company does not buy carbon offsets is *not* due to the voluntary system being too complicated (Question 6.4, reverse scored), while 73% (19/26) did not believe that all certified emission reductions (CERs) are equal (Question 6.7).

4.3.5.2 Mitigation product considerations

The majority (81% (21/26)) of respondents indicated that the product source (Question 7.2) was an important consideration (reasonably important: 42% (11/26), very important: 39% (10/26)) when purchasing carbon offsets. The mean was 4.00, with a standard deviation 1.17. In comparing companies with different levels of environmental impact the Wilcoxon p-value test was used, which indicated that there was a significant difference between high- and low-impact companies. For high-impact companies, the product / source is a smaller consideration than for low-impact companies, who consider it very important.

Table 4.11: Question 7.2 – 7.4

Importance	Low impact and medium impact (n=14)		High impact (n=12)		Overall (n=26)		Wilcoxon p-value
	Mean	Std dev	Mean	Std dev	Mean	Std dev	
7.2: Product / source (e.g. wind power, trees)	4.43	0.76	3.50	1.38	4.00	1.17	0.0612
7.3: Reputation of the provider	4.64	0.63	4.08	0.80	4.39	0.75	0.0461
7.4: Geographic area where offset occurs	4.21	1.12	2.92	1.31	3.62	1.36	0.0106

The level of importance concerning the reputation of the service provider is tested in Question 7.3, which indicates that 92% (24/26) of respondents indicated that this was an important consideration, showing a mean of 4.38 and standard deviation of 0.75. The Wilcoxon test was applied to the sample to compare varying levels of environmental impact. This test indicates that there is a significant difference (5% confidence level) between high- and low-impact companies. For high-impact companies, the reputation of the provider is a smaller consideration than for low-impact companies, who consider it very important.

When reviewing the level of importance of the geographic area where the offset occurs, a comparison between companies with two levels of environmental impact was conducted with the Wilcoxon test, which shows a significant difference (5% confidence level), as seen on Table 4.11. Companies with a low environmental impact believe that the geographic area is very important, while companies which have a high environmental impact believe that this is generally a minor consideration. The mean for Question 7.4 is 3.61, with a standard deviation of 1.36.

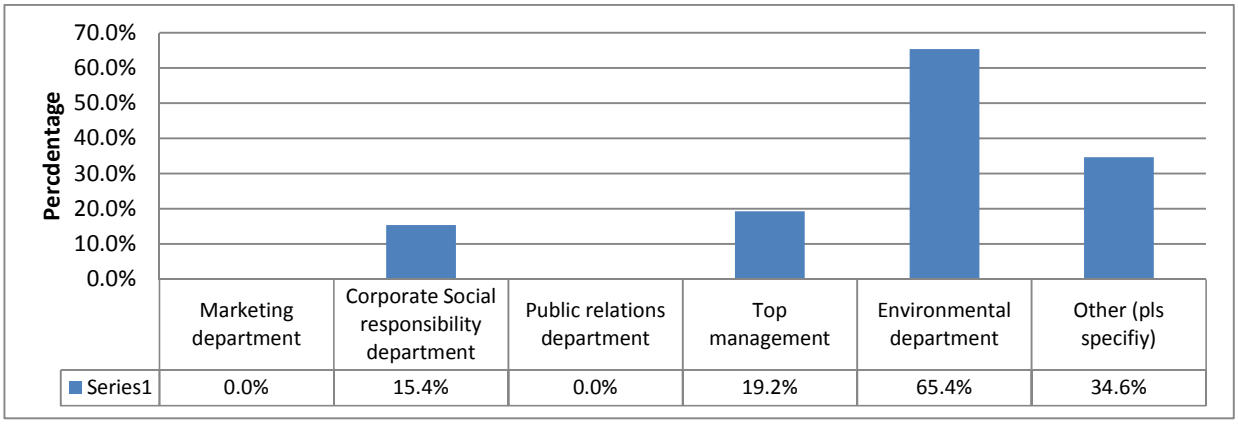
4.3.6 Theme 4 findings (organisational strategy)

Theme 4 comprises 20 questions directed toward organisational strategy, based on the companies' corporate plans of action required to achieve and institutionalise corporate climate change mitigation.

4.3.6.1 Corporate climate change responsibility

In Question 1, respondents were asked which department within their respective organisations was responsible for climate change mitigation efforts. The majority (65% (17/26)) indicated their Environmental Department, with 39% (10/26) indicating “Other”. When “Other” was further investigated, many organisations indicated that such duties lay with the Sustainability Department, while many more indicated that it fell under more than one department. The results are detailed in Figure 4.4.

Figure 4.4: Question 1



A comparison between companies' environmental impact was tested using the Fisher p-value for Question 1, with no statistical difference found between the two groups. The Fisher p-value was 0.1249.

4.3.6.2 Corporate approach to climate change

In Question 2, four statements were put to the respondents, who were asked to indicate which statement best describes their company's approach to climate change. The majority 58% (15/26) indicated that they aim to be leaders in climate change mitigation actions, with 31% (8/26) aiming to be fast followers. No companies indicated that climate change does not affect them. No statistical difference was found when conducting a comparison test between companies' environmental impact using the Fisher p-value for Question 2. The Fisher p-value was 1.0000.

4.3.6.3 Motivations for corporate actions (continued from 4.3.2.1)

In Question 3, five statements were offered, with participants asked to indicate what the motivation is for their organisation to take climate change action by indicating how important the statements were. The majority (77% (20/26)) indicated that it was good for their brand (Question 3.1), while 58% (15/26) believed that it helped them to retain existing clients (Question 3.4). Further, the majority (54% (14/26)) indicated that the efforts of their business competitors were not a motivating factor. Companies seemed generally undecided on whether compliance was a motivating factor (Question 3.6). The largest motivating factor was related to efficiency, as 88% (23/26) of companies indicated that this was an important motivation to take climate change action.

Table 4.12: Question 3.1 and 3.4 – 3.7

Motivation	**Low impact and medium impact (n=14)**		**High impact (n=12)**		**Overall (n=26)**		**Wilcoxon p-value**
	Mean	Std dev	**Mean**	**Std dev**	**Mean**	**Std dev**	
3.1: It is good for our brand	3.71	1.14	3.92	0.10	3.81	1.06	0.6356
3.4: It helps us retain existing clients	3.54	0.97	2.67	1.56	3.12	1.33	0.1445
3.5: Our competitors are doing it	2.50	1.16	2.92	1.44	2.69	1.29	0.4948

3.6: We have to (compliance)	3.00	1.41	3.33	1.44	3.15	1.41	0.5408
3.7: It makes us more efficient	4.36	0.75	4.42	0.67	4.39	0.70	0.9103

Table 4.12 further details the results found when conducting a comparison between companies' environmental impact by using the Wilcoxon test for Questions 3.1 and 3.4 – 3.7. No statistical difference was found between the two groups as all p-values are above 0.05.

4.6.3.4 Climate change strategies

The questionnaire asked whether respondents' companies have measured their carbon emissions, to which 100% of companies indicated Yes (Question 6.8), while 85% (22/26) indicate that they have a detailed understanding of their carbon emissions footprint and have set realistic and achievable carbon reduction targets (Question 6.15). However, 62% (15/26) have not allocated sufficient resources to achieve their carbon reduction target (Question 6.9), even though 92% (24/26) believe that they can reduce their environmental footprint while increasing their productivity in a sustainable way (Question 6.10, reverse scored).

The results showed that 69% (15/26) of respondents indicated that climate change is clearly featured at a strategic planning level within their company (Question 6.11) and 77% (20/26) indicated that it is clearly featured at an operational planning level within the company (Question 6.12). Only 46% (12/26) of respondents factor the costs for greenhouse gas mitigation into major investment and operational decisions (Question 6.16). When conducting a comparison test based on environmental impact for Question 6.16 using the Fisher p-value test, a statistical difference was found between the two groups, with a confidence level of 5% (p-value 0.0246). The results indicate that high-impact companies do factor the costs for greenhouse mitigation into investment decisions (75% (9/12)) while low-impact companies do not (65% (9/14)), as further detailed in Table 4.13. The findings do, however, show that 65% (17/26) of companies believe climate change will have a fundamental impact on their business model (Question 6.18), while 62% (16/26) perceive carbon management as a business asset which can create new opportunities (Question 6.14).

Table 4.13: Question 6.16

Motivation	Low impact and medium impact (n=14)			High impact (n=12)			Fisher p-value
	Yes	No	I don't know	Yes	No	I don't know	
6.16: Our company factors the costs for greenhouse gas mitigation into major investment and operational decisions.	21.43	64.29	14.29	75.00	25.00	0.00	0.0246

Question 6.19 asked respondents if their "company's chairperson clearly articulates the company's views on climate change and greenhouse gas control measures". To this question, 69% (18/26) indicated Yes. To add to this, 85% (22/26) indicated that their board conducts periodic reviews on climate change and monitors progress in implementing strategies (Question 6.20). The majority (62% (16/26)) of companies believe they have sufficient skills in their company to account and administer greenhouse gas mitigation products internally (Question 6.13). The companies seemed generally uncertain whether investors take climate change action into account when deciding to invest in their company (Question 6.17), with 54% (14/26) indicating that they do take it into account, 35% (9/26) indicating that they don't, and 11% (3/26) being undecided.

A comparison test was conducted based on environmental impact, using the Fisher p-value for Questions 6.8 – 6.15 and 6.17 – 6.20. No statistical difference was found between the two groups, as all p-values were above 0.05.

