DETERMINANTS OF CORPORATE GREEN INVESTMENT PRACTICES IN THE JOHANNESBURG STOCK EXCHANGE (JSE) LISTED FIRMS

by

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DEDICATION

In memory of my late father (Mr Jackson Ganda) and my late mother (Mrs Winnet Ganda). You guided me, taught me and instructed me in the path I should take. I will always remember and love you. Rest in eternal peace.

DECLARATION

I declare that **DETERMINANTS OF CORPORATE GREEN INVESTMENT PRACTICES IN THE JOHANNESBURG STOCK EXCHANGE (JSE) LISTED FIRMS** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

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Full names **Date**

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"Now unto him that is able to keep you from falling, and to present you faultless before the presence of his glory with exceeding joy - to the only wise God our Saviour, be glory and majesty, dominion and power, both now and ever. Amen." (Jude 1:24-25).

ABSTRACT

The purpose of this study was to determine the factors which spur corporate green investment practices amongst firms listed on the Johannesburg Stock Exchange (JSE). The data were sourced from companies' annual sustainability reports over a period of five years (2010 to 2014) and were subjected to content analysis. This quantitative study adopted a multiple case research approach as it examined all 100 South African CDP companies listed on the JSE. Data analysis was conducted using Chi-Square tests, together with Phi and Cramer's V tests. The findings indicate that legislation influences the corporate green investment practices of JSE listed firms as do corporate image, profitability and environmental consciousness. Legislation, corporate image, profitability and environmental consciousness showed a significant relationship with the green investment practices of JSE listed firms. Furthermore, the number of JSE listed firms which supported each of these variables as a factor which promoted firm green investment practices steadily increased during the period 2010 to 2014. This study makes a modest contribution to knowledge by suggesting a framework to understand corporate green investment practice in JSE listed firms based on the study's findings and a review of the literature. Arising from this framework, suggestions are made for further research to scrutinise how a combination of the four determinants of firm green investment practice could influence corporate eco-efficiency, firms' engagement in green operations and markets, corporate environmental compliance and the incorporation of environmental performance measures in corporate performance measurement systems.

KEY CONCEPTS: Environmental legislation; Corporate image; Profitability; Environmental consciousness; Green investment practices; JSE listed firms.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABBREVIATION	FULL NAME
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CDP	formally Carbon Disclosure Project is CDP
CEO	Chief Executive Officer
CHP	Combined Heat and Power
CL	Climate Leader
CPRS	Carbon Pollution Reduction Scheme
DJSI	Dow Jones Sustainability Index
EIA	Environmental Impact Assessment
EMC	Environmental Management Capability
EMS	Environmental Management Systems
ENPD	Environmental New Product Development
EPA	Environmental Protection Agency
ESG	Environmental, Social and Governance
EU	European Union
EUSD	European Union Sustainable Development
EV	Electric Vehicle
FICAT	Forest Industries Carbon Assessment Tool
FIT	Feed-in-Tariff
GDP	Gross Domestic Product
GEEF	Green Energy Efficiency Fund
GHG	Greenhouse gas
GLM	Green Logistics Management
GSCM	Green Supply Chain Management
IPPC	Intergovernmental Panel on Climate Change
ISO	International Standards Organisation
IT	Information Technology
KPI	Key Performance Indicator

JSE	Johannesburg Stock Exchange
LEED	Leadership in Energy and Environmental Design
NBI	National Business Initiative
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
OH&S	Occupational Health and Safety
R&D	Research and Development
ROA	Returns on Assets
ROE	Returns on Equity
ROS	Returns on Sales (ROS)
RPS	Renewable Portfolio Standard
RSCM	Responsible Supply Chain Management
SA	South Africa
SRI	Socially Responsible Investing
TGC	Tradable Green Certificates
UK	United Kingdom
UN	United Nations
UNCSD	United Nations Commission for Sustainable Development
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
USA	United States of America
WCED	World Commission on Environment and Development
df	Degrees of freedom
P	Statistical p-value
χ^2	Chi-Square
A	Alpha

CHAPTER 1
INTRODUCTION

1.1 Introduction and Background

The 21st century is a century in which greening the economy represents a fundamental issue that require to be addressed (Han and Kim, 2010). Whilst the general society interests in environmental issues has heightened owing to the worsening natural environment (desertification, deforestation, soil erosion, pollution, reduced diversity of plants and animals, natural disaster effects), corporations should improve their investments dedicated to greening the economy (Granly and Welo, 2014; IPPC, 2007). These, include amongst others wind power technologies, energy efficiency practices, waste management initiatives, carbon capture and storage (CCS), green financing instruments, solar energy technologies, smart grid systems, biofuels, biomass and marine energy generation (Eyraud, Clements and Wane, 2013; Kahlenborn, 1999). Therefore, green investments are important corporate issues in light of pronounced stakeholder pressure to move away from the traditional business as usual operating activities (Chen, 2010).

The concentration levels of global carbon emissions have increased steadily since the pre-industrial era and have become an environmental scourge in modern society (Dong, Wang, Jin, Qiao and Shi, 2014). It is now feared that the survival of future generations might be endangered if the current generation does not make efforts to reduce carbon emissions (Plouffe, Lanoie, Berneman and Vernier, 2011). In South Africa, environmental problems resulting from increased carbon emissions are evident (Tyrer, 2008). Therefore, reducing global carbon emissions is an important responsibility in the 21st century (CDP, 2010). However, despite widespread acknowledgement of these problems, some corporations are still not willing to engage in carbon reduction and green investment practices (Kesidou and Demirel, 2012).

The reasons for corporate reluctance to engage in green investment activities include, amongst others, the ineffectiveness of numerous environmental metrics

(Darnall, Henriques and Sadorsky, 2005); buyers' disinterest in considering green issues during purchasing (Luchs, Naylor, Irwin and Raghunathan, 2010); a lack of green expertise and motivation by organisations (Borghesi, Cainelli and Mazzanti, 2012) and the fact that some organisations do not feel that green initiatives make business sense (Busch and Hoffman, 2011). Continual unwillingness on the part of some companies to participate in green investment initiatives contributes to negative impacts such as climate change (Chan, He, Chan and Wang, 2012). Nonetheless, a number of companies are participating in green investment practices (Chien and Peng, 2012) including South African organisations (CDP, 2014). Therefore, it is important to identify the motivators that enhance corporate green investment practices.

Given growing carbon emissions and resultant environmental damage, some countries and interested organisations have developed policies to manage environmental challenges (Chang and Chen, 2013). The South African government has designed policies to support carbon emission reduction, such as the Green Economic Policy Framework of South Africa (South African Treasury, 2010). The country has also adopted numerous, diverse policies relating to climate change (CDP, 2009). Furthermore, in 2004, the Johannesburg Stock Exchange (JSE) became the first stock exchange in a developing economy to introduce sustainability criteria that measure amongst other things, corporate carbon or green initiatives (CDP, 2010). The JSE thus promotes positive corporate environmental management activities in South Africa (Visser, 2005).

However, environmental protection and carbon emission reduction are not only policy issues; corporate compliance and commitment is required to achieve success (Chiou, Chan, Lettice and Chung, 2011). Thus, this study sought to determine the factors which influence green investment practices in JSE listed firms with the aim of assisting policy makers to promote greening the economy initiatives through improved corporate green practices and environmental policies.

1.2 Statement of the Research Problem

The anthropogenic continued global deployment of fossil fuels (for example oil, gas and coal) is one of the major causes of the worldwide problem which is global warming that is propelling severe environmental degradation through phenomenon such as climate change (Geels, 2013). Climate change has triggered heightening desertification, acute droughts, frequent heat waves, rising sea levels, soil erosion, animal and plant extinction, strong hurricanes and highly destructive floods (Haigh and Griffiths, 2007; IPPC, 2007). Evidence suggest that these environmental challenges have motivated the heightening interrelated combined problems of both global economic crisis and the climate change crisis (Dienes, 2015). Arguably, the ability to support green investments rest on the foundation of the combined worldwide climate change crisis and economic crisis and require new interventions that promote sustainable green practices (Hoffman, 2005).

Whilst industrial growth in South Africa is essential, the energy base of the country's industries is unsustainable, with up to 80% of its energy derived from coal, a fossil fuel (CDP, 2009). In 2010, South Africa was rated 17th in a global list of countries that are large emitters of greenhouse gases mainly due to the use of non-renewable energy sources (Yawitch, 2010). The country's large carbon footprint calls for strategies to reduce emissions (CDP, 2010). Studies conducted for the Kyoto Protocol included South Africa among the leading emitters of six major greenhouse gases, namely, carbon dioxide, methane, hydrofluorocarbons, nitrous oxide, perfluorocarbons and sulphur hexafluoride (Winkler and Marquand, 2009). Tyrer (2008) notes, that the country releases three times more greenhouse gas emissions than any other country in Africa. Therefore, it is vital that South Africa develops low-carbon or green technologies (Pegels, 2009).

However, research indicates that some investors are still hesitant with regard to green investments as they are of the view that such investments may not necessarily yield positive financial returns (Berrone, Surroca and Tribó, 2007). Nonetheless, the cost of delaying green investment initiatives may be huge and damaging, not only to business, but to the entire society (CDP, 2014). On a more positive note, (CDP,

2010), a number of companies listed on the JSE are adopting green investment practices (CDP, 2009). This study aimed to identify the factors that motivate green investment practices in these firms in order to promote improved green and environmental policies that may improve corporate take-up of green investment.

Despite the growing importance of environmental issues, previous research on corporate sustainability in South Africa has not dwelt specifically on evaluating the factors that explain firms' emerging green investment practices. Related research on sustainability in South Africa includes corporate sustainability embeddedness (Pretorius and Le Roux, 2012), company environmental reporting requirements (De Villiers and Van Staden, 2010) and corporate citizenship (Visser, 2005). However, none of these studies examined the factors that spur corporate green investment practices.

Studies in other countries have identified the likely determinants of corporate green investment initiatives. Corporate image was found to influence corporate green investment initiatives in Taiwanese and Canadian companies (Chang and Chen, 2013; Berkhout and Rowlands, 2007). Legislation influences some USA companies to adopt green investment practices (Gray and Shimshack, 2011; Berrone and Gomez-Mejia, 2009). Other factors that have been found to spur green investment practices include profitability in UK and Brazilian companies (Veisten, 2007; Tomasin, Pereira, Borchardt and Sellitto, 2013) and environmental consciousness in Chinese and Hong Kong companies (Chan et al., 2012; Chan, Hon, Chan W and Okumus, 2014).

Given that the factors that influence corporate green investment practices in South Africa remain unknown, this study sought to bridge this gap by examining whether the four factors identified in the international literature apply to South African companies and use the findings to propose a framework to understand and research green investment practices in South African companies.