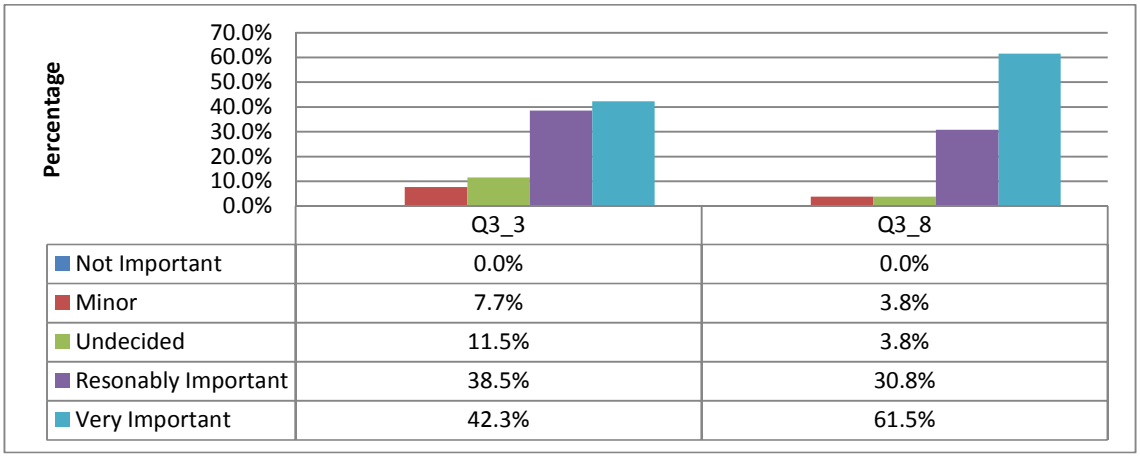
4.3.7 Theme 5 findings (finance)

The fifth theme reviews finance as concepts relating to costs, risk and their interrelationship with climate change mitigation. This theme consists of 8 questions.

4.3.7.1 Motivations for corporate actions (continued 2)

In Question 3, two statements were made in which participants were asked to indicate their organisations' motivation to take climate change action by selecting how important the statements were. The results are summarised in Figure 4.5.

Figure 4.5: Summarised results for Question 3.3 and 3.8



	Q3_3	Q3_8
Not Important	0.0%	0.0%
Minor	7.7%	3.8%
Undecided	11.5%	3.8%
Resonably Important	38.5%	30.8%
Very Important	42.3%	61.5%

The results showed that 81% (21/26) of the respondents indicated that if it increased their profitability it would be a motivation to take climate change action (Question 3.3). This finding is further supported by Question 3.8, where 92% (24/26) of respondents indicated that if it saved them money it would be a motivation for their organisation to take climate change action.

Table 4.14: Question 3.3 and 3.8

Motivation	**Low impact and medium impact (n=14)**		**High impact (n=12)**		**Overall Impact n=26)**		**Wilcoxon p-value**
	Mean	Std dev	Mean	Std dev	Mean	Std dev	
3.3: It increases our profitability	4.21	0.98	4.08	0.90	4.15	0.93	0.6234
3.8: It saves us money	4.36	0.93	4.67	0.49	4.50	0.76	0.4977

Table 4.14 details the results found when conducting a comparison between companies' environmental impact, using the Wilcoxon p-value for Questions 3.3 and 3.8. No statistical difference found between the two groups as all p-values are above 0.05.

4.3.7.2 Perspectives on corporate climate chance action

The majority of the companies surveyed (73% (19/26)) indicated that they disagreed with the statement “Our company would rather purchase carbon offsets to reduce our carbon footprint if it is cheaper than taking internal action to reduce our emissions.” (Question

4.19). The results showed a mean of 4.15 and standard deviation of 0.73, with no statistical difference found between the two groups.

When questioning respondents regarding whether South African customers take climate change action into account when considering purchasing products from them, 58% (15/26) indicated that customers did not take climate change action into account and 35% (9/26) remained undecided (neither agreed nor disagreed) (Question 4.20). The results showed a mean of 3.62 and standard deviation of 1.20, with no statistical difference found between the two groups. Table 4.15 further details the results found when conducting a comparison between companies' environmental impact, using the Wilcoxon test for questions 4.19 – 4.21.

Table 4.15: Question 4.19 – 4.21

Motivation	**Low impact and medium impact (n=14)**		**High impact (n=12)**		**Overall (n=26)**		**Wilcoxon p-value**
	Mean	**Std dev**	**Mean**	**Std dev**	**Mean**	**Std dev**	
4.19: Our company would rather purchase carbon offsets to reduce our carbon footprint if it is cheaper than taking internal action to reduce our emissions.	4.36	0.50	3.92	0.90	4.15	0.73	0.2117
4.20: South African customers take climate change action into account when considering purchasing products from us.	3.71	1.33	3.50	1.09	3.62	1.20	0.5451
4.21: International customers take climate change action into account when considering purchasing products from us.	1.64	0.63	2.50	1.17	2.04	1.00	0.0654

A minority (39% (10/26)) of the respondents are of the view that international customers take climate change action into account when considering purchasing products from them. However 35% (9/26) neither agreed nor disagreed with the statement (Question 4.21). The results showed a mean of 2.04 and standard deviation of 1.00. When compared between companies with different levels of environmental impact the Wilcoxon two-sample non-parametric test was used, with results detailed in Table 15. Question 4.21 indicated a statistical significant (10%) difference between the low- and high-environmental impact companies, where lower impact companies disagreed significantly with the statement “International customers take climate change action into account when considering

purchasing products from us", whereas the high environmental companies took a more neutral position

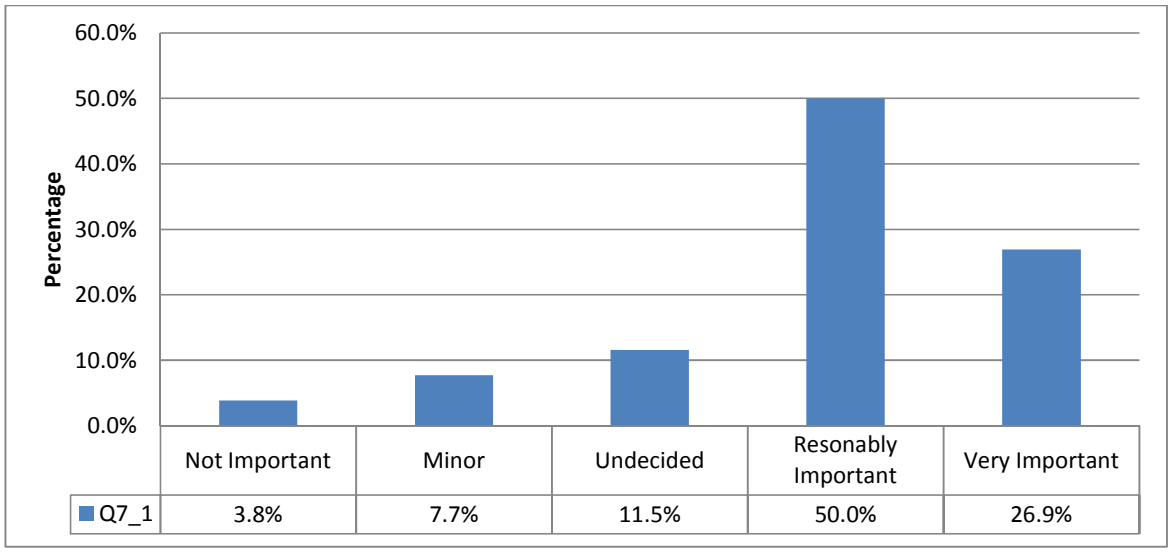
4.3.7.3 Cost perceptions of mitigation instruments

The results indicated that half (50%(13/26)) the respondents surveyed in Question 6.21, indicated that GHG mitigation reduction instruments were not too expensive to use at this stage, while 35% (9/26) indicated that they did not know whether they were too expensive. The sample seemed largely uncertain when asked whether they had explored international carbon trading systems and had found them to be a source of external funds for their GHG mitigation efforts. Half (50% (13/26)) indicated No and 42% (11/26) indicated Yes. No statistical difference was found between the two groups when using the Fisher test.

4.3.7.4 Carbon offset considerations

The majority of the respondents indicated that price was an important consideration (reasonably important: 50% (13/26), and very important: 27% (7/26)) when purchasing carbon offsets. The results indicated an overall mean of 3.61 and standard deviation of 1.05 as illustrated in figure 4.6.

Figure 4.6: Question 7.1



The comparison between respondents with different levels of environmental impact used the Wilcoxon test, which indicates that there is a significant difference between high- and low-impact companies. For high-impact companies, price was a larger consideration when purchasing carbon offsets than for low-impact companies, who consider it reasonably important as illustrated in table 4.16.

Table 4.16: Question 7.1

Importance	**Low impact and medium impact (n=14)**		**High impact (n=12)**		**Overall (n=26)**		**Wilcoxon p-value**
	Mean	Std dev	Mean	Std dev	Mean	Std dev	
Price	3.54	1.05	4.25	0.96	3.88	1.05	0.0657

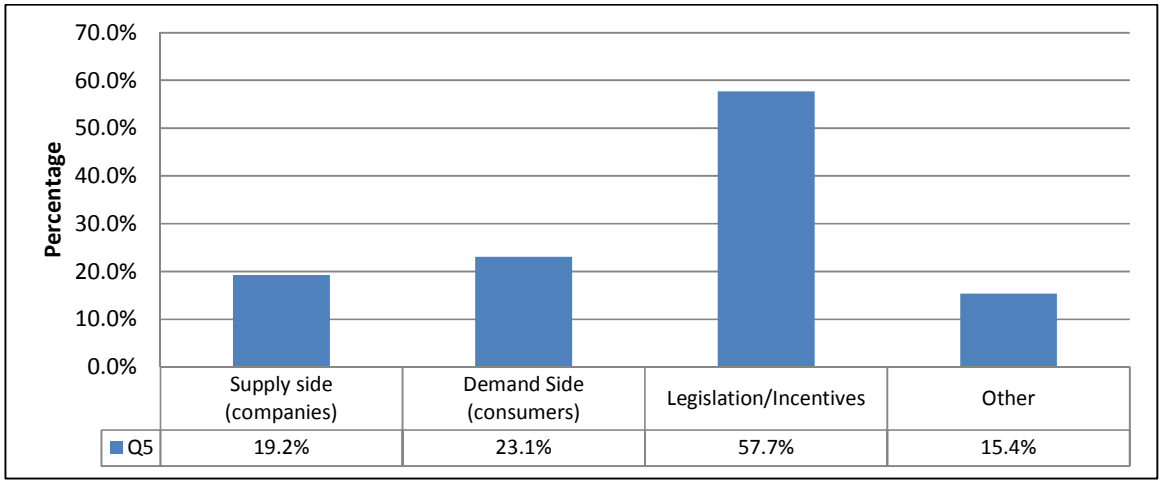
4.3.8 Validation of results

To validate the survey results, two additional questions were asked and followed up with semi-structured interviews with four of the sample.

4.3.8.1 Corporate climate change – growth perspectives

In Question 4.7, participants were asked what, in their opinion, would fuel the growth of greenhouse gas mitigation instruments in the future. The majority (58% (15/26)) of the respondents indicated that legislation will fuel the growth of greenhouse gas mitigation instruments in the future, followed by 23% (6/26) being of the opinion that consumers (demand side) will fuel growth in this area. Interestingly, only 19% (5/26) believed that the supply side (companies) will fuel growth in greenhouse gas mitigation instruments.

Figure 4.7: Summarised results for Question 5

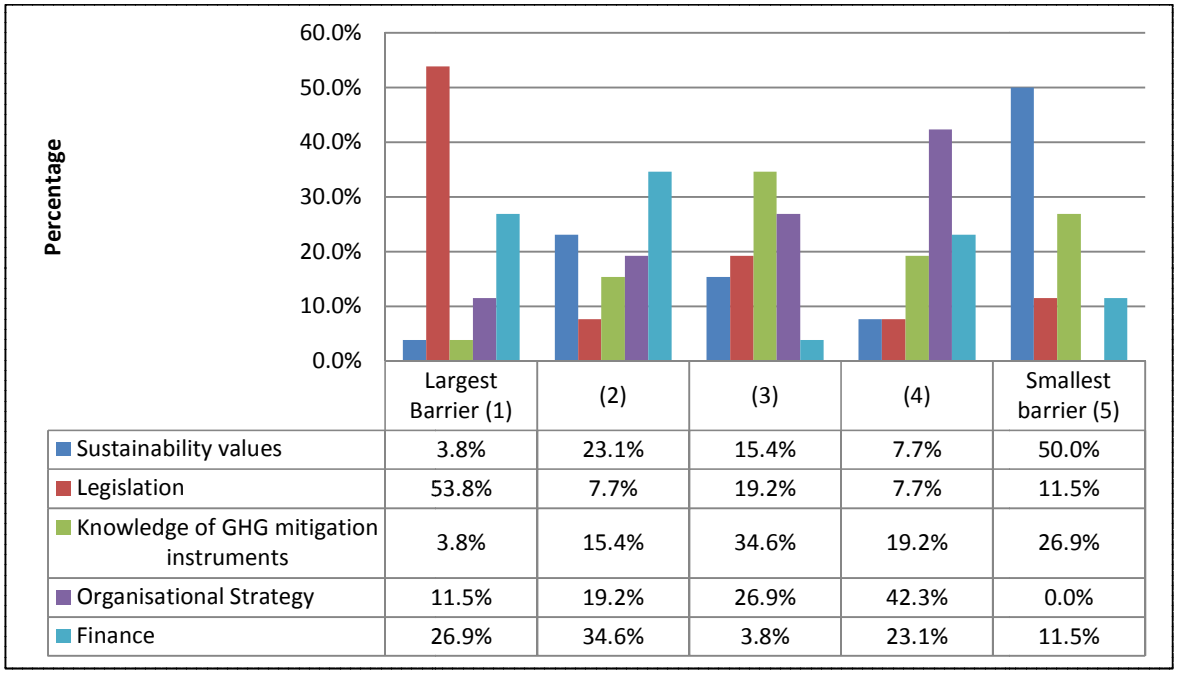


The results show that 15% (4/26) of respondents selected “Other” in addition to their answer. Further information was therefore solicited from those answering “Other”. Two respondents indicated that a shared approach between the Government and private sector will be required as the risks are too big with a single approach. One respondent indicated that due to the complexity of the issue the pressure to change will be applied from a number of angles at the same time. The final input from the sample indicated that the cost and availability of energy will be an additional driver which will fuel growth for greenhouse gas mitigation instruments.

4.3.8.2 Corporate climate change barriers

In Question 8, participants were asked to rank market barriers to corporate climate change action. A small majority of respondents (54% (14/26)) believed that legislation is the largest barrier, followed by finance, knowledge of the GHG mitigation instruments, and organisational strategy. The smallest barrier was considered to be sustainability values.

Figure 4.8: Summarised results for Question 8



	Largest Barrier (1)	(2)	(3)	(4)	Smallest barrier (5)
Sustainability values	3.8%	23.1%	15.4%	7.7%	50.0%
Legislation	53.8%	7.7%	19.2%	7.7%	11.5%
Knowledge of GHG mitigation instruments	3.8%	15.4%	34.6%	19.2%	26.9%
Organisational Strategy	11.5%	19.2%	26.9%	42.3%	0.0%
Finance	26.9%	34.6%	3.8%	23.1%	11.5%

Figure 4.8 graphically represents the results. When comparing companies with different levels of environmental impact, no statistical differences between the two groups of companies was found, as all p-values were greater than 0.05

Table 4.17: Question 8

Importance	**Low impact and medium impact (n=14)**		**High impact (n=12)**		**Overall Impact (n=26)**		**Wilcoxon p-value**
	Mean	Std dev	Mean	Std dev	Mean	Std dev	
Sustainability values	3.93	1.21	3.58	1.62	3.77	1.39	0.5840
Legislation	1.93	1.33	2.42	1.62	2.15	1.46	0.5057
Knowledge of GHG mitigation instruments	3.43	1.28	3.58	1.08	3.50	1.18	0.8122
Organisational strategy	3.14	1.17	2.83	0.94	3.00	1.06	0.3248
Finance	2.57	1.40	2.58	1.51	2.58	1.42	0.8948

Based on Question 8, the respondents indicated that the largest barrier is legislation followed by finance, knowledge of GHG mitigation instruments, organisational strategy. The smallest barrier was considered to be sustainability values. These findings were further supported in the informal interviews, where all interviewees believed that there were a number of factors that had an impact on their climate change action. However, all

noted that legislation or rather the *un*certainty or *lack* of legislation was the factor that had the greatest impact on the market. All were of the opinion that a carbon tax would be introduced in the future. This perceived introduction of anticipated legislation and / or carbon tax seemingly has an impact on the company's actions, as many were hesitant to be too active in the fear that this would negatively affect them once legislation is finalised and implemented.

4.3.9 Conclusion

This chapter presented the results from the empirical research conducted as part of the study. Frequencies (descriptive statistics) were presented to provide insight into the market barriers for voluntary climate change mitigation in the South African private sector, based on five themes. Cross tabulations were calculated and presented to establish relationships with companies with varying environmental impact levels. The interpretation of the results is discussed in further detail in chapter 5, including conclusions and recommendations for future research.

5 RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

The purpose of this study is to identify the extent to which market barriers exist, which inhibit the uptake of voluntary climate change mitigation mechanisms in the South African private sector. This will provide insight into the perceived lack of action in corporate climate change mitigation. In the fourth chapter, the analysis of the research was presented. In this chapter, the results are interpreted against the research objectives, drawing from the literature as detailed in Chapter 2. Chapter 5 also discusses the recommendations of the study and the conclusions drawn, including recommendations for future action and research.

The research was guided by three main research objectives:

- To identify thematic clusters of market barriers in voluntary climate change mitigation in the South African private sector.
- To identify potential market barriers in voluntary climate change mitigation in the South African private sector.
- To provide recommendations to increase the implementation of climate change mitigation by the corporate sector in South Africa.

5.2 CONCLUSIONS: INTERPRETATION OF RESULTS

5.2.1 Identification of theme-based market barriers clusters in voluntary climate change mitigation in the South African private sector

The first phase of the research studied the available literature. This provided a broad framework and revealed five clusters of market barriers inhibiting the uptake of voluntary climate change mitigation mechanisms in the South African private sector. The substance of these clusters was further interrogated by the respondents in primary research phase 1, and thereafter tested on the private sector in primary research phase 2.

The respondents who participated in the primary research phase 2 ranked the five market barriers clusters based on their level of significance towards inhibiting the uptake of voluntary climate change mitigation. The results indicate the order of significance, starting with legislation, followed by finance, knowledge of the GHG mitigation instruments, organisational strategy and lastly sustainability values, as indicated in Table 5.1.

Table 5.1: Ranking of thematic clusters

Thematic Clusters	1= Most significant, 5= Least significant
Legislation	1
Finance	2
Knowledge of the GHG mitigation instruments	3
Organisational strategy	4
Sustainability values	5

The primary and most significant cluster, *legislation,* refers to the regulatory framework, within which climate change action operates and outlines the legal requirements which are to be met. This is followed by *finance***,** which relates to cost, productivity, efficiency and risk, and its relationship to climate change mitigation action. The third cluster refers to the internal *knowledge* of GHG mitigation instruments within the private sector. This represents the expertise, skills and experience of the organisation to actively mitigate their impacts on climate change. The fourth cluster represents *organisational strategy* and the corporate will and action required to implement corporate climate change action. Furthermore this organisational strategy relates to concrete decisions and actions taken. The fifth and final cluster concerns *sustainability values*, which concerns the organisations' managements' commitment to the triple bottom line based on abstract sustainability ideals.