1.3 Research Questions

Based on the above research problem, the general research question underlying this study was:

1.) What are the factors associated with corporate green investment activities in JSE listed firms?

The specific research sub-questions were:

1.1) How does environmental legislation influence green investment practices in JSE listed firms?

1.2) To what extent does corporate image influence green investment practices in JSE listed firms?

1.3) To what degree does profitability influence green investment practices in JSE listed firms?

1.4) How does environmental consciousness influence green investment practices in JSE listed firms?

1.5) What framework can be developed to enhance understanding and research on corporate green investment practices in JSE listed firms?

1.4 Research Aim & Objectives

1.4.1 Aim of the study

To determine the factors which influence corporate green investment practices amongst JSE listed firms.

1.4.2 Objective of the study

Given the research questions and the aim of the study defined above, the general research objective was:

1.) To identify the determinants of corporate green investment practices in JSE listed firms.

Therefore, the specific research objectives were:

1.1) To analyse whether environmental legislation influences green investment practices in JSE listed firms;

1.2) To appraise if corporate image influences green investment practices in JSE listed firms;

1.3) To determine if profitability influences green investment practices in JSE listed firms;

1.4) To examine if environmental consciousness influences green investment practices in JSE listed firms; and

1.5) To propose a framework to understand the determinants of corporate green investment practices in JSE listed firms.

1.5 Structure of the Study

The remainder of this thesis is organised as follows:

Chapter 2

Chapter two presents the first section of the literature review and reviews national and international literature on corporate green investment practices. It also reviews the role played by corporate green investment practices in economic sustainability, social sustainability and environmental sustainability. The chapter also presents the theoretical framework employed for this study, namely, the Stakeholder theory and the Goal-Framing theory.

Chapter 3

Chapter three reviews the literature on the relationship between environmental legislation and corporate green investment practices. It is divided into three sections: previous positive findings, mixed findings and negative findings.

Chapter 4

Chapter four reviews the international and African literature on the association between corporate image and corporate green investment practices. This review is divided into three sections: previous positive findings, mixed findings and negative findings.

Chapter 5

Chapter five reviews the international and African literature on the relationship between profitability and corporate green investment practices. Once again, it is divided into three sections: previous positive findings, mixed findings and negative findings.

Chapter 6

Chapter six reviews the international and African literature on the relationship between environmental consciousness and corporate green investment practices and is divided into three sections: previous positive findings, mixed findings and negative findings.

Chapter 7

This chapter presents the research methodology employed for this study, including the research method and design, population and sample, research data and data collection procedures. The chapter also discusses the data analysis procedures, research validity, research reliability and the ethical considerations taken into account in conducting this study.

Chapter 8

Chapter eight presents the statistical results and analysis and a discussion of the findings. It concludes with a summary of the chapter.

Chapter 9

This chapter presents a summary of the research study based on the five research objectives. Thereafter the researcher makes a modest contribution to the literature by proposing a framework to understand the determinants of corporate green investment practices in JSE listed companies in South Africa. This is followed by a conclusion and the study's limitations.

1.6 Significance of the Study

This study is important because government and corporations require information to develop green policies that will enhance corporate carbon emission reduction practices (Inderst, Kaminker and Stewart, 2012). The recently adopted green economic development policy of the Republic of South Africa also makes this research timely in providing current information on companies' green investment practices and the factors that spur such practices. Such information will enable the government to initiate policies to strengthen positive corporate green behaviour that could ultimately result in a reduction in the country's carbon emission status. This research is also significant as it bridges the gap in knowledge in the South African literature on the factors that affect corporate green investment practices. Furthermore, a framework is proposed for further research on corporate green investment practices in South Africa.

CHAPTER 2
LITERATURE REVIEW
CORPORATE GREEN INVESTMENT PRACTICES AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter presents a literature review on corporate green investment practices. Section 2.2 reviews the literature on the concept of green investment practices. International and African literature on corporate green investment practices is also presented in this section. Section 2.3 reviews the literature on the role of corporate green investment practices in sustainable development and section 2.4 presents the theoretical framework which is in two main parts, namely, Stakeholder theory and the Goal-Framing theory. The final section presents a summary of the chapter.

2.2 The Concept of Corporate Green Investment Practices

Climate change is one of the major environmental issues affecting the planet in present-day scenarios and from a long-term perspective. Climate change is evident in increased mean ocean and air temperatures, extended thawing of both ice and snow, and an increase in the global mean sea level. Many long-run transformations in relation to climate have also been identified at oceanic, regional and continental levels. These include shifts in Arctic ice and temperatures, extensive shifts in the quantity of precipitation and the salinity of the ocean, shifts in wind directions and trends, and increased prevalence of natural catastrophes such as tropical cyclones, droughts, heat waves and floods (IPPC, 2014, 2007). On-going extensive deforestation in Amazonia as well as the increased desertification of the Sahel region offer evidence of the anthropogenic impact of climate change on regional capacity. This implies that increases in carbon emissions in the 21st century will exceed 20th century levels (IPPC, 2007).

The relationship between financial issues and the natural environment calls for an examination of both economic and environmental perspectives. Corporate green

investment practices are thus a distinct feature of modern firms' environmental responsibility. Robert Haβler, cited in Ecologic (1998:100) defines green investment as "investment in environmentally sound companies/projects such as: companies that systematically, comprehensively and successfully minimise their environmental impact by reducing the consumption of natural resources, substituting harmful substances with less damaging ones and lowering emissions to air, water and soil; companies/projects that try to maximise their environmental benefit by environmentally intelligent and innovative products and services."

Similarly, Kahlenborn (1999:66) describes green investment as "….any form of financial investment whereby the investor pays attention to ecological goals as well as the traditional aims of investment. On the other hand, green investment can be understood as an investment that successfully counteracts negative influences on the environment, or serves to produce goods or services that have positive effects on the environment." In line with this perspective, green investment can be defined as "….a form of investment where in addition to the traditional targets of an investor-liquidity, safety and performance-ecological criteria are also considered when making an investment decision" (Christian Armbruster in Ecologic, 1998:99).

The World Economic Forum (2013:12) demonstrates green investment as "a broad term closely related to other investment approaches such as socially responsible investing (SRI) and sustainable, long-term investing." More specifically, Phung (2014:1) outlines that "Green investments are traditional investment vehicles (such as stocks, exchange-traded funds and mutual funds) in which the underlying businesses are somehow involved in operations aimed at improving the environment. This can range from companies that are developing alternative energy technology to companies that have the best environmental practices."

Doval and Negulescu (2014:847) highlights that "Green investments are practically considered as being the expenses an organization is making for a positive impact on the environment. It includes the harming avoiding of the environment and restoring and maintaining the natural capital (renewable energy, bio fuels, forests, bio food and many others)." Therefore, green investment practices include reduced-emission energy supply activities (green energy, green research and development (R&D));

energy efficiency (hybrid vehicles, insulation and cooling models, energy saving mechanisms, waste management; smart grid technologies), water security (quality and quantity) and various forms of carbon sequestration initiatives (agriculture, carbon capture and storage (CCS) models, reforesting) (Eyraud et al., 2013).

In line with Eyraud et al., (2013), Kahlenborn (1999: 69) identifies different types of green investment including “green savings accounts, green saving certificates, environmental direct investment, and environmental investment funds.” Eyraud, Wane, Zhang and Clements (2011) also supported Eyraud et al. (2013) and Kahlenborn (1999) and note that firm green investment initiatives include “(i) financial investment in renewable technologies (including large hydroelectric projects), (ii) capacity investment in the nuclear sector, (iii) selected energy-efficient technologies, and (iv) research and development (R&D) in green technologies.”

For the purpose of this study, green investment practices refer to all diversified environmentally compatible and/or climate resilient activities which companies have adopted and identified as environmentally friendly and therefore designed to protect the natural environment by way of committing finance and/or capital. These green investment practices include various forms of green energy technologies, green research and development initiatives, energy efficient technologies, waste management activities, water security practices, carbon sequestration practices, green financing instruments, insulation and cooling frameworks, smart grid technologies and electric vehicles.

The global literature has also outlined various green investment practices in corporate contexts. The following section examines corporate green investment practices from an international perspective.

2.2.1 International Perspectives on Corporate Green Investment Practices

International perspectives on corporate green investment practices are provided by previous studies that examined the green initiatives adopted by companies in different parts of the world other than Africa in order to create low-carbon or green environments and ultimately green economies. For example, numerous global

companies have adopted green supply chain management (GSCM) practices (Andiç, Yurt and Baltacıoğlub, 2012; Chan et al., (2012)); green supplier development practices (Dou, Zhu and Sarkis, 2014); specific carbon emissions management practices (zero-carbon policy, governance issues, setting targets, verification activities, risk assessment, reporting and supplier collaboration) (Hsu, Kuo, Chen and Hud, 2013a); green logistics management (GLM) initiatives (Lai and Wong, 2012) and green purchasing benchmarks (Yen and Yen, 2012).

Other significant green investment activities include energy management mechanisms (Aguilera-Caracuel, Hurtado-Torres and Aragón-Correa, 2012); resource efficient technologies (Pons, Bikfalvi, Llach and Palcic, 2013); green buildings (Wang, Toppinen and Juslin, 2013a); green screening, environmental education and training (Fonseca and Jabbour, 2012); green energy technology adoption (hydropower, wind, geothermal, solar and bioenergy systems) (Baris and Kucukali, 2012); supporting structures such as Tradable Green Certificates (TGC) and Feed-in-Tariffs (FITs) (Jaraitė and Kažukauskas, 2013); cleaner production initiatives (Zeng, Meng, Yin, Tam and Sun, 2010a); green R&D initiatives (Tsai, 2012) and green innovation practices, namely, producing ecological products, recycling waste material, employing environmental technologies and implementing energy saving mechanisms) (Cuerva, Triguero-Cano and Córcoles, 2014; Lin,Tan and Geng, 2013).

Besides, corporate green Information Technology (IT) (Rahim and Rahman, 2013); adopting environmental management systems that are ISO 14001 certified (Granley and Welo, 2014); deploying environmental key performance indicators (KPIs) (Caniato, Caridi, Crippa and Moretto,2012); Carbon Capture and Storage (Eyraud et al., 2013); green financing techniques and hence engagement in related green markets (Inderst et al., 2012) and integrating green accounting or environmental accounting practices in business practices as a result of, amongst others, the presence of emissions trading markets, carbon tax, green financial and national green policy instruments (Deegan, 2013; Geels, 2013) represent important global organisational green investment practices.

The following section explores corporate green investment activities from an African perspective.