The themed clusters are not mutually exclusive nor are they exhaustive but rather provide a framework of theme-based market barriers. Inaction (or limited action) does not lie with one barrier alone as the barriers are complex and multidimensional, and thematic market barriers are often mutually reinforcing. Viewing market barriers for climate change mitigation should therefore be seen holistically and not in isolation, thus ensuring that a systematic perspective is taken. This is further discussed in the second research question.

5.2.2 Identification of potential market barriers to voluntary climate change mitigation in the South African private sector

The primary barrier to voluntary climate change action concerns the lack of local and international policy frameworks. The different rules and resultant uncertainty around local and international frameworks seems to impede consistent and meaningful action. While this uncertainty does not prevent the private sector from taking voluntary action, it does appear to negatively affect the overall scale and type of climate change mitigation efforts.

The South African private sector believes that voluntary climate change efforts alone will not be sufficient and that additional legislative intervention will be required. Companies indicate that future legislation will act as a catalyst to expand the climate change mitigation market, which, in the absence of clear rules, encourages a “wait and see” approach. In a challenging economic climate, companies are obliged to balance economic, social and environmental interests while remaining globally competitive. The private sector may therefore be positioning itself, ready to take action once legislation has been clarified and implemented. Until such a time, internal energy efficiency will be the primary action taken. The study found that actions are largely motivated by the financial business case and driven by an increase in efficiency, profitability and money savings.

Companies that have implemented voluntary actions to reduce their GHG emissions are generally motivated by a financial business case with short-term payback periods. Currently, there are no financial penalties for those companies that do not act, and limited financial incentives for those that do act beyond the business case. It could therefore be argued that the relative lack of legal requirements concerning corporate climate change presents a significant barrier by creating a competitive disadvantage for those companies that take action in the present.

The possible implementation of a South African carbon tax was included as a question in the research questionnaire to ascertain whether the private sector anticipates its introduction in the near future. The majority of respondents had expected such a tax to be implemented – which has subsequently occurred. In February 2012 the National Treasury announced that a tax will be imposed in 2013-14 to limit GHG emissions based on industry

sector, thereby making companies responsible for their external environmental costs. At the time of writing, full and final details of the carbon tax law remain unclear.

Companies with a high environmental impact seem to be more price sensitive than low environmental impact companies when taking action to mitigate climate change. Price sensitivity is related to factors such as the level of emission reductions required and the subsequent cost and scale of action required from companies with a higher environmental footprint. Compared to low-impact companies, high environmental impact companies indicate that it is more difficult to be profitable whilst simultaneously preserving the environment. In addition they are more cautious to engage in South African carbon trading schemes than low-impact companies. Climate change mitigation product preferences differ between companies with high and low environmental impact. Companies with low environmental impact, consider product characteristics such as; the product/source, reputation of the provider and geographic area where the carbon offset occurs, of higher importance than their high environmental impact counterparts.

The private sector has a limited appetite for purchasing GHG mitigation instruments. Despite the importance of factors such as price, reputation of the supplier, product source and geographic location, the private sector indicates that it would rather take internal action to reduce emissions than purchase carbon offsets – even if the former is more expensive. Even though it could be argued that GHG mitigation instruments are too expensive for the private sector, half of the respondents indicated such instruments were not too expensive and 35% indicated that they did not know the costs involved. This result therefore reflects that only 15% of respondents believe these instruments are too expensive. It could be argued that the private sector has had limited active engagement with GHG mitigation instrument providers, despite knowing how and where to access these products. Furthermore the results indicate that companies have a narrow perspective on climate change actions, as the majority have not considered purchasing offsets on the carbon market or South African renewable energy certificates.

In 2010 the Carbon Disclosure Project found that 94% of JSE 100 companies disclosed their greenhouse gas emissions, with 31 companies aiming for specific targets. In 2011 this increased to 99% of companies disclosing GHG emissions and 40 companies setting targets. A large majority of these companies have a detailed understanding of their carbon

emissions footprint and have set realistic and achievable carbon reduction targets. However, when reviewed in detail, many companies seem to be reporting one thing while doing (or not doing) another. All of the companies that participated in the study indicated that they had measured their carbon emissions, while 85% indicated that they have set realistic and achievable carbon reduction targets. However, in contradiction to setting these targets, only 38% have allocated sufficient resources to actually achieve these targets. This irregularity in the setting of “seemingly” realistic targets and thereafter failing to assign sufficient resources to achieve the targets, leads to the perception that falling short of targets is not of great consequence, nor is it a priority.

Companies regularly include climate change considerations at the strategic and operational planning level, but less than half of these companies factor GHG costs into the actual major investment and operational decisions. Significant statistical differences were found based on the level of a company’s environmental impact, need to be taken into consideration. The majority of high-impact companies do factor such costs into investment decisions, while 65% of low-impact companies do not. The majority of corporate actions are short-term, once-off initiatives without any seemingly large-scale impacts. In this context, the motivation to take climate change action is again based on a financial business case, as found by Reyers (2009:165).

The research shows that although companies recognise that they can reduce their environmental footprint while increasing their productivity in a sustainable manner, this is seemingly not being put into practice. These discrepancies raise the question of how seriously the corporate sector considers climate change action, and the perceived importance of being “seen” to be involved in climate change action from a political and/or strategic viewpoint. It could be argued that perhaps the scale and level of action required demotivates companies, as they attempt to balance a number of priorities but fail to assign similar priority levels and resource expenditure to climate change action.

Company sustainability values reflect the commitment by management towards environmental preservation and their inherent responsibility to help mitigate climate change. Companies are struggling to translate these values into climate change mitigation behaviour and manage the expectations of all stakeholders. The challenge lies in putting such commitments into practice. Companies believe that environmental management is

critical for the sustainability of their operations. They further believe that their financial wellbeing is dependent on the environment and that it is their responsibility to take action as corporate citizens to preserve the natural environment for future generations. The corporate sector is primarily motivated by financial benefits associated with increased efficiency, productivity and profits. A secondary motivation for companies to take action is to align themselves with the perceived positive branding opportunities related to climate change activities. South African companies further indicate that they are not motivated by their competitors' climate change actions. This is likely due to the fact that the majority see themselves as leaders (or fast followers) in climate change mitigation efforts and assume their competitors are lagging behind in such efforts. Interestingly, the research shows that more than a third of the companies are uncertain if their South African and/or international customers take climate change into account when purchasing their products. When comparing local and international customers, there is a bias towards international customers being more influenced by climate change action than their South African counterparts. The cost benefit of corporate climate change action, beyond the obvious business case, is yet to be determined as the private sector is generally uncertain of the true drivers for their investors' and customers' decisions.

In general, the findings suggest that the private sector is politically and ethically committed to environmental stewardship. They recognise their inherent responsibilities and impacts on the environment and, in principle, are dedicated to mitigating their impacts on climate change. The challenge lies in remaining globally competitive and maximising shareholder returns whilst balancing social and environmental ideals and interests. The private sector has adopted a "take position, wait and see approach" which places them in a position to take advantage of, and influence, the opportunities and risks associated with climate change without having a negative impact on their bottom line.

5.2.3 Recommendations to increase the implementation of climate change mitigation within the South African corporate sector

It is recommended that legislative and regulatory bodies negotiate and implement a simple, clear and effective policy framework, both nationally and internationally. The lack of clarity regarding regulations and growing uncertainty in the private sector impedes the utilisation and growth of voluntary climate change mitigation mechanisms. It is

recommended that such regulations prescribe penalties to companies with excess emissions, and reward companies that take steps to mitigate their impacts. Stakeholders and the private sector should be consulted in the development of these regulations to ensure that implementation progresses beyond once-off, short-term projects in favour of mainstream programmes that produce long-term change.

Given that corporate action in terms of disclosure seems to be a growing trend, it is recommended that clear measureable actions be reported alongside targets that go beyond disclosure. Both actions and targets should be tracked in order for companies to be held accountable. It is further recommended that the King Committee review its King Code to include a form of regulation that moves beyond motivating companies on a purely voluntary basis.

It is recommended that the regulatory focus shifts from barriers to motivators to encourage the private sector to participate more meaningfully and quantitatively in mitigating their impacts. These motivators should further incentivise companies and not competitively disadvantage them for being progressive.

It is suggested that the barriers affecting voluntary climate change mitigation are not mutually exclusive but rather a complex multidimensional issue. Any attempt to remove the barriers will require a systemic approach across all departments within a company – and all players within the private sector.

Although the findings suggest that the corporate sector has little to no appetite for external GHG mitigation instruments, the reasons for this remain ambiguous. It is recommended that the suppliers of external GHG mitigation instruments further engage with the private sector to better understand its needs, requirements and motivations in adopting climate change action. It is further recommended that suppliers communicate collectively and effectively with the private sector and demonstrate their instruments' benefits.

The research indicates that corporate branding is an important motivator for companies to take action. It is therefore recommended that suppliers of GHG mitigation instruments align themselves further with branding opportunities as an entry point into the private sector.

With global competitiveness at its toughest, companies must have a detailed understanding of their consumers' and investors' purchasing habits and motivations. It is recommended that companies include climate change purchasing and investment indicators within their market research frameworks, to observe whether consumers' and investors' habits and trends are influenced by corporate climate change action.

5.2.4 Future research

This study focused on identifying specific and thematic clusters of market barriers in voluntary climate change mitigation in the South African private sector. A number of clusters emerged from this study, along with a number of barriers.

The survey questionnaire used in the study was developed through an extensive process of consultation in phase 1 of the study (Chapter 3). It is recommended that this tool be adapted and used to further investigate the climate change mitigation in corporate South Africa.