2.2.2 African Perspectives on Corporate Green Investment Practices

Studies have identified green investment activities adopted in African countries in order to promote green environments and/or a green or low carbon economy. Examples include obtaining ISO 14001 environmental certification (Sasol Ltd, 2012); employing efficient environmental management systems which comply with the King III requirements and the Greenhouse Gas Protocol standards (Anglo American Platinum Ltd, 2012); supporting waste recycling activities (Hyprop Investments Ltd, 2012); implementing Environmental Impact Assessments (EIAs) (Exxaro Resources Ltd, 2012), and employing the Forest Industries Carbon Assessment Tool (FICAT) to reduce carbon emissions and deploying Combined Heat and Power (CHP) to produce energy which minimises reliance on highly carbon fuels (Sappi, 2012).

Other important green investment activities are: establishing green building facilities through utilising the “Greenstar SA building rating system” (Emira Property Fund Ltd; Standard Bank Group, 2012); deploying energy saving lighting systems (Lonmin Ltd, 2012); supporting green banking - “Nedbank Green Savings Bond” and “Nedbank Green Affinity” (Nedbank, 2012); funding Clean Development Mechanisms (CDMs); promoting carbon trading and providing advice on environmental management (Investec, 2012) and engaging green stakeholders in decision making, promoting an environmental culture, encouraging environmental training and green innovation (BHP Billiton Ltd, 2013).

Arguably, recycling materials and plastics into useable forms (Gold Fields Ltd, 2012); incorporating a green procurement strategy (African Bank Investments Ltd, 2012) and developing partnerships with environmental groups such as ClimateWise, the United Nations Environment Programme Finance Initiative (UNEP FI), the Principles for Sustainable Insurance and National Business Initiative (NBI) that advocate for improved corporate environmental accountability; and reducing environmental impacts and integrating climate change in investment projects (Sasol Ltd, 2012) also represent vital green investment activities.

Significant organisational green investment initiatives include offering sustainable development training through the South African Eco-Schools programme (Anglo American Platinum Ltd, 2012); applying “carbon-intensive” mechanisms such as video conferencing and machine-to-machine buying and selling practices (Vodacom Group, 2010) and engaging consulting firms such as Global Carbon Exchange (GCX) to evaluate and measure the company’s carbon footprint and establishing long-run energy efficiency targets (SA Corporate Fund, 2012).

Again, integrating the Anglo American ECO2MAN energy and carbon dioxide management project and implementing energy efficient schemes (Anglo American Platinum Ltd, 2012); adopting an “Energy and Carbon Management Strategy” and installing integrated pollution capturing systems (Gold Fields Ltd, 2012); implementing external green legal audit practices and developing a climate change response model (Lonmin Ltd, 2012); and introducing land rehabilitation practices, land reclamation activities, water and air quality management initiatives and improved management of hazardous materials (Royal Bafokeng Platinum Ltd, 2012) are also important green investment practices.

The following Table 2.1 show examples of specific types of green investment practices identified in International and African perspectives.

Table 2.1: Examples of Specific Types of Green Investment Practices

International perspectives	African perspectives	Notable differences
Take part in Carbon Tax issues (Deegan, 2013)	---------	To date, no African country has introduced carbon tax.
Carbon Capture and Storage (Eyraud et al., 2013)	-------	This practice is quite expensive and has not been integrated in African corporate settings.
Participating in Emissions Trading markets (Deegan, 2013)	-------	The African stock market has not yet engaged in emissions trading activities.
Adopting Tradable Green Certificates (Jaraitė and Kažukauskas, 2013)	------	Common in Europe and USA. African countries are yet to engage as it is too costly.
Green financing tools (Geels, 2013)	Green financing tools (Nedbank, 2012)	Some European countries have green banks. In Africa, selected banks offer green financing with limited options.

The following section evaluates the role of corporate green investment practices in sustainable development.

2.3 The Role of Corporate Green Investment Practices in Sustainable Development

Corporate green investment practices are part of a sustainable development initiative. This section examines economic sustainability, social sustainability and environmental sustainability.

2.3.1 Economic sustainability

The economic element of sustainable development, often referred to as economic sustainability, indicates that in their quest for economic emancipation, companies are expected to guarantee equitable allocation and employment of natural capital (Zhu, Sarkis, Cordeiro and Lai, 2008b). Therefore, economic sustainability promotes long-run employment which does not result in environmental damage (Ramiah, Martin and Moosa, 2013). The primary corporate economic sustainability objectives discussed in this section are: green employment generation; supporting green innovation; considering environmental externalities in the market and considering the economic situation of future generations.

Green employment generation

Corporate investment in green employment is regarded as a significant factor in sustainable development in developing and emerging economies (Kesidou and Demirel, 2012). Green employment at the local level supports sustainable development by acting as a mechanism which advances the “war on poverty” (Chung and Tsai, 2007). Poverty alleviation improves living standards and thus the social status of community members. Corporate investment in green employment can be evaluated in two ways: quantitative (the number of people employed by the company) and qualitative (skills and human capital) (Wehling, Hernandez, Osland, Osland, Deller and Tanure, 2009; Wee and Quazi, 2005).

Moreover, corporations, especially those that are foreign owned, can influence the host country’s green employment in both direct and indirect ways. They make a direct contribution by improving the host nation’s productive capacity at a greater rate than would have been possible if the host nation depended on local investors (Wehling et al., 2009). Consequently, when green sectors that indigenous companies have failed to invest in are developed, the local green industry’s scale of

operation expands, thereby promoting economic practices which inevitably create more green employment opportunities (Antonietti and Marzucchi, 2013). Foreign owned companies influence local green employment indirectly by means of the procedures the company transfers intentionally or unintentionally in relation to green expertise and green technologies as well as increased support for original green products and manufacturing procedures among indigenous firms (Shin, Curtis, Huisingh and Zwetsloot, 2008). Therefore, the “green idea gap” between highly industrialised and less industrialised countries can eventually be closed.

Furthermore, owing to labour migration, employees in companies with superior green operations are able to acquire green skills and use such expertise and management capabilities to establish their own businesses, thereby creating more employment and promoting green technology diffusion (Santolaria, Oliver-Sola, Gasol, Morales-Pinzón and Rieradevall, 2011; Chang, 2011). Some schools of thought posit that firms’ adoption of green energy technologies reduces greenhouse gases and creates employment as well as income (Chen, Lai and Wen, 2006). Employment includes jobs which promote the preservation of the natural environment by increasing energy saving initiatives, creating green or low-carbon environments and reducing pollution and waste (Daily, Bishop and Steiner, 2007; Wagner, 2008). Hence, green employment is linked to sustainable development through the integration of renewable sources of energy.

Examples of green energy technologies that promote green jobs and income are the adoption of biotechnology, solar energy incorporation and wind energy integration. The United Nations Environmental Programme posits that by 2030 the renewable energy sector will create 20 million jobs globally: 2.1 million in wind energy, 12 million in the bio-fuels industry and 6.3 million in solar photovoltaic technologies. For example, the green jobs in the solar photovoltaic technology sector are amongst others namely, quality insurance managers, logistics managers, crop and slay engineers, crystal growing engineers, module manufacturing engineers, wire technology engineers, laser operations technicians and silicon crystal growers (IPPC, 2007; Yin and Powers, 2010).

The green jobs created by wind energy development are amongst others namely, site supervisors, senior risk management analyst jobs, wind plant administrators, site

prospectors, wind data analysts, wind energy forecasting and resource assessment jobs, wind field technicians and wind plant monitoring technicians (IPPC, 2007; Yin and Powers, 2010). As well, the green jobs developed through the bio-fuels sector are amongst others namely, chemical and mechanical engineers, agricultural engineers, genetic engineers, scientists, microbiologists, codes and standard developers, equipment production workers, storage facility operators, harvesting equipment mechanics and farmers (IPPC, 2007).

Green employment can be generated through the adoption of green energy technologies via two processes: self-employment in green energy technologies or creating various types of jobs through employing green energy sources, and paid jobs in green energy technologies (Katuwal and Bohara, 2009). Therefore, the main environmental advantages associated with green energy sources are savings which flow from reduced consumption of traditional energy sources (for instance coal, kerosene, and firewood) and thus less carbon emissions (Omer, 2008). Green energy technologies also offer other advantages; for example, biogas plants in rural areas where women are heavily concentrated (Katuwal and Bohara, 2009) reduce their workload by an average of three hours per day through reducing the amount of time spent gathering firewood, cleaning blackened pots and jars and cooking. This time can be used for other income generating schemes such as fishing, raising poultry and gardening and on education.

Green technologies such as biogas are thus an attractive economic mechanism that generates jobs (Katuwal and Bohara, 2009) and promotes well-being as well as increasing income. Since green technologies are clean and environmentally friendly, the impact of diseases such as bronchitis, lung cancer and asthma is considerably reduced (Younger, Morrow-Almeida, Vindigni and Dannenberg, 2008), leading to less expenditure on medical care and thus more disposable income. Waste slurry is also a vital by-product of biogas plants. This organic manure promotes sustainable farming, thereby increasing productivity and expanding the agro-industry that creates more jobs, generates income and improves people's standards of living.

Companies that adopt green investment practices are able to reduce water, air and land pollution (Cagno, Trucco and Tardini, 2005). The natural environment is conserved and in some cases, upgraded to allow new species of fauna and flora to

be introduced. Such areas attract tourism and recreational activities as well as night markets, festivals and carnivals that create green employment prospects for local people. Hence, sustainability strategies can be job friendly even in the immediate term. Thus, although some companies' activities deplete natural resources which can result in unemployment, green development strategies create alternative job prospects (Kumar, Teichman and Timpernagel, 2012). Such strategies are enhanced by natural resource management such as environmental protection, landscape design, arboriculture and horticulture.

Green jobs are thus a sector-particular advancement strategy that connects disadvantaged, low-skilled persons to employers in growing green organisations (Chan et al., 2014). For example, green investment practices implemented at national level to develop infrastructure can generate many employment opportunities which do not require university qualifications. Hence, in the era of sustainable development, green jobs are highly likely to be the direct consequence of the global green revolution.

In light of more stringent international policies and global legislation that require disclosure of information on the carbon footprint of products and compliance with specific environmental regulations, companies that adopt green technologies are increasing the overall economic competitiveness of their countries (Eiadat, Kelly, Roche and Eyadat, 2008). Moreover, the successful implementation of green technology requires specialised and highly qualified green manufacturing employees and researchers to support green investment activities and the production of complex, environmentally compatible commodities (Horbach, Rammer and Rennings, 2012).

Green technology diffusion impacts production processes and the demand for skills in other economic environments, creating further employment opportunities (Tassou, Ge, Hadawey and Marriott, 2011). For example, the European Union's commitment to incorporating green energy technologies involves significant support for securing energy provision, and spurring technological growth and innovation in addition to promoting employment prospects and regional growth. Suitable benchmarks that promote carbon reduction and compliance with the Kyoto Protocol have also been introduced. Thus, green technology is a viable employment generating approach.