While this research reviewed the JSE SRI 2010, it is recommended that future research, to investigate drivers, motivators and barriers to corporate climate change action, include medium to large companies in South Africa. This will assist in gaining an insight into their perspectives on the climate change discourse and their role in climate change mitigation.

5.2.5 Conclusion

The findings of the study highlight the market barriers that are impeding the uptake of voluntary climate change mitigation mechanisms by the private sector. It highlights the need for a simple, clear and effective policy or regulatory framework to be implemented nationally and internationally. This framework should stipulate that companies with excess emissions should be penalised, while companies taking decisive action to mitigate their impacts should be rewarded. Furthermore actions taken to reduce market barriers should be tackled holistically, taking cognisance of the complexity of the barriers, and levels of companies' environmental impact.

Corporate climate change actions should be integrated within the entire organisation whereby these actions are mainstreamed not only into policy, but translated into sustained practice. Companies are continually improving the quality of reporting and public disclosure, however this is not enough if we are to successfully tackle global climate change and ensure a sustainable future for generations to come. It is recognised that business, government and civil society need to translate their values into behaviours and actions to share the responsibility of climate change.

"It always seems impossible until it's done". Nelson Mandela

6 LIST OF REFERENCES

Bernstein, L., Bosch, P., Canziani, O., Chen, Z., Christ, R., Davidson, O., Hare, W., Huq, S., Karoly, D., Kattsov, V., Kundzewicz, Z., Liu, J., Lohmann, U., Manning, M., Taroh, M., Menne, B., Metz, B., Mirza, M., Nicholls, N., Nurse, L., Pachauri, R., Palutikof, J, Parry, M., Qin, D., Ravindranath, N., Reisinger, A., Ren, J., Riahi, K., Rosenzweig, C., Rusticucci, M., Schneider, S., Sokona, Y., Solomon, S., Stott, P., Stouffer, R., Sugiyama, T., Swart, R., Tirpak, D., Vogel, C., and Yohe, G. *Climate change 2007: Synthesis Report*. IPCC, Valentia, Spain.

Burke, T. 2009. *Connecting the Dots: How Climate Change Transforms Market Risks and Opportunities.* United Nations Global Compact.

Carbon Trust 2006.*The Carbon Trust: Three Stage Approach to Developing a Robust Offsetting Strategy.* London, England:The Carbon Trust

Ciegis, R., Ramanauskiene, J., Martinkus, B. 2009. The Concept of Sustainable Development and its Use for Sustainability Scenarios. *Engineering Economics, 62(2):*28-37.

Cogan, D.G. 2006. *Corporate Governance and Climate Change: Making the Connection.* Boston, USA:Ceres.

Cogan, D.G. 2008. *Corporate Governance and Climate Change: The Banking Sector.* [Online] Available from: http://www.ceres.org//Document.Doc?id=269 [Accessed 2009-03-11].

Cooper, D.R. and Schindler, P.S. 2003. *Business Research Methods*. 8th ed. New York: USA: McGraw-Hill.

Corina, G. and Roxana, S. 2011. Comparative Study on Corporate Governance. *Economic Science Series.* 20(2):674-680.

Creswell, J. W., and Plano Clark, V. L., 2007. *Designing and Conducting Mixed Methods Research.* Thousand Oaks, California: Sage.

Department of Environmental Affairs and Tourism. 2009. *National Climate Change Response Policy: Discussion Document for the 2009 National Climate Change Response Policy Development Summit.* [Online] Available from: www.ccsummit2009.co.za/framework.html [Accessed: 2010-07-15].

Drexhage, J. and Murphy, D. 2010. *Sustainable Development: From Brundtland to Rio 2012.* [Online] Available from: http://www.un.org/wcm/webdav/site/climatechange/shared/gsp/docs/GSP1-6_Background%20on%20Sustainable%20Devt.pdf [Accessed 2012-09-10].

Dunn, S. 2003. *Down to the Business of Climate Change: An Overview of Corporate Strategies*. [Online] Available from: http://www.climatebiz.com/resources/resource/down-business-climate-change-an-overview-corporate-strategies. [Accessed 2009-04-10].

Dyllick, T. and Hockerts, K. 2002. Beyond the business case for corporate sustainability. *Business Strategy and the Environment*, 11(2):130-141.

Gladwin, T., Kennelly, J. and Krause, T. 1995. Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research. *Academy of Management Review*, 20(4): 874-907.

Global Reporting Initiative. 2006. *Sustainability reporting guidelines.* [Online] Available from: http://www.globalreporting.org/ReportingFramework/G3Online/ [Accessed 2009-03-12].

Griffiths, A., Haigh, N. and Rassias, J. 2007. A Framework for Understanding Institutional Governance Systems and Climate Change: The Case of Australia. *European Management Journal,* 25(6):415-427.

Grist, N. 2008. Positioning Climate Change in Sustainable Development Discourse. *Journal of International Development* 20(6):783–803.

Groves, R., Fowler, F., Couper, M., Lepkowski, J., Singer, E. and Tourangean, R. 2004. *Survey Methodology.* [Online] Available from: http://books.google.co.za/books [Accessed 2009.07.10].

Hendricks, P., S., and Wyngaard, R.G. 2010. South Africa's King III: A Commercial Governance Code Determining Standards of Conduct for Civil Society Organizations. *International Journal of Not-for-Profit Law,* 12(2):104-109.

Hoffmann, H. and Kolk, A. 2007. Business, Climate Change and Emissions Trading: Taking Stock and Looking Ahead. *European Management Journal*, 25(6):411-415.

Incite Sustainability. 2008. *Carbon disclosure project report 2008: JSE Top 100*. [Online] Available from: http://www.cdproject.net/reports.asp [Accessed: 2009-10-01].

Incite Sustainability. 2009. *Carbon disclosure project 2009: South Africa JSE 100.* [Online] Available from: http://www.nbi.org.za/welcome.php?pg=2&pgm=M&id=11046 [Accessed 2009-07-10].

Incite Sustainability. 2011. *CDP South Africa JSE 100 Report 2011 Partnering for a low carbon future.* [Online] Available from: https://www.cdproject.net/CDPResults/CDP-2011-South-Africa-JSE-100-Report.pdf [Accessed 2012-05-10].

Institute of Directors Southern Africa, 2009. *King Code of Governance for South Africa 2009*

IPCC. 2007a. *Summary for Policymakers in Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC. 2007b. *Summary for Policymakers in Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the*

Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK.

IPCC. 2008. *IPCC Fourth Assessment Report*: *Annex 1 Glossary*, Aviel Verbruggen, Belgium.

IPCC. 2011. *Summary for Policymakers. In: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation* [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Kates, R., Parris, T. and Leiserowitz, A. 2005. What is Sustainable Development? Goals, Indicators, Values and Practice. *Environment: Science and Policy for Sustainable Development*, 47(3): 8–21. [Online] Available from: http://www.heldref.org/env.php. [Downloaded 2012-04-10]

King. 2002. *Executive Summary of the King II Report 2002*. Institute of Directors in Southern Africa.

King, M.E. 2006. *The Corporate Citizen*. South Africa: Penguin Books.

King. 2009. *King Report on Governance for South Africa 2009*. Institute of Directors Southern Africa 2009. [Online] Available from: http://www.iodsa.co.za/downloads/documents/King_Code_of_Governance_for_SA_2009.pdf. [Accessed 2012-05-10].

KPMG. 2006. *2006 Survey of Integrated Sustainability Reporting In South Africa*. [Online] Available from: http://www.kpmg.co.za/images/naledi/pdf%20documents/mc1672%20sustainability%20survey%2036pg.pdf [Accessed 2009-03-12].

KPMG. 2008. *International Survey Of Corporate Responsibility Reporting.* [Online] Available from: http://www.kpmg.com/Global/IssuesAndInsights/ArticlesAndPublications/Pages/Sustainability-corporate-responsibility-reporting-2008.aspx [Accessed 2009-03-25].

KPMG. 2009. *Sustainable IT, Finding Your Shade Of Green*. [Online] Available from: http://www.iodsa.co.za/king.asp#King%20III%20Report%20-%202009 [Accessed 2009-03-12].

KPMG. 2011. *Corporate Sustainability: A Progress Report.* KPMG International, Switzerland.

Leedy, P.D. and Ormrond, J.E. 2005. *Practical research: Planning and design*. 8th ed. Upper Saddle River, N.J: Pearson/Merrill Prentice Hall.

Leiserowitz, A., Kates, R. And Parris, T. 2006. Sustainability Values, Attitudes, and Behaviors: A Review of Multinational and Global Trends *Annual Review of Environment and Resources*, 31(1):413-444.

Lloyd, B. and Subbarao, S. 2009. Development Challenges Under the Clean Development Mechanism (CDM)-Can Renewable Energy Initiatives be Put in Place Before Peak Oil?. *Energy Policy*, 37(1)237:245

Masters, L. and Duff, L. 2011. *Overcoming Barriers to Climate Change Adaption Implementation in Southern Africa*. Braamfontein, South Africa. Africa Institute of South Africa and the Institute of Global Dialogue.

Mizrach, B. 2011. Integration of the Global Carbon Markets*. Energy Economics*, 34(1): 335-349

Naidoo, R. 2009. *Corporate Governance: An Essential Guide for South African Companies*. Pietermaritzburg. Juta.

National Research Council. 1999. *Our Common Journey: A Transition toward Sustainability.* Washington, DC. National Academy Press.

Okereke, C. 2007. An Exploration of Motivations, Drivers and Barriers to Carbon Management: The UK FTSE 10*., European Management Journal*, 25(6):475-486.

Panneerselvam, R. 2004. *Research Methodology*. New Delhi, India. Prentice-Hall of India

PricewaterhouseCoopers. 2008. *Global Disclosure Report 2008: Global 500*. [Online] Available from: http://www.cdproject.net/reports.asp [Accessed 2009-04-13].