Besides their contribution to job creation, green technologies also have a positive impact on a country's overall economic development through new investment in green technology, the impact on Gross Domestic Product (GDP), the energy security of a nation and its balance of trade (Silalertruksa, Gheewala, Hunecke and Fritsche, 2012). Favourable balances of a country's macro-economic variables will eventually result in poverty alleviation and improved GDP per capita. Thus, green jobs are vital in promoting green economic development - a growing economic emancipation framework that involves economic growth and environmental preservation (Amel, Manning and Scott, 2009).

Green jobs can be classified as direct, induced and indirect employment. Direct green employment refers to jobs generated in the design, production, distribution, installation and maintenance of the different components of green technology or green projects (Tassou et al., 2011; Jacob, Beise, Blazejczak, Edler, Haum, Jänicke and Rennings, 2006).

Indirect green employment relates to jobs generated in upstream and downstream companies. This type of employment has a "multiplier effect" on each dollar spent (Silalertruksa et al., 2012). It occurs when a dollar is used to purchase commodities manufactured by suppliers in a particular area. For instance, when a dollar is spent on an appliance produced in the area, the producer uses part of this dollar to employ more workers, increase production and buy more commodities. Thus, the extent to which a dollar spent in a specific trade or industry is re-spent in that area is referred to as the "multiplier" of that industrial context. Finally, induced employment refers to job prospects in the broader economy as a result of expenditure and the economic practices associated with direct and indirect employment.

Numerous factors have been identified that promote the growth of green jobs. Firstly, there must be adequate local demand for green employment. For example, higher per capita GDP in a metropolitan area implies that numerous green jobs will be created. Moreover, the growth of other green economic services, namely, green banking and green legal services is promoted, resulting in increased green economic development (Silalertruksa et al., 2012). Secondly, local green firms must not be concentrated in a single region. The dispersion of green industries to various regions

results in more green employment as corporations are not trapped in an economic growth model that is hard to transform (Hoffman, 2005).

Thirdly, the population trends in the metropolitan area are important. For example, if an area experiences a high increase in population, different forms of employment, including green jobs, are generated. If the area is experiencing a decrease in population, green employment is difficult to create. Fourthly, a large population in the metropolitan area leads to the generation and sustenance of green jobs in the region (Silalertruksa et al., 2012). Finally, the green education levels of the labour force are also important (Wong, Lai, Shang, Lu and Leung, 2012) since green corporations require various experts in areas such as green installation, green production, energy auditing and green consulting (Chang and Chen, 2012; Chung and Wee, 2011). Thus, the availability of a specialised and qualified green labour force eventually increases the scope of green jobs in a country.

Supporting green innovation

In the era of knowledge development, innovation is vital in propelling economic growth. However, innovation can have diverse environmental effects (Van Staden and Hooks, 2007). Environmental sustainability issues have generated new demands and concerns in relation to corporate innovativeness (Zhu, Sarkis and Lai, 2011). Green innovation refers to advanced improvements in commodities, procedures and business frameworks that enable both the firm and the economy as a whole to promote environmental sustainability (Triguero, Moreno-Mondéjar and Davia, 2013). Frondel, Horbach and Rennings (2007) define green innovation as the incorporation of original knowledge, commodities, procedures and conduct to minimise environmental damage or meet particular sustainability standards.

Chen et al. (2006) explain green innovation as both software and hardware advancements in green technologies (such as energy efficiency, green design of products, waste recycling and the firm's environmental management initiatives) which are associated with green commodities or procedures. Moreover, green innovation embraces practices such as biotechnology adoption, cleaner and more effective environmental procedures, recycling, resource efficiency, water management procedures and the manufacture of eco-products which are environmentally compatible (Plouffe et al., 2011; Santolaria et al., 2011).

In this manner, green innovation can be employed to increase the firm's environmental performance so as to comply with national legislation, satisfy stakeholders' interests and meet the industry's green benchmarks (Wu, 2009; Popp, Hafner and Johnstone, 2011). The support and participation of a company's senior managers is a major step towards integration and implementation of successful green innovation initiatives (Geerts, 2014). Such support is important as green innovation is continuous in the sense that it consistently seeks approaches which improve the green performance of the company's products, processes, and managerial and marketing functions so as to address the environmental challenges which negatively affect the industry's and the country's economic performance (Berrone and Gomez-Mejia, 2009).

Collaboration between a firm and its suppliers provides for green platforms that inspire and motivate all parties to continue greening and managing new green products (Yen and Yen, 2012). The most significant factor associated with green innovation is that technological commodities and procedures must have more green attributes than they had in the past (Dangelico and Pujari, 2010). Companies should seek to integrate green innovations which lead to favourable environmental performance in addition to promoting economic growth (Belin, Horbach and Oltra, 2009). The evidence suggests that firms that adopt green innovation practices are able to minimise production costs and improve both their economic efficiency and that of the nation at large due to spill-over effects (Jahdi, 2007; CILTSA, 2013).

Green innovation can also be deployed by companies to increase their environmental responsibility by manufacturing commodities that contain less carbon and supporting the removal of other dangerous substances, thereby contributing to the transition to a green economy (Sullivan, 2009). While many companies have embraced innovation in pursuit of sustainable development in recent years, there is a paucity of empirical research on this issue. Moreover, developing and emerging economies generally do not gather data on green innovation or its applications, despite the fact that the rapid depletion of natural resources in these countries has negatively impacted the environment and undermined sustainable development objectives (SAPIA, 2008).

Innovation which is green-based supports the effective employment of natural resources which improves the allocation of scarce resources and assists companies to develop innovative methods to transform waste into saleable commodities, thereby contributing to overall corporate and national economic efficiency (Sinkin, Wright and Burnett, 2008). Furthermore, green products enhance customer satisfaction (Ko, Hwang and Kim, 2013). The growing number of green aware consumers prefers firms that support green innovation (Kammerer, 2009). For example, customers have boycotted non-green firms and have demonstrated their willingness to pay a premium for green products. Therefore, firms should ensure that their products are certified as environmentally friendly (Bernardo, Casadesus, Karapetrovic and Heras, 2009).

Green-oriented innovation can also avoid the costs associated with non-compliance with environmental regulations and reduce production costs by means of environmental R&D (Cuerva et al., 2014). Moreover, companies that adopt green mechanisms to differentiate their commodities from those of their competitors achieve improved competitiveness in the international market (Chiou et al., 2011) thereby improving the country's trade balance. Therefore, environmental management implemented through green innovation can serve as a viable channel to foster the green competence of a firm. Given the benefits associated with green innovation, this is likely to trigger the green transformation of other corporations (Del Brio, Fernández and Junquera, 2007).

The current era is not accommodating of managerial or company reluctance to adopt green innovation practices (Chang and Chen, 2013). Government regulation has been employed to prompt companies to overcome inertia, and integrate new knowledge in addition to raising consciousness on the need to replace out-dated appliances and technologies which cause environmental damage and simultaneously reduce the firm's profitability (Gabaldón-Estevan, Criado and Monfort, 2014). Moreover, a firm's suppliers can have a direct effect on its greening status. The firm must be able to incorporate, coordinate, construct and transform its competence and resources since suppliers prefer to deal with firms that produce high quality green commodities (Kammerer, 2009). Firms that adopt such strategies gain long-run benefits at company level as well as strategic advantages through building mutual relationships with suppliers (Tseng and Chiu, 2013). Companies that

adopt green innovation should continue developing new green ideas that are firm specific (Eiadat et al., 2008), thereby improving the level of green knowledge in the country.

Considering environmental externalities in the market

Business practices that sacrifice environmental resources damage the natural environment. Environmental degradation has heightened the conflict between firm growth and environmental sustainability, thereby sparking global debate (Demirel and Kesidou, 2011). In pursuit of profit, corporations generate high levels of pollution, which leads to negative environmental externalities. Environmental externalities refer to the environmental effects of manufacturing and consumption patterns that result in advantages or costs to other partners or stakeholders. Relevant examples include water pollution generated by dyeing procedures and diseases resulting from inhaling dusty substances in a coal mining operation. While such activities generate pollution which costs the environment dearly, the company does not incur any costs (Walker and Wan, 2012). From an environmental perspective, market failure is the ultimate result.

In the same vein, the production and deployment of traditional private vehicles and industrial activity generate carbon emissions which result in considerable environmental damage and high medical expenditure (as a result of asthma, lung cancer and other respiratory illnesses) (Younger et al., 2008). Once again, the general public rather than the polluting firms bear the damage and the costs (Clarkson, Li, Richardson and Vasvari, 2011). These negative externalities should be internalised since the market on its own is unable to resolve this issue. The internalisation process relates to all public or private approaches aimed at ensuring that environmental advantages or costs are indicated when pricing commodities (Chien and Peng, 2012).

In this respect, internalising an externality demonstrates that the company bears all, or a portion of, the expenses associated with particular negative externalities, or reaps benefits connected with specific positive externalities. Internalisation will result in prices acting as a signal with respect to social desires or inclinations. Ultimately, this creates an improved national market and private context. Internalising the environmental externalities reflected in manufacturing costs, service provision and

consumption activities by reflecting such costs in the price of commodities will ensure that polluting firms bear the cost of pollution prevention and the preservation of natural assets. Globally, the principle “the polluter pays” has been employed to indicate who should incur environmental costs; it is the standard that is applied in internalising environmental externalities in addition to designating environmental liabilities.

The introduction and implementation of “the polluter pays” principle means that companies are required to pay for damage to the environmental and health (Cagno et al., 2005). The producer or polluting firm has sole responsibility for the environmental effects of its products during every stage of the lifecycle of its products (Morgenstern, Pizer and Shih, 2002). Furthermore, through green legislation, government is able to manage or reduce the negative environmental externalities generated by companies (Gabaldón-Estevan et al., 2014). Hence, enforcement of legislation has also been identified as an important instrument which internalises the impacts of a firm’s manufacturing practices on the natural environment. Compliance with green legislation requires companies to introduce new manufacturing procedures that sustain positive performance while avoiding the cost of non-compliance (Wei, Xie and Posthuma, 2011).

However, the initial cost of adopting green designs, production procedures and green products in order to reduce pollution are normally high. Given the competitive nature of the market, this suggests that firms may require inducement (Zhu, Sarkis and Lai, 2007) to pay the price to adopt green practices that enhance environmental sustainability while reducing negative environmental externalities (Griffin and Sun, 2013). Preferential inducements are required that support the production of green commodities and discourage the manufacture of non-green commodities (Veisten, 2007). This would encourage companies to support resource efficiency, integrate environmental preservation approaches and introduce green innovation, thereby promoting sustainable business behaviour (Lun, 2011; Sprengel and Busch, 2011) which translates into improved national economic prosperity.

Government inducements can take form of user fees, property rights, subsidies, tax inducements and support from society at large (Eiadat et al., 2008; South African Treasury, 2010). For instance, firms that are polluting the environment may be

required to pay a green tax or a subsidy may be offered to the company to assist it to address the problem. Such interventions can restore and maintain the quality of the environment. From a global perspective, environmental quality has been regarded as a “public good”; hence, the high demand for effective government-led green policies on firms’ production activities (Delmas, Montes-Sancho and Shimshack, 2010). If a company is able to internalise an externality, it is no longer regarded as an externality since it becomes part of normal business activity. Therefore, this area of practice is no longer part of environmental sustainability. In this case, environmental sustainability is a transitional procedure and not merely an organisational initiative designed to address particular standards (Bohdanowicz, 2006).

There are circumstances when a company voluntarily incurs the greater part of the burden associated with its environmental externalities in order to remain competitive (De Villiers and Van Staden, 2011). A company can improve its market base (expanding economies of scale) through modifying the aggregate total framework by extending profit margins (making buyers incur the costs) or through combining these intervention strategies. Through such policies, the company is able to transform environmental externality expenses to advantageous effects for the natural environment.

Companies assign value to environmental externalities when the market responds favourably to the internalisation of an environmental externality and to compliance with green legislation (Chung and Wee, 2011; Yu, Ting and Wu, 2009) which enhances economic welfare. The purpose of economic welfare initiatives is to examine the economic efficiency of the firm by employing socially productive resources (Pons et al., 2013). As such, internalising environmental externalities means that external environmental costs are included in the firm’s decision-making, guaranteeing the long-term viability of the firm by understanding possible risk and liability situations and alerting stakeholders to the health and environmental effects of the company’s business practices (Lee, Min and Yook, 2015a; Li, Richardson and Thornton, 1997).

Considering the economic situation of future generations

In economics, the concept of “future generations” is linked to environmental challenges in relation to resource use, pollution and long-term resource allocation

(Sinkin et al., 2008). As the principal users of natural resources which are gradually declining, companies need to develop green mechanisms which promote sustainable consumption of these resources in the present whilst ensuring that future generations will also benefit (Silalertruksa et al., 2012). This is the core emphasis of the concept of sustainable development (United Nations Report, 1987). It suggests that while companies use both natural resources and human capital, all forms of capital should be sustainable (Huang, Wu and Rahman, 2012). Future generations will benefit from development in technologies, and green investment in natural and human capital by green-oriented corporations (Barker, Lutz, Meyer, Polliitt and Speck, 2011; Rennings and Rammer, 2009).

However, the need to ensure that resources are preserved for future generations has not been accompanied by positive interventions. Furthermore, sustenance of some natural resources is difficult as there are no substitutes for some and they are also critical to economic growth. In addition, pressurising corporations to maintain existing natural resources creates uncertainty about the future. Thus, the green decisions and choices corporations make are based on incomplete information on the impact of business operations on the natural environment (Lindenberg and Steg, 2007). The other issue in relation to sustaining the current stock of natural capital is irreversibility. Once existing natural resources have been consumed to extinction, they cannot be restored to their original form.

For example, some global species of fauna and flora have been lost. It is very difficult to reclaim deserts which are currently expanding and tropical forests which are gradually shrinking. This impacts the possibility of maintaining the same economic practices and status for future generations. Once natural capital has become extinct, there is increased possibility of environmental damage in the future (IPPC, 2007). Ultimately, the economic situation of future companies will be negatively affected as there will be fewer natural resources to support production (Norton, 2007).

Green investment policies which factor in future demand are significant tools that preserve the interests of future generations (Yang, Lu, Haider and Marlow, 2013). As such, there is a need for companies to integrate green strategies that preserve and simultaneously act as trustees of the rights of future generations with respect to the

natural environment (Eltayeb, Zailani and Ramayah, 2011). Such policies are expected to compensate future generations for the negative environmental externalities produced, generate economic inducements and provide sufficient funding to guarantee the transition to green environments and economies (Khor and Udin, 2013).

The concept of market failure is important in explaining why it is important that companies adjust the current market framework to support intergenerational equity (Chen, Chang and Wu, 2012a). One suggestion is the establishment of a "trust fund" by an independent organisation which will allow both present and future generations to acquire an equal share of natural capital. Another would be to establish a property regime which protects particular commodities for the benefit of both the present and future generations. However, such practices may be difficult in light of corruption, prevalent inequality, the strategic role played by some natural resources and the credibility of those assigned to manage such funds.

Another big challenge involves the perception that future generations are comprised of human beings who do not exist (IPPC, 2007). Companies could argue that they do not have an obligation to those that have not yet been born. Thus, the association between corporations and future generations tends to be asymmetrical (IPPC, 2007). However, decisions based on self-interest work to the detriment of others, but those that are developed in a social unit and are transparent tend to benefit both decision makers and others (Sprengel and Busch, 2011). Such democratic procedures enhance comprehension of the needs of future generations (Hillestad, Xie and Haugland, 2010). Hence, companies should reflect on the decisions they have made in the past as this will enable them to understand the expectations of future generations (Sambasivan, Bah and Jo-Ann, 2013).

The following section evaluates social sustainability, with particular emphasis on firms' green investment activities.

2.3.2 Social sustainability

The social component indicates that corporations should pursue economic gains while recognising society's need for health, culture, education and human rights (UNDESA, 2012). Therefore, the social dimensions of sustainability focus on

promoting welfare objectives, safety, the engagement of all stakeholders, and social interaction and equity for the benefit of both present and future generations. The United Nations' Commission for Sustainable Development's (UNCSD) social indicators identified the themes of social sustainability as equity, health, education, housing, security (combating crime) and population. The European Union Sustainable Development's (EUSD) social indicators classified the themes of social sustainability as social inclusion, public health, demography and good governance. The Organisation for Economic Co-operation and Development's (OECD) social measures categorised social sustainability dimensions as economic self-sufficiency, equity, health and social cohesion.

For the purpose of this study, social sustainability themes with respect to corporate contexts are discussed under the following objectives: preservation of health and safety, promoting education and personal growth for sustainability, maintaining social and cultural values for sustainability and fostering equality for sustainability.

Preservation of health and safety

Social responsibility emphasise the firm's effects on human beings. Health and safety at the workplace is an area of social responsibility that is directly linked to employees in a supply chain (Golob and Bartlett, 2007). Companies are expected to promote health and safety both by protecting employees from dangerous and harmful substances and working conditions and by promoting education, healthy lifestyles and sporting activities.

Protection of health and safety in the work place

Preservation of health and safety in the workplace is often referred to as occupational health and safety (OH&S). The BIS (2007:19) defines OH&S as the "conditions and factors that affect or could affect the health and safety of employees or other workers (including temporary workers or contractor personnel), visitors, or any other person in the workplace." Thus, any hazards that could affect workers and others' health in the workplace should be identified and addressed. OH&S practices include the provision of health and sporting facilities, a good working environment and regular health inspections. Employee training enables workers to develop an appropriate mind-set with regard to their work. It provides them with the knowledge required to enhance their psychological, social and physical health.

OH&S training programmes include hygiene, first aid, fire drills, ergonomics and handling stress. Moreover, companies are encouraged to construct green buildings that enhance OH&S objectives since they promote water efficiency, the employment of green technologies and recycling of material which reduce negative environmental impacts (Wang et al., 2013a). OH&S measures can be instituted in buildings throughout their life span which results in fewer accidents during the construction process, the building's useful life and any upgrading (BIS, 2007). Improved management of a building's material and non-material assets also creates safer, more cost-effective and environmentally compatible buildings which enhance productivity and thus a firm's profitability (Bozovic-Stamenovic, Kishnani, Tan, Prasad and Faizal, 2015; Bohdanowicz, 2005).

Given increasing green consciousness at the global level, employees are likely to be attracted to and remain with companies that offer environmentally friendly infrastructure that complies with OH&S standards (Chang and Chen, 2012). Protection of health and safety at the workplace includes activities that promote employees' health (mental, social and physical), prevent risks (such as dust, carbon emissions, noise, and high temperatures) to employees' health and offer a workplace environment that enhances employees' psychological and physiological capabilities (UNDESA, 2012).

Thus, the promotion of health in the workplace enhances social progress. Sound employee health policies are an essential aspect of a firm's social responsibility and a prerequisite for sustainable economic and social emancipation. In this regard, companies are expected to develop OH&S mechanisms that generate and sustain stakeholder value irrespective of the firm's overall policies (BIS, 2007). Such initiatives will enable the company to address health and safety issues in a context of sound corporate governance which meets society's expectations.

Corporate philanthropic health related practices

Business corporations are expected to support health frameworks through participating in philanthropic activities which promote health-care practices and health services delivery (UNDESA, 2012). For instance, most developing countries offer poor health services and need to invest in technology to improve such services. Corporate investment in the health sector of a community or nation contributes to

poverty alleviation and addressing the health needs of the less privileged. Companies can also distribute food to the economically disadvantaged, donate medical supplies and implement public health education initiatives. A healthy society generates sustainable economic and social development outlooks which result in an improved standard of living (Hussainey and Salama, 2010).

Philanthropic health activities can be perceived as a public relations instrument which enables organisations to develop mutual relationships with consumers and other stakeholders (Sappi, 2012; Anglo American, 2014). For example, a mining firm with high acid mine drainage or a high carbon emitting factory can provide medical care to the community where they are located. Philanthropic health initiatives enhance the prospects of creating a sustainable society that is strong and healthy. Corporate philanthropic exercises in relation to health enable a firm to strengthen its bargaining power in relation to government departments through reducing conflict and building mutual relationships and to improve employee morale and thus productivity (BIS, 2007). Thus, in order to advance the community, firms must aim to improve the societies where they operate (Bakar, Sheikh and Ameer, 2011).

Promoting product safety

Product safety is a growing area of concern in the globalised business environment due to increased consumer awareness (Tsai, 2012). Product safety relates to reducing the likelihood that consumption or use of a particular product will lead to death, injury, sickness or undesirable impacts on people or equipment (Lin, Tan and Geng, 2013). The product may be consumed by a person, physically introduced into the human body or placed in a specific physical place for use. Therefore, product safety issues are usually identified in the areas of design failure, defective production processes, software challenges, poor storage facilities and inadequate distribution practices (Exxaro Resources Ltd, 2012). With respect to green investment practices, corporations are expected to ensure that their products and manufacturing operations receive environmental certification (Sambasivan and Fei, 2008).