PricewaterhouseCoopers. 2009. *King's Council: Understanding and Unlocking the Benefits of Sound Corporate Governance. Executive Guide to King III*. South Africa, PricewaterhouseCoopers Inc.

PricewaterhouseCoopers. 2011. *CDP Global 500 Report 2011: Accelerating Low Carbon Growth*. [Online] Available from: https://www.cdproject.net/CDPResults/CDP-G500-2011-Report *[*Accessed 2012-04-20].

Rea, M.H. 2012. *King III and GRI+12: A review of sustainability reporting in South Africa*. Johannesburg, Sustainability services

Reyers, M. 2009. *Corporate Sustainability Consciousness: A Climate Change Perspective*. Published MCom thesis: University of Pretoria.

Reyers, M., and Gouws, D. 2010. An Exploratory Study of Motivations Driving Corporate Investment in Voluntary Climate Change Mitigation in South Africa. *South African Journal of Economic and Management Sciences*, 14(1)92-108

Sathaye, J., Najam, C. Cocklin, T. Heller, F. Lecocq, J. Llanes-Reguerio, J. Pan, G. Petchel-held, S. Rayner, J. Robinson, R. Schaeffer, Y. Sokonan, R. Swart, H. Winkler. 2007: *Sustainable development and Mitigation. In Climate Change 2007: Mitigation. Contribution of Working Group III to the fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B.Metz, O.R. Davidson, P.R Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Saunders, M., Lewis, P. and Thornhill, A. 2007. *Research Methods for Business Students.* 4th ed. Harlow, England: Financial Times/Prentice Hall.

Shu, C. and Schroeder, H. 2010. Private Governance of Climate Change in Hong Kong: An Analysis of Drivers and Barriers to Corporate Action. *Asian Studies Review*, 34(3):287–308.

South Africa. 1998. *National Environmental Management Act, No 107 of 1998*. Government Gazette 401(19519):1-72. [Online] Available from http://www.info.gov.za/view/DownloadFileAction?id=70641 [Accessed: 2009-10-15].

South Africa. 2011. *National Climate Change Response – White Paper.* [Online] Available from: http://www.info.gov.za/view/DownloadFileAction?id=152834 [Accessed 2011-07-10].

Stern, N. 2006. *The Economics of Climate Change: Summery of Conclusions.* [Online] Available from: http://www.hmtreasury.gov.uk/d/CLOSED_SHORT_executive_summary.pdf [Accessed 2009-04-10].

Stoffberg, H. and Prinsloo, P. 2009. *Climate Change a Guide for Corporates*. Pretoria, UNISA Press.

The Johannesburg Declaration on Sustainable Development. 2002. http://www.housing.gov.za/content/legislation_policies/johannesburg.htm.

The World Bank. 1999. *Corporate Governance: A Framework for Implementation.* Washington DC, USA.

Trialogue. 2007. *The Sustainable Business Handbook: Smart Strategies for Responsible Companies*. 4th ed. Cape Town, Trialogue.

Tyler, E. 2007. *Carbon Disclosure Project South Africa Report 2007: JSE Top 40*. [Online] Available from:
http://www.cdproject.net/cdp5reports.asp [Accessed: 2010-04-18].

UNEP. 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*. [Online] Available from: www.unep.org/greeneconomy. [Downloaded 2011.08.12].

UNFPA. 2011. *The State of World Population 2011*. Pedro Sá da Bandeirathe. United Nations Population Fund.

UNFCCC. 2007. *Innovative Options for Financing.* [Online] Available from: http://unfccc.int/resource/docs/publications/innovation_eng.pdf [Downloaded 2009.08.12].

UNIDO. 2003. *Clean Development Mechanism (CDM) investor guide*. Vienna, Austria.

United Nations. 1992. Kyoto Protocol *To The United Nations Framework Convention on Climate Change*. [Online] Available from: http://unfccc.int/resource/docs/convkp/kpeng.pdf. [Downloaded 2009-04-10].

Unterlerchner, J. 2007. *Survey Of Integrated Sustainability Reporting In South Africa: An Investigative Study of The Companies Listed on the JSE Securities Exchange All Share Index*. Unpublished USB Thesis. Stellenbosch: University of Stellenbosch.

Unterlerchner, J. and Malan, D. 2008. The *corporate response to sustainability reporting.* USB Leaders Lab Magazine, August 2008:22-25. [Online] Available from: http://www.usb.sun.ac.za/USB/discover/LeadersLab/August%202008/Corporate_response_sustainability_reporting.pdf. [Accessed 2009-03-12].

Vaughn, M., and Verstegen Ryan, L. 2006. Corporate Governance in South Africa: A Bellwether for The Continent?. *Corporate Governance: An International Review.* Sep 14(5):504-512.

WBCSD. 2011. *Transformation in the Turbulent Teens.* Geneva, Switzerland. World Business Council for Sustainable Development

WCED. 1987. *Our Common Future.* New York, USA. Oxford University Press.

Welman, J. and Kruger, S. 2003. *Research Methodology: For Business and Administrative Sciences*. 2nd ed. Southern Africa. Cape Town. Oxford University Press.

Weisberg, H., Krosnick, J. and Bowen, B. 1996. *An Introduction to Survey Research, Polling and Data Analysis.* 3rd Ed. The Ohio State University. Sage Publications Incorporated.

Winkler, H., Marquard, A., Tyler, E., Visser, M., Brick, K. 2009. *Economics of climate change: Context and concepts related to mitigation*. Energy Research Centre. University of Cape Town.

Yohe, G.W., R.D. Lasco, Q.K. Ahmad, N.W. Arnell, S.J. Cohen, C. Hope, A.C. Janetos and R.T. Perez, 2007: Perspectives on climate change and sustainability. *Climate Change 2007: Impacts, Adaptation and Vulnerability*. *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 811-841.

APPENDIX 1: ITEM CLARIFICATION QUESTIONAIRE

Item clarification questions and references

No	Question	Resource
1.1	Environmental issues are very important to the management of our company.	Reyers (2009:183)
1.2	Our company is only interested in "ticking boxes" when it comes to environmental compliance.	Secondary research
1.3	Our company's management believes that the company's financial wellbeing is dependent on the environment.	Reyers (2009:183)
1.4	Our company's management believes that financial responsibility to its shareholders, finance providers, customers and employees is more important that responsibility to environmental preservation.	Reyers (2009:183)
1.5	Our company's management believes that it is difficult to be a profitable company and preserve the environment at the same time.	Reyers (2009:183)
1.6	Our company's management believes that we have a responsibility to preserve the natural environment.	Reyers (2009:183)
1.7	Our companies' management believes that environmental concerns should be subordinate to people's needs.	Reyers (2009:183)
1.8	Our companies' management believes that all costs and benefits of environmental action should only be measured in financial terms.	Reyers (2009:183)
1.9	Our company believes it has a responsibility to preserve the environment for future generations.	Gladwin, T.N., Kennelly, JJ., Krause, T. 1995.
1.10	Sacrifices on behalf of future generations, nonhuman nature or distantly less fortunate current generations are generally unwarranted, unless market signals dictate otherwise.	Gladwin *et al* 1995
1.11	The earth's physical resources are virtually inexhaustible because of infinite human ingenuity in exploiting them or in finding substitutes for emergent shortages.	Gladwin *et al* 1995
1.12	Nature changes gradually, fast enough to be detected, yet slow enough to be controlled.	Gladwin *et al* 1995
1.13	There is no cause for undue alarm or drastic action, because environmental dangers are greatly exaggerated.	Gladwin *et al* 1995
1.14	Globalisation and its trickle down benefits are the key to alleviating poverty, bettering the lives of the poor without sacrifices from the rich.	Adapted from Gladwin *et al* 1995
2.1	We are hesitant to engage with the global climate change mitigation system because it is too complicated.	Secondary research
2.2	We are hesitant to engage with the South African climate change mitigation system because it is too complicated.	Secondary research
2.3	Our company believes there will be an emissions cap introduced in South Africa in the future.	Adapted from Reyers (2009:198)
2.4	Voluntary climate change action to mitigate climate change will not be sufficient and legislative intervention will be needed.	Adapted from Reyers (2009:198)
2.5	Our company is waiting the finalisation of the legislative climate change requirements before taking action.	Adapted from Reyers (2009:198)
3.1	Our company knows were to access options to mitigate our impacts on climate change (example: Trees for Africa to purchase trees to mitigate impact).	Secondary research
3.2	Our company has considered buying carbon offsets.	Secondary research
3.3	Our company is buying carbon offsets.	Reyers (2009:187)
3.4	Our company does not buy carbon offsets because the voluntary system is too complicated.	Secondary research
3.5	Our company has a thorough understanding of the options available to us to mitigate our impacts on climate change.	Secondary research
3.6	Our company understands the variations of carbon offset products.	Secondary research
4.1	Our company classifies Climate Change action as an integral component of good corporate governance.	Secondary research
4.2	Our company classifies climate change mitigation as an integral part of our sustainability reporting.	Secondary research
4.3	Climate change is clearly featured at a strategic planning level within our company.	Adapted from Reyers (2009:198)
4.4	Climate change is clearly featured at an operational planning level within our company.	Adapted from Reyers (2009:198)
4.5	Climate change is clearly featured at a capability level within our company.	Secondary research
4.6	Our company believes there will be a future market for climate change action products.	Secondary research
4.7	Our company has a detailed understanding of our carbon emissions footprint.	Secondary research
4.8	Our company factors the costs for greenhouse gas emissions into major investment and operational decisions.	Ceres 2006:14
4.9	South Africa investors take climate change action into account when deciding to invest in our	Adapted from Reyers