Environmental certification is an indication that the product and manufacturing procedure adhere to particular environmental, social and ethical principles at all levels of the value chain (Tomasin et al., 2013). Certification enhances consumer expectations of product safety and quality; its absence may lead to negative

stakeholder reports and feedback, and even boycotts. Therefore, the importance of green and environmental certification cannot be underestimated. Adherence to environmental certification ensures that the firm's products are free from toxic and harmful substances such as carbon and that perishable products reach their destination in good condition (Nishitani, 2010).

Unsafe food can result in numerous acute and life-long illnesses, extending from diarrhoea to cancer (Younger et al., 2008) and has also resulted in considerable revenue losses and unemployment. Furthermore, some products are transported across the world, increasing exposure to risk (Geerts, 2014). Improved green product safety enables a company to reduce the risk (death and illness) associated with poor product safety standards (Pioneer Foods Ltd, 2012).

Environmental certification empowers a firm to comprehend and remove production failures as well as errors in the product life cycle (Kumba Iron Ore Ltd, 2012). Compliance with green standards and legislation to promote product safety and ultimately buyer safety is an on-going process (Zhu et al., 2008b). Companies must ensure that products that are unsafe do not reach the market (Tsai, 2012). Green products are safe and enhance the consumer's quality of life (sustainable consumption) (Nishitani, 2010).

Promoting education and personal growth for sustainability

Education is a powerful instrument which promotes social transformation, heightens consciousness, and provides training to various professional disciplines and trains scientists to create technologies that will assist in addressing the challenges confronting future generations (African Bank Investments Ltd, 2012). Due to companies' past failure to appreciate the significance of sustainability, the world is encountering challenges such as high carbon emissions, global warming, water shortages, drought, loss of biodiversity and increased desertification (IPPC, 2007). Green education spearheaded by corporations can play an important role in supporting sustainability (Bose and Pal, 2012). Companies can offer education programmes that promote public awareness of the environment and green technology, train employees how to design, install and repair green technologies and train policy developers on approaches that support efficient green policies (Wee and Quazi, 2005).

The international literature notes that companies that offer green education, foster green competitiveness, acquire superior technology and adhere to international and national environmental legislation are more likely to succeed, while non-green firms are likely to fall by the wayside (Peuckert, 2014; Gabler, Richey and Rapp, 2015). The development of new green skills is significant in achieving sustainable development goals and is an essential ingredient in surviving in the competitive and constantly changing global environment (Chan et al., 2014). For example, there has been a shift from “end-of-pipe” mechanisms to comprehensive environmental management and procedure-oriented techniques that demand holistic technical, social and personal expertise (Frondel et al., 2007).

Hence, green education is a vital tool to enable professionals to understand diverse and complex environmental challenges, identify integrated solutions and implement proactive initiatives (Waldman, Siegel and Javidan, 2006). Education for sustainability requires companies to foster deep learning that empowers employees to become problem solvers, as global challenges are not neatly configured (Wagner, 2010). Education also prepares employees to act as responsible citizens on issues that relate to the earth and its natural environment (Zśoka, 2008). Thus, in order to promote the integration of sustainable activities, company educational models need to become more pro-active and offer appropriate green educational courses which suit both highly qualified and less skilled employees (Gluckman, 2010).

In promoting green education for sustainability, corporations can expand the curriculum to include experiential learning and social education (Triguero et al., 2013) and interdisciplinary studies and systems thinking (Chan and Hawkins, 2010) and link the curriculum to local environments, inculcate critical reasoning in employees and conduct effective environmental research projects (Wagner, 2008). An analysis of green educational approaches reveals that education for sustainability involves interactive, mutual learning, involving the learner and the frameworks in which they are integrated (Jalali Naini, Aliahmadi and Jafari-Eskandari, 2011). Therefore, conventional educational procedures may not be effective in fostering green education for sustainability in a corporate context, since this form of learning requires that knowledge is gained in contexts that have defined limits, and is not inquiry- and problem-oriented (Liu, 2012). Traditional forms of environmental

education also limit the learner to individual comprehension and critical reasoning as the teacher is viewed as the vessel of knowledge (Chan, 2011).

Since education for sustainability requires applied learning scenarios, companies must also ensure that positive affective (emotion/feeling) learning results that cause employees to develop acceptable environmental beliefs, perceptions and conduct (Del Brio et al., 2007). These affective outcomes are likely to stimulate more responsible environmental issue problem solving mechanisms in relation to existing environmental challenges (Amel et al., 2009). This view is based on the notion that environmental challenges are associated with values and can hence be addressed by influencing a person's beliefs and attitudes (Hoejmose, Roehrich and Grosvold, 2014). Successful sustainable development demands educational techniques that enable people to share values, integrity, equity and consciousness.

Thus, ethical issues relating to the environment can be part of regular classes, can be introduced as independent courses and could be integrated in the workplace (Zhu et al., 2011). Moreover, education for sustainability should build capacity for individual and collective action, critical reasoning and problem-solving, attitudes that support environmental sustainability, knowledge of human and natural models and consciousness of the association between human beings and nature (Waldman et al., 2006). As such, green education in corporate environments should embrace lifelong acquisition of knowledge with a democratic learning procedure founded on learning with others and from the natural environment (Ko et al., 2013). In this respect, education for sustainability should promote cognitive and perceptual transformation. Transformation can be achieved by scientific green innovation that mutually benefits the society, the economy and the natural environment (Cuerva et al., 2014).

Maintaining social and cultural values for sustainability

Policies and principles pertaining to the sustainable use of natural resources not only involve environmental and economic issues, but support social and cultural values (UNDESA, 2012). Social and cultural dimensions include objects and frameworks, namely, historical sites, indigenous culture, local traditions and the local people's habitat. Therefore, corporations should support the social and cultural values of the places where they conduct their business (Kansal, Joshi and Batra, 2014). Social

values are concerned with the quality of life in a society and therefore, encompass issues relating to democracy, equity, happiness, health and security (Sasol Ltd, 2012; Liu and Anbumozhi, 2009).

Culture can therefore be defined in terms of individual consciousness of cultural values; the procedure involved in culturing an individual; intellectual and artistic activities that have the potential to inculcate culture in an individual and culture as a framework which sustains, communicates and demonstrates the attributes of a specific society, and hence enables people to engage with it. Hofstede (2001:10) defines culture as "a collective programming of the mind that distinguishes the members of one group or category of people from another." The tangible components of culture which corporations should promote include monuments which can take the form of paintings, buildings, sculptures, the natural archaeological environment, and human-made scenery. Intangible constituents of culture include initiatives, portraits, knowledge, expertise, tools, artefacts and cultural spaces related to local communities which community members recognise as elements of their tradition.

Understanding cultural values leads to the development of "healthy" interrelationships among frameworks, namely, company ownership, the firm's operations and the local community (Hofstede, 2001). A sound culture in the corporate environment promotes appreciation, positive communication, long term commitment and the ability to find solutions to conflicts. Promoting and sustaining the social and cultural values of a local society thus preserve the national heritage. Crucial global issues such as environmental degradation, greenhouse gas emissions, corruption, bribery, labour disputes and human rights violations which have increased in recent years can be solved at firm level by supporting social and cultural sustainability (Norton, 2007; UNDESA, 2012). A company needs to recognise the values of other stakeholders so as to acquire resources and legitimacy (Aerts and Cormier, 2009).

When companies promote local cultural and social values, they are able to respond to the interests of their major stakeholders. This enables them to gain social acceptability which is important in improving economic performance (Anglo American Platinum Ltd, 2012). The influence of social and cultural values should not be

underestimated as demands for sustainability emanate from the public, government, other companies and society. For example, the public can exert pressure on the government to introduce green legislation which will force companies to introduce measures to preserve the natural environment (Innes and Sam, 2008). Examples of social and cultural concerns include injuries, nuclear waste, carbon emissions, DDT usage, fossil fuel power and acid rain (IPPC, 2007).

A corporation's capability to acquire green resources shows that it is contributing to the protection of the environment (Iraldo, Testa and Frey, 2009). In this regard, the firm's green investment policy enhances social legitimacy (Bebbington, Larrinaga-Gonzalez and Moneva, 2008). Socially legitimate companies have superior access to strategic resources, thereby promoting green economic emancipation (Aerts and Cormier, 2009). Contemporary society is aware of companies' responsibility to promote environmental sustainability in the areas where they operate. Hence, the green reputation of a product, green satisfaction and green trust create social legitimacy which increases consumers' willingness to pay higher prices for green products (Chen, 2010).

Promoting social and cultural values includes restoring previous industrial areas and upgrading low-tech sectors (De Marchi, 2012). Green innovations can be applied to low-tech sectors in local areas and green R&D can be used to promote these sectors (Cuerva et al., 2014). Moreover, developing relationships with the indigenous cultural heritage is important as this enables other important industries such as tourism to develop. Thus, a firm's engagement with the cultural heritage context fosters a generation of creative companies and ultimately a developed economy. In this way, social and cultural values can be employed as economic engines which promote sound environmental performance, economic development and competitiveness (Chan et al., 2012).

It is clear that social and cultural values should inform company decision making and a firm's environmental performance (Hofstede, 2001). Principle 22 of the *Rio Declaration on Environment and Development* (1992) highlights that local people and communities play an important role in protecting the natural environment as a result of their knowledge and traditions. It adds that countries have a responsibility to promote indigenous people's identity, beliefs and demands as well as enabling their

effective engagement in achieving sustainable emancipation. Therefore, it is vital for companies to engage with traditional leaders in the communities where they operate on issues concerning the natural environment.

Community stakeholders' participation in a firm's green practices restores pride among the local community and strengthens the relationship between the firm and the society. It also enables the company to find lasting environmental solutions which are accepted by the local community. Stakeholder engagement can take place in green policy formulation, in implementing green projects and in evaluating such projects (Delmas, Russo and Montes-Sancho, 2007). This will ensure that green investment policies remain at the forefront of the company's policy (Dong et al., 2014). Moreover, stakeholder participation in greening issues enables them to "hear and have a voice" in practices in their community, thereby avoiding manipulation and total control by the company (Gonzalez-Benito and Gonzalez-Benito, 2005). Stakeholder participation offers numerous benefits to the firm's planning and implementation procedures, in addition to reducing costs (by not participating in activities which do not benefit the local people) (Aerts and Cormier, 2009).

Promoting equality for social sustainability

Research on workplace equality has identified numerous challenges. Minority groups and women have encountered persistent hindrances to career progression. Therefore, organisations should adopt policies that address the challenges associated with discrimination, unfavourable conditions and injustice (Feagin, 2014). Companies should carefully evaluate inequality and its consequences at all levels of the organisation (Williams, 2007).