	company.	(2009:190)
4.10	International investors take climate change action into account when deciding to invest in our company.	Adapted from Reyers (2009:190)
4.11	Climate change will have a fundamental impact on our business model.	Adapted from Reyers (2009:198)
4.12	Our companies' chairperson clearly articulates the companies' views on climate change and GHG control measures.	Adapted from Kauffmann and Less (2009:19)
4.13	Our companies' board conducts periodic reviews on climate change and monitors progress in implementing strategies.	Adapted from Kauffmann and Less (2009:19)
4.14	What do you think will fuel the growth of climate change action products in the future? Please mark with an X a. Demand Side (companies) b. Demand Side (consumers) c. Legislation d. Government e. Other	Secondary Research
4.15	Which of the following statements best describes your companies approach to climate change: a. We aim to be leaders in climate change mitigation actions b. We aim to be fast followers in terms of climate change mitigation actions c. We are taking a wait and see approach to climate change mitigation actions and will take action depending on what our stakeholders require from us.	Adapted from Reyers (2009:198)
4.16	Which department within your organisation is responsible for climate change actions a. Marketing department b. Corporate social responsibility department c. Public relations department d. Top management e. Environmental department	Secondary research
5.1	Our company would rather purchase carbon offsets to reduce our carbon footprint if it was cheaper than taking internal action to reduce emissions.	Adapted from Reyers (2009:201)
5.2	South African customers take climate change action into account when considering purchasing products from us.	Adapted from Reyers (2009:201)
5.3	International customers take climate change action into account when considering purchasing products from us.	Adapted from Reyers (2009:201)
5.4	Our company does not buy carbon offsets because it is too expensive.	Secondary research
6.1	What is the motivation for your organisation to take climate change action, Please rank the following :(5=Very important, 4=important, 3=undecided, 2=minor, 1= Not important)	Secondary research
	a. It is good for our brand	
	b. It is our responsibility	
	c. It increases our profitability	
	d. It helps us retain existing clients	
	e. Our competitors are doing it	
	f. We have to (compliance)	
	g. It makes us more efficient	
	h. It saves us money	
6.2	If our company purchased carbon offsets how important would the following elements be; please rank the following: (5=Very important, 4=important, 3=undecided, 2=minor, 1= Not important)	Adapted from Reyers (2009:201)
	a. Price	
	b. Product/Source (e.g. wind power, trees)	
	c. Reputation of the Provider	
	d. Geographic area where offset occurs	

APPENDIX 2: FINAL ITEM CLARIFICATION QUESTIONAIRE

Item Clarification Questionnaire : Barriers for corporate climate change action

Dear Participant

I am developing a survey instrument to investigate potential barriers for action from the South African corporate sector based on their climate change action impacts.

This survey questionnaire will be sent to senior managers responsible for sustainability / triple bottom line / stakeholder reporting under the South African Global Reporting Initiative (GRI) in 2008. Corporate climate change action/mitigation is defined as a "*Technological change and substitution that reduce resource inputs and emissions per unit of output"*. For the purposes of this study mitigation and action is viewed as" action taken from the corporate sector to mitigate the company's impacts on climate change"

You are asked to serve as a content expert due to your experience and expertise in the climate change and/or sustainable development/corporate social responsibility/corporate governance field. Your participation and contribution in this survey instrument is vital to this study due to limited academic research in this field in South Africa. This research forms part of an M Com in Business Management in the Centre for Responsible Leadership at the University of Pretoria. Your voluntary participation and time are highly valued and appreciated.

This instrument consists of Six (6) themes relating to corporate climate change action and will be assessed on a five point likert scale[1] with 1 representing "strongly disagree" and 5 representing "strongly agree" with the exception of:

- Question 5.14), 5.15) and 5.16) which are multiple choice questions.
- Question 6.1) and 6.2) that will be assessed on a five point rating scale with 1 representing "Not important" and 5 representing "very important",

The six (6) themes contain numerous questions with a particular focus on potential market barriers to corporate climate change action within each theme. The themes were identified through available research.
Theme 1: Sustainability values: The sustainability values reflected by the organisations management commitment to the triple bottom line with a focus on the environment.
Theme 2:Legislation: The regulatory framework in which the climate change science and action (adaptation and mitigation) operates in.
Theme 3: Knowledge of climate change mitigation supply: The expertise, skills and experience of the organisation in climate change mitigation with a particular focus on the supply of mitigation products e.g. carbon offsetting, TREC's.
Theme 4: Organisational strategy: The corporate plan of action required to achieve and institutionalise corporate climate change action.
Theme 5: Finance: The theme of money refers to concepts relating to time, money and their interrelationship with risk and climate change mitigation.
Theme 6: Motivations: The drivers for action/inaction of companies to invest in sustainability initiatives.

On the attached form you are asked to provide some personal information about yourself to enable us to qualify your expertise and experience. In addition to completing the questionnaire, you are also asked to give input/comment on the comprehensiveness of the survey instrument and deletion/addition of questions. All information provided by you will be considered confidential and no personal information will be published.

Please complete the questionnaire and send it back before the 23 June 2010. Once again I would like to thank you in advance for your time and effort in completing this.

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Research Supervisor: **: Prof Derick de Jongh**: Director: Centre for Responsible Leadership: University of Pretoria +27 (0)12 420 3386 (Office) derick.dejongh@up.ac.za

I provide consent by completing this questionnaire: YES…. (tick)

[1] 1=strongly agree, 2= agree, 3=neither agree or disagree, 4=disagree, 5=strongly disagree

A). Item clarification questionnaire on potential market barriers for corporate climate change action.

Please complete the survey instrument below comprising of 7 pages. Judge each item honestly, as you perceive it based on your expertise. **Please only complete the white area of the table below**. In the white area within the table below please indicate with an X in the relevant block as "not essential" or "essential" to the specific question on climate change action. Indicate with an X in the applicable block if the "item is clear" or if the "item is unclear". Hence you should have market 2X's at each question.

Dimensions and potential market barriers for corporate climate change action		**LIKERT SCALE**					**Indicate the relevance (essential or not essential) of sections 1-7 and a potential question (clear/unclear item) within that section.**			
No	**What is the relevance and clarity of the question**	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**	**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
Theme 1: Sustainability Values							**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
1.1	Environmental issues are very important to the management of our company.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.2	Our company is only interested in "ticking boxes" when it comes to environmental compliance.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.3	Our company's management believes that the company's financial wellbeing is dependent on the environment.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.4	Our company's management believes that financial responsibility to its shareholders, finance providers, customers and employees is more important that responsibility to environmental preservation.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.5	Our company's management believes that it is difficult to be a profitable company and preserve the environment at the same time.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.6	Our company's management believes that we have a responsibility to preserve the natural environment.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.7	Our companies' management believes that environmental concerns should be subordinate to people's needs.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.8	Our companies' management believes that all costs and benefits of environmental action should only be measured in financial terms.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.9	Our company believes it has a responsibility to preserve the environment for future generations.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.10	Sacrifices on behalf of future generations, nonhuman nature or distantly less fortunate current generations are	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				

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	generally unwarranted, unless market signals dictate otherwise.									
1.11	The earth's physical resources are virtually inexhaustible because of infinite human ingenuity in exploiting them or in finding substitutes for emergent shortages.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.12	Nature changes gradually, fast enough to be detected, yet slow enough to be controlled.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.13	There is no cause for undue alarm or drastic action, because environmental dangers are greatly exaggerated.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
1.14	Globalisation and its trickle down benefits are the key to alleviating poverty, bettering the lives of the poor without sacrifices from the rich.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
Theme 2: Legislation							**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
2.1	We are hesitant to engage with the global climate change mitigation system because it is too complicated.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
2.2	We are hesitant to engage with the South African climate change mitigation system because it is too complicated.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
2.3	Our company believes there will be an emissions cap introduced in South Africa in the future.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
2.4	Voluntary climate change action to mitigate climate change will not be sufficient and legislative intervention will be needed.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
2.5	Our company is waiting the finalisation of the legislative climate change requirements before taking action.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
Theme 3: Climate change mitigation supply							**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
3.1	Our company knows were to access options to mitigate our impacts on climate change (example: Trees for Africa to purchase trees to mitigate impact).	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
3.2	Our company has considered buying carbon offsets.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
3.3	Our company is buying carbon offsets.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
3.4	Our company does not buy carbon offsets because the voluntary system is too complicated.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
3.5	Our company has a thorough understanding of the options	**Strongly Agree**	**Agree**	**Neither agree or**	**Disagree**	**Strongly Disagree**				

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	available to us to mitigate our impacts on climate change.			disagree						
3.6	Our company understands the variations of carbon offset products.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
Theme 4: Organisational Strategy							**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
4.1	Our company classifies Climate Change action as an integral component of good corporate governance.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.2	Our company classifies climate change mitigation as an integral part of our sustainability reporting.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.3	Climate change is clearly featured at a strategic planning level within our company.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.4	Climate change is clearly featured at an operational planning level within our company.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.5	Climate change is clearly featured at a capability level within our company.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.6	Our company believes there will be a future market for climate change action products.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.7	Our company has a detailed understanding of our carbon emissions footprint.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.8	Our company factors the costs for greenhouse gas emissions into major investment and operational decisions.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.9	South Africa investors take climate change action into account when deciding to invest in our company.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.10	International investors take climate change action into account when deciding to invest in our company.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.11	Climate change will have a fundamental impact on our business model.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.12	Our companies' chairperson clearly articulates the companies' views on climate change and GHG control measures.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
4.13	Our companies' board conducts periodic reviews on climate change and monitors progress in implementing strategies.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree				
Multiple Choice Questions within section 4.							**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
4.14	What do you think will fuel the growth of climate change action products in the future? Please mark with an X f) Demand Side (companies)	A	B	C	D	E				

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	g) Demand Side (consumers) h) Legislation i) Government j) Other									
4.15	Which of the following statements best describes your companies approach to climate change: **d.** We aim to be leaders in climate change mitigation actions **e.** We aim to be fast followers in terms of climate change mitigation actions **f.** We are taking a wait and see approach to climate change mitigation actions and will take action depending on what our stakeholders require from us.	A	B	C						
4.16	Which department within your organisation is responsible for climate change actions **f.** Marketing department **g.** Corporate social responsibility department **h.** Public relations department **i.** Top management **j.** Environmental department	A	B	C	D	E				
Theme 5: Finance							**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
5.1	Our company would rather purchase carbon offsets to reduce our carbon footprint if it was cheaper than taking internal action to reduce emissions.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
5.2	South African customers take climate change action into account when considering purchasing products from us.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
5.3	International customers take climate change action into account when considering purchasing products from us.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
5.4	Our company does not buy carbon offsets because it is too expensive.	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**				
Theme 6: Motivations							**Not Essential**	**Essential**	**Item is Clear**	**Item Is Unclear**
6.1	What is the motivation for your organisation to take climate change action, Please rank the following : (5=Very important, 4=important, 3=undecided, 2=minor, 1= Not important)									
	a. It is good for our brand	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	b. It is our responsibility	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	c. It increases our profitability	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	d. It helps us retain existing clients	**Very**	**Important**	**Undecided**	**Minor**	**Not important**				

		Important								
	e. Our competitors are doing it	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	f. We have to (compliance)	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	g. It makes us more efficient	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	h. It saves us money	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
6.2	If our company purchased carbon offsets how important would the following elements be; please rank the following: (5=Very important, 4=important, 3=undecided, 2=minor, 1= Not important)									
	a. Price	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	b. Product/Source (e.g. wind power, trees)	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	c. Reputation of the Provider	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				
	d. Geographic area where offset occurs	**Very Important**	**Important**	**Undecided**	**Minor**	**Not important**				

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APPENDIX 3: FINAL SURVEY QUESTIONAIRE

Survey Questionnaire: Barriers for corporate climate change action.

Dear Participant

I have developed a survey instrument to investigate potential barriers for climate change action from the South African corporate sector. This survey has been sent to you as you have been identified as a senior manager responsible for sustainability / triple bottom line / stakeholder reporting under the South African Global Reporting Initiative (GRI) in 2008. You are asked to answer 41 questions (40 multiple choice and 1 open ended).

Your participation and contribution in this survey instrument is vital to this study due to limited academic research in this field in South Africa. This research forms part of an M Com in Business Management in the Centre for Responsible Leadership at the University of Pretoria. Your voluntary participation and time are highly valued and appreciated. All information relating to the particulars of individuals and/or companies will be held in the strictest confidence and will be considered confidential.

Please complete the questionnaire and send it back before the [insert date]. Once again I would like to thank you in advance for your time and effort in completing this.

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Research Supervisor::
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I provide consent by completing this questionnaire: YES…. (tick)

Survey Questionnaire.

Please complete the survey instrument below comprising of 3 pages. Judge each item honestly, as you perceive it based on your expertise

Dimensions and potential market barriers for corporate climate change action		Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
Theme 1: Sustainability Values						
1	Environmental Management is seen as critical for the sustainability of our operations	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
2	In a low carbon future economy, our company will survive in its present form	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
3	Our company's financial wellbeing is dependent on the environment.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
4	Our company's management believes that financial responsibility to its shareholders, finance providers, customers and employees is more important that responsibility to environmental preservation.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
5	Our company's management believes that we have a responsibility to preserve the natural environment	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
6	Our company's management believes that there is no cause for undue alarm or drastic action, because environmental dangers are greatly exaggerated.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
7	Our company considers reporting our GHG impacts as an integral component of good corporate governance	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
8	Our company considers mitigating our GHG impacts as an integral component of good corporate governance	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
9	Our company is primarily interested in "ticking boxes" when it comes to environmental compliance.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
Theme 2: Legislation						
10	Voluntary climate change action to mitigate climate change will not be sufficient and legislative intervention will be needed.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
11	We are hesitant to engage with international carbon trading schemes as it is too complicated	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
12	We are hesitant to engage with South African carbon trading schemes as it is too complicated	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
13	Our company believes there will be a Carbon Tax introduced in South Africa in the future.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
14	Our company is waiting the finalisation of the legislative climate change requirements before taking action.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
Theme 3: GHG mitigation instruments						
15	Our company has considered purchasing GHG emissions reduction instruments on the carbon market.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
16	Our company does not buy carbon offsets because the voluntary system is too complicated.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
17	Our company has a thorough understanding of the GHG mitigation instruments available to us to mitigate our impacts	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree

	on climate change					
18	Our company has explored the option of purchasing South African REC's (renewable energy certificates)	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
Theme 4: Organisational Strategy						
19	We have sufficient skills in our company to account and administer GHG mitigation products internally	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
20	Climate change is clearly featured at a strategic planning level within our company	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
21	Our company factors the costs for GHG emissions into major investment and operational decisions.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
22	Our company has a detailed understanding of our carbon emissions footprint. and have set realistic and achievable carbon reduction targets	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
23	We have measured our carbon emissions	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
24	We have allocated sufficient resources to achieve our carbon reduction target	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
25	Our company believes that we can reduce our environmental footprint, while increasing our productivity in sustainable way.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
26	Our company perceives Carbon Management as a business asset which can create new opportunities	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
27	South Africa investors take climate change action into account when deciding to invest in our company.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
28	International investors take climate change action into account when deciding to invest in our company.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
Multiple Choice Questions within section 4.						
29	What do you think will fuel the growth of carbon market in the future? Please mark with an X a) Demand Side (companies) b) Demand Side (consumers) c) Legislation d) Other , Please specify: _____	A	B	C	D	
30	Which of the following statements best describes your companies approach to climate change: a) We aim to be leaders in climate change mitigation actions b) We aim to be fast followers in terms of climate change mitigation actions c) We are taking a wait and see approach to climate change mitigation actions and will take action depending on what our stakeholders require from us. d) Our company will profit from climate change e) Climate change does not affect us.	A	B	C	D	E

31	Which department within your organisation is responsible for climate change actions a) Marketing department b) Corporate social responsibility department c) Public relations department d) Top management e) Environmental department	A	B	C	D	E
Theme 5: Finance						
32	Our companies' management believes that all costs and benefits of environmental action should only be measured in financial terms	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
33	We have explored international carbon trading systems and have found them to be a source of external finance for our GHG mitigation efforts	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
34	Our company would rather purchase carbon offsets to reduce our carbon footprint if it was cheaper than taking internal action to reduce emissions.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
35	Our company has allocated a GHG budget in anticipation of future legislation	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
36	South African customers take climate change action into account when considering purchasing products from us.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
37	International customers take climate change action into account when considering purchasing products from us.	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
38	GHG mitigation reduction instruments are too expensive for us to use at this stage	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
Theme 6: Motivations						
39	What is the motivation for your organisation to take climate change action, Please select 3 of the following					
	a) It adds value to our brand					
	b) It is our responsibility					
	c) It makes us more competitive					
	d) It helps us retain existing clients					
	e) Our competitors are doing it					
	f) We have to (compliance)					
	g) It makes us more efficient and therefore more profitable					
40	If our company purchased carbon offsets how important would the following elements be; please rank the following: (5=Very important, 4=important, 3=undecided, 2=minor, 1= Not important)					
	a) Price	Very Important	Important	Undecided	Minor	Not important
	b) Product/Source (e.g. wind power, trees)	Very Important	Important	Undecided	Minor	Not important
	c) Reputation of the Provider	Very Important	Important	Undecided	Minor	Not important
	d) Geographic area where offset occurs	Very Important	Important	Undecided	Minor	Not important
41	**In your opinion, what are the top 5 Market Barriers for corporate GHG mitigation action?**					

APPENDIX 4: JSE SRI 2010

JSE SRI Database 2010

No	Company
1	Absa Group
2	Advtech Limited
3	AECI Limited
4	African Bank Ltd
5	African Bank Investments (ABIL)
6	African Oxygen
7	African Rainbow Minerals Ltd
8	Allied Electronics Corporation Limited
9	Allied Technologies Limited
10	Anglo American plc
11	AngloGold Ashanti
12	Anglo Platinum
13	ArcelorMittal South Africa
14	Aspen Pharmacare Holdings Limited
15	Aveng
16	Barloworld Limited
17	BHP Billiton
18	The Bidvest Group
19	Blue Label Telecoms
20	Business Connexion Group
21	Capital Shopping Centres Group plc
22	Clicks Group Limited
23	Discovery Holdings Limited
24	DRD Gold Mining
25	Exxaro Resources
26	FirstRand
27	The Foschini Group Limited
28	Gold Fields Limited
29	Grindrod
30	Group Five
31	Growthpoint Properties
32	Harmony Gold Mining
33	Hulamin
34	Illovo Sugar Limited
35	Impala Platinum Holdings
36	Imperial Holdings
37	Investec Ltd and plc
38	JSE Limited
39	Kumba Iron Ore
40	Liberty Holdings Limited
41	Lonmin plc
42	Massmart Holdings Limited
43	Medi-Clinic Corporation Limited
44	Merafe Resources
45	MMI Holdings (previously Metropolitan Holdings)
46	Mondi Ltd and plc

47	MTN
48	Murray and Roberts Holdings Limited
49	Nampak
50	Nedbank Limited
51	Northam Platinum
52	Oceana Group Limited
53	Old Mutual
54	Palabora Mining
55	Pick n Pay
56	Pretoria Portland Cement Company Limited
57	Rainbow Chicken Limited
58	Remgro Limited
59	RMB Holdings
60	SABMiller plc
61	Sanlam
62	Santam Limited
63	Sappi
64	Sasol
65	Standard Bank Group
66	Steinhoff International Holdings
67	Sun International
68	Telkom SA Limited
69	Tiger Brands
70	Tongaat Hulett
71	Truworths Limited
72	Vodacom Group Limited
73	Woolworths Holdings