Besides issues such as gender and race, new issues, namely, religion, age and sexual preferences have received global attention (Williams, 2007) and have been highlighted by the United Nations Declaration on Sustainability, International Labour Organisation (ILO) debates and other global principles and indicators. As such companies should adopt long-term, strategic policies with respect to human rights that consider all stakeholders' interests (Walker and Wan, 2012).

A company's sustainability initiatives should address issues such as social justice, comply with legislative requirements and take into account the views of its workforce. Ideally, companies should establish diversity units in their Human Resources

department in order to provide a “voice” that promotes cultural transformation within the company and promotes consultation and negotiation with trade unions and workers on equality issues (Wehling et al., 2009). Moreover, companies can come together in associations that promote equality. Such a network would encourage members to participate in discussions, meetings and the exchange of ideas regardless of national or even international boundaries. It is difficult for an individual employee to take the initiative to present his/her grievances or complaints (Feagin, 2014). Companies should consider equality as one of their core values, thereby raising consciousness of social sustainability issues.

The legislative framework in many countries requires companies to provide equal opportunities and benefits. Furthermore, inequality impacts negatively on operational efficiency. Addressing work discrimination creates communities that are harmonious and peaceful. Management thus needs to be familiar with the local environment as equality is a very sensitive issue among indigenous communities and underestimating the impact of discriminatory practices can have detrimental consequences (De Villiers and Van Staden, 2011).

Globalisation has had a significant impact on social welfare and workplace relations (UNDESA, 2012), often with contradictory results. For example, while globalisation has resulted in increased employment opportunities, they are concentrated in low-paid jobs. Furthermore, increasing employee mobility has changed the racial and class composition of the workforce (Williams, 2007). Corporations are therefore called upon to address equality issues in pursuit of social sustainability. Due to the “melting pot” circumstances brought about by globalisation, affirmative action and other initiatives that recognise, promote and value social diversity are important to avoid discrimination at the work place (Williams, 2007).

Promoting equality addresses poverty and destitution, and enhances solidarity, collaboration and self-respect. John Locke, cited by Gutmann (1980:28) noted that “the state of nature has a law of nature to govern it, which obliges everyone; and reason which is that law, teaches all mankind who will but consult it that, being all equal and independent, no one ought to harm another in his life, health, liberty or possessions.” Thus, improved work and supply chain environments, labour rights,

social advancement and assistance, human rights and stakeholder engagement have a considerable impact on equality.

The following section examines environmental sustainability with particular emphasis on corporate green investment activities.

2.3.3 Environmental sustainability

In terms of the environmental component, corporations should consider the impact of their operations on the natural environment (Andiç et al., 2012). The environment should be maintained in its original state (Khor and Udin, 2013). Consequently, environmental sustainability requires companies to formulate initiatives that fulfil human needs while protecting the life support frameworks of the earth and its flora and fauna (Yen and Yen, 2012). Fonseca and Jabbour (2012) define environmental sustainability as activities and drivers that improve the quality of the environment in the long run. The key objectives are preservation of natural spaces and biodiversity; responsible employment of green energy; reduced use of fossil fuels; preservation of the natural environment and prevention of environmental hazards and risks.

Preservation of natural spaces and biodiversity

Adaptation and mitigation initiatives are regarded as essential mechanisms to minimise the effects of business operations on the natural environment (Triguero et al., 2013). The effects of business activities on biodiversity have been considerable, extensively affecting habitats and species (Vachon and Klassen, 2007). Biodiversity can be defined as the range of plants, animals and other living organisms within a specific location or region. The Convention on Biological Diversity (2007:1) states that biodiversity refers to “the variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.” Carbon emissions and pollution have impacted negatively on biodiversity, calling for initiatives to restore and sustain natural environments (Baris and Kucukali, 2012).

For instance, companies can collaborate with government to create wetlands that store rain water, thereby reducing rising sea levels, sequestrating carbon and

providing a habitat for living organisms. The challenges in this regard include a lack of cooperation among organisations, restrictive policies and laws, conflicting legal powers and incompatible institutional principles (Zeng et al., 2010a; Thomas, 2009). Increased economic activity has resulted in the loss of some species and the diminution of others (Aasen, Westskog, Wilhite and Lindberg, 2010). The carrying capacity of the natural environment is negatively affected by industrial activities that exploit natural resources and by human habitation (Junquera, Del Brío and Fernández, 2012.) which result in the loss of natural green spaces, namely farmlands, forests and wetlands (Yen and Yen, 2012; IPPC, 2007).

Therefore, companies should formulate conservation policies that not only seek to protect iconic places but are able to sustain biodiversity in the environments in which they operate (Tseng and Chiu, 2013). Corporate conservation policies should consist of goals and approaches that are informed by and supported by science (De Marchi, 2012). Furthermore, the policies should reflect the firm's values, available knowledge and expectations of environmental management for particular periods of time (Wong, 2012). Adaptive preservation policies that companies can promote or fund include the establishment of dynamic, preserved areas, migration initiatives and activities which encourage the extension of static preserved areas (Chen, Chang and Wu, 2012b; Lin et al., 2013).

Companies can also support human activities such as integrated livelihoods, environmental consciousness projects, property rights and governance policies and procedures that are environmentally friendly (Hsu et al., 2013a). Since funding mechanisms are generally spread over certain periods of time, corporations should prioritise areas which they want to protect (Nandy and Lodh, 2012). The company can conduct initial area assessments using established standards in relation to community diversity, scarcity or the rareness of the species and natural state of the area (Eneh, 2011). Company efficiency is imperative in planning environmental conservation activities (Jeong, Jang, Day and Ha, 2014) as it encourages non-disturbance of species' transitions, discourages modification of environmental protection goals and avoids changing conservation principles (Pellegrino and Lodhia, 2012).

Environmentally preserved areas support the growth of natural environments within city locations, promote urban ecology, foster the growth of environmental services and help to climate-proof city locations which are affected by global warming (IPPC, 2007). Ultimately, these green environments deliver improved environmental quality which promotes the health and welfare of the company's employees and the public at large (Delmas et al., 2007). Corporations should recognise that they are part of the natural environment (Junquera et al., 2012). This would enhance their understanding of the various species which interact and maintain life on earth. Biodiversity issues should be part of a company's main policy framework and stakeholders should participate in decision making on issues relating to biodiversity (Lanoie, Laurent-Lucchetti, Johnstone and Ambec, 2007).

Given the fact that environmental issues are sometimes complex, corporations should collaborate with external stakeholders (Yu et al., 2009). The development of in-house environmental expertise may be expensive, inadequate and time-consuming (Azapagic, 2004). Teamwork and partnerships can be used to tap into knowledge and enhance performance (Yu et al., 2009). Stakeholder engagement is important as corporations are not always aware of the most effective green investment policy to prevent the loss of species and their habitat (Anglo American Platinum Ltd, 2012).

While corporations can adopt short-term measures to prevent the loss of biodiversity, given the limited available resources, long-term policies (which involve more extensive stakeholder engagement) are important to protect already endangered species as well as to preserve current biodiversity (Royal Bafokeng Platinum Ltd, 2012). Therefore, co-operative efforts with other stakeholders such as Non-Governmental Organisations (NGOs) help to protect biodiversity. NGOs are often subjected to less direct government control, have access to financial resources, have superior biodiversity visions and are generally flexible (Nedbank, 2012). Wilson (1999:136) emphasises that "the rescue of biodiversity can only be achieved by a skilful blend of science, capital investment, and government: science to blaze the path by research and development; capital investment to create sustainable markets; and government to promote the marriage of economic growth and conservation."

Responsible employment of green energy

Global pressure for investment in green energy has increased considerably in recent years (Caniato et al., 2012). This is stimulated by energy security issues, concerns relating to the effects of climate change resulting from increased greenhouse gas emissions and the need for new energy systems (Fonseca and Jabbour, 2012). Green energy sources, also known as renewable resources, have the ability to regenerate and recycle using natural procedures (IPPC, 2007). Hence, the employment of these non-exhaustible energy resources has been associated with preventing environmental damage (Zeng et al., 2010a). Examples of green energy sources include bioenergy, geothermal energy, wind energy, solar energy, ocean wave energy and hydro-power energy (IPPC, 2007).

At the broad level, green investment initiatives by companies are important to promote green technologies and increase the supply of green energy; thereby improving overall environmental consciousness (Omer, 2008). Thus, research is required on green energy that will both promote economic advancement and be acceptable to society (Delmas et al., 2007). Specific attributes have been identified that will enable a company's green energy scheme to become a successful business venture which translates to overall national development. Firstly, the area selected should be appropriate to the green technology available. For example, wind energy sources can be situated in areas that have significantly high wind speeds and are located near the grid network, while solar energy sites should be situated in areas that receive an abundance of sunlight all year round. Companies should also take into account that appropriate locations to set up green energy projects are becoming increasingly scarce, particularly in urban centres; hence the growing trend to locate such schemes in remote areas (IPPC,2007).

In the same vein, green energy projects by firms require investment in power transmission systems, viable transmission passageways, and transmission network improvements which are compatible with green energy resources (Berkhout and Rowlands, 2007). Secondly, green energy schemes should be situated in areas which can be linked to existing grid frameworks (Katuwal and Bohara, 2009). When

interlinking is easy, the integration of green energy schemes should be timely and involve minimal costs. Thirdly, corporations that invest in green energy sources should evaluate their projects to determine if they are able to cover the high associated initial costs and to maintain acceptable financial benefits (Yin and Powers, 2010). This approach is important as green energy schemes are normally capital intensive (Inderst et al., 2012). Thus, it can be concluded that corporations should develop green energy policies that take into account societal approval, economic efficiency, resource efficiency and environmental compatibility (Jaraitė and Kažukauskas, 2013).

In comparison with non-renewable sources of energy, green energy sources are at a disadvantage in terms of current production levels and costs (IPPC, 2007). Increased corporate investment in green energy resources could improve the market diffusion of green energy systems (The Africa Report, 2014). Moreover, green investment by companies encourages green technological innovations and spurs the entire green energy investment cycle, thereby reducing investor reluctance (Böhringer, Moslener, Oberndorfer and Ziegler, 2012). As such, government support in the form of incentives and legislation that support green energy integration by companies is important. Favourable government policies foster the widespread incorporation of renewable energy technologies (Aasen et al., 2010).

With respect to green energy technologies, while technological developments are significant, much depends on attitudes. It important for companies to communicate their views on green energy deployment to the responsible government department since this enhances wider incorporation of such investment by companies in pursuit of green energy standards (Inderst et al., 2012). Government policies that do not take stakeholders' views into account will not encourage the development of green energy resources (Investec, 2012). A strategically designed, long-run, stable policy scenario is the principal organisational platform to foster the growth and adoption of green energy technologies (Vodacom Group, 2010).

As such, competitive corporations that are economically sustainable are crucial linchpins in ensuring widespread employment of green energy resources (Baris and Kucukali, 2012). An economically sustainable firm is capable of implementing better

R&D projects on green energy technologies, thereby improving environmental awareness (Nedbank, 2012). Research and Development are important to determine the extent to which natural resources are used, to continually improve environmentally friendly technology performance, to evaluate energy efficiency standards, measure carbon emissions and calculate cost savings (Eyraud et al., 2011). Moreover, endogenous associations and organisational concerns are important social issues that need to be assessed. Hence, green energy schemes that are compatible with the specific attributes of a location should be adopted (Yin and Powers, 2010). A firm's green R&D should connect green energy technologies with schemes such as eco-tourism, environmental cultural celebrations and bio-cultures.

In areas associated with insufficient competences, corporations should comprehend that green energy schemes are vital in reducing poverty and creating jobs for women and the youth and that they promote innovative capacity building. Thus, while funding can be solicited from international investors, local knowledge and ability are important in supporting effective implementation (Tassou et al., 2011). Besides promoting sustainable development objectives, the adoption of green energy technologies will benefit the local community as the ultimate beneficiaries of the advantages offered by green energy (Katuwal and Bohara, 2009). At the same time, corporations' green energy investment policies should be in line with existing green energy models and have long-term capability in green energy contexts (Yin and Powers, 2010). Cost-effectiveness and the competitive performance of clean technologies flow from policies that consider compatibility issues, sustainability, and increased production and employment (Menz and Vachon, 2006).

Reduction in the use of fossil fuels

Humankind's energy frameworks are the primary contributors to increased carbon emissions, with non-renewable or fossil fuel sources the major perpetrator (Omer, 2008). The literature notes that the potential effects of continual carbon emissions include rising sea levels leading to damage in coastal areas, increased occurrence of droughts, heavy precipitation in some locations, extended environmental damage, low agricultural production, and increased mortality rates and malnutrition as well as

the possible extinction of both endangered and non-endangered species (IPPC, 2007). These negative impacts have principally been associated with the use of fossil fuels since they contain large amounts of carbon (Aguilar, García, Trujillo, Villanueva and Ojeda, 2011). Fossil fuels are non-renewable resources which do not replenish themselves at an adequate rate for continued economic employment in relation to human timeframes (IPPC, 2007, 2014).

Examples of fossil fuels are coal, gasoline, diesel oil, fuel oil, kerosene and natural gas. While the Kyoto Protocol commits all nations to introduce initiatives to reduce carbon emissions, corporations who are the primarily emitters of carbon owing to their industrial operations should be the main players in green investment activities (Frondel et al., 2007). Examples of energy intensive firms include those manufacturing automobile parts, construction firms, chemical manufacturers, food and beverage firms, mining supply companies, paper manufacturers, the metal industry, textile firms and the transport industry (Gouws, Brent and Pierce, 2012). The main reason for doing away with the use of fossil fuels is that the use of non-renewable resources increases the risk of climate change (Eyraud et al., 2013). Fossil fuels contribute to carbon emissions into the atmosphere that take a long period of time to have an effect on the climate (IPPC, 2007). Thus, the impact of present day fossil fuel use could only become apparent in 50 years' time (IPPC, 2007).

While scholars have noted that there is general uncertainty regarding the time scale, distribution and extent of the economic impact of global climate change, it is important that measures be introduced to avert any possible crisis (Triebswetter and Hitchens, 2005). While today's corporations that use non-renewable resources will not encounter the negative effects of climate change, the costs will ultimately be borne by future generations (SAICA News, 2009). Green legislation has been adopted in many countries and there is significant stakeholder pressure for companies to reduce their use of fossil fuels. Companies need to pay more attention to the well-being of future generations (Delmas et al., 2010). Furthermore, the continued use of non-renewable energy will hinder the growth and competiveness of green energy resources (Omer, 2008). Thus, it is imperative that industry and commerce use green energy instead of fossil fuels since it has the greatest potential

to promote energy efficiency and reduce carbon emissions (Jaraitė and Kažukauskas, 2013).

While non-renewable resources are the backbone of most global energy frameworks in the current context, there are increasing reports of energy insecurity apart from climate change issues (Jaraitė and Di Maria, 2012). Energy insecurity related to fossil fuels use involves the physical unavailability of these resources owing to depletion, volatility and the non-competitiveness associated with energy prices (IPPC, 2007). Reduced use of fossil fuels and increased use of environmentally friendly energy sources will promote reduced energy intensity, reduce the costs associated with resource allocation and foster a corporate energy framework that is compatible with a country's long-term energy policy requirements (Gouws et al., 2012). There is a mutual association between economic growth and energy usage, since expanded energy usage results in extended economic advancement (Delmas et al., 2007). However, companies must be able to employ green energy resources efficiently in place of fossil fuels, thereby generating high energy efficiency, and reduced environmental pollution and carbon emissions (Aasen et al., 2010).

Numerous challenges have been associated with the use of fossil fuels. The first is that carbon emissions in the form of sulphur dioxide generate acid rain which damages monuments and buildings as well as reduces agricultural productivity due to high acidification of the soil. The extraction of resources such as coal and oil also destroys aquatic life through oil spills, damages agricultural land, and produces unpleasant odours which cause health problems; they are also associated with transportation challenges and the resources are generally dirty. In addition, the combustion procedures associated with fossil fuels destroy the ozone layer, allowing harmful ultra violet (UV) rays to enter and cause skin cancer in human beings.

Moreover, large amounts of some fossils such as coal are required to generate the required amount of electricity on a regular basis. Due to increased demand for energy, available technologies are unable to acquire the amounts of coal required within a particular timespan. This has resulted in unsafe methods being adopted to acquire coal which endangers workers' lives, exposes them to lung diseases and damages the environment by causing soil erosion, high acid levels and

desertification. It is thus clear that reduced use of fossil fuels by companies would promote sustainable development goals.

Preservation of the natural environment

The natural environment has become one of the principal components of business life. Therefore, issues relating to the natural environmental have a significant impact on firm performance and social and economic development (Haigh and Griffiths, 2007). Corporations should be more sensitive to environmental demands in order to protect and productively employ natural resources (Mohiuddin, 2014). Increasing pressure from governmental legislation, consumers, and environmental interest groups has forced companies to integrate environmental practices (Norton, 2007). Thus corporate environmental protection policies are necessary to improve efficiency, preserve the natural environment and ensure a sustainable future. Moreover, the company's environmental orientation and policy promotes good relations with relevant stakeholders (Qi, Zeng, Li and Tam, 2012).

This suggests that today's corporations should integrate their environmental policy with the firm's vision and mission (Pons et al., 2013). This will stimulate the adoption of green investment practices which increase corporate environmental awareness (Midthun, Nørstebø, Pérez-Valdés and Bjørkvoll, 2012). In addition, the firm's stakeholders, including suppliers, shareholders, employees, competitors, government, and the media are also stimulated to become more environmentally conscious (Liu, 2012; Hsu, Tan, Zailani and Jayaraman, 2013b; Hu and Hsu, 2010). Furthermore, the success of the corporate environmental policy is secured through expanded senior management participation as environmental issues considerably influence the company's performance (Berrone and Gomez-Mejia, 2009). Therefore, protection of the natural environment is guaranteed once the corporations' culture, philosophy and standards are attuned to that environment (Min, 2011).

Assuming that environmental attitudes determine practices, environmentally compatible procedures and commodities call for more innovation than in non-environmentally oriented firms (Demirel and Kesidou, 2011). In this way, a firm's environmental management practices can become new competitive strategies which enhance economic advancement (Santolaria et al., 2011). Thus, greening should not be assumed to lead to reduced revenue as environmentally compatible innovations

enable a firm to avoid the negative impacts of industrial competition (Yu et al., 2009). Therefore, effective environmental management policies should be adopted with performance indicators, budgets, strategic planning and environmentally approved standards such as ISO benchmarks.

Performance indicators are important in ensuring internal adherence to environmental legislation and policies, spurring consistent improvement, and supporting effective internal and external decision making through the provision of sound environmental data (Caniato et al., 2012). Budgets are important to describe the financial implications of environmental activities, and disclose and trace any variances in the environmental budget (Garay and Font, 2012). Strategic planning with respect to environmental issues promotes comprehensive integration of environmental concerns, and enables the firm to gain access to sound, high quality environmental information (Triguero et al., 2013). This improves time management, minimises the expenses associated with environmental practices, and assists the company to select the most appropriate environmental technologies, investments and practices.

Environmental standards such as those created by ISO are important methods which measure the attainment of objectives and targets through the provision of a management framework, and improve firm loyalty to environmental goals and environmental consciousness (Rao and Holt, 2005). Hence, adopting environmental protection practices can both minimise negative environmental effects and improve firm productivity (Midthun et al., 2012). For instance, cleaner production practices prevent pollution through process innovation (Cagno et al., 2005). Accordingly, successful environmental management initiatives require the transformation of process technologies, natural resources substitution, particular water use and waste models, energy efficiency standards and process efficiency (Wu, Tseng and Vy, 2011; Chien and Shih, 2007).

Improvements in the production procedure are promoted by minimising the costs associated with waste management. Savings are also generated by effective deployment of natural resources and energy, and distribution expenses are reduced by improved quality and the equitable allocation of resources (Kong and White, 2010). This is the foundation of eco-efficiency; manufacturing processes and product

distribution procedures are undertaken at a lower cost while environmental effects are reduced, natural resource intensity is minimised and energy efficiency is achieved (Pogutz and Russo, 2009).

Regardless of their size, companies' environmental policies are defined along a continuum which extends from reactive approaches which attempt to address legislative demands to proactive methods that foster eco-efficiency by implementing voluntary environmental activities (Sinkin et al., 2008). Thus, it is reasonable to expect that competent management and pro-active conduct in relation to environmental issues are capable of generating corporate financial gains. Therefore, it is important for a company to secure adequate environmental skills, employees, assets and technology that support environmental protection (Sezen and Çankaya, 2013).

Promoting protection from environmental hazards and the reduction of environmental risks

As noted earlier, human practices have been the chief driver of increasing environmental hazards. Environmental hazards refer to the condition of a phenomenon that has the capability to endanger the natural environment and severely affect people's well-being. Therefore, environmental hazards embrace issues such as contamination and pollution (environmental liability risk) as well as storms, floods, tsunamis and earthquakes (natural catastrophe risks) (Chacha, 2014). Such hazards can also be classified into different categories such as biological, psychological, mechanical, physical and chemical. Biological hazards (also known as biohazards) are biological substances which endanger the well-being of living things. Examples include medical waste, parasites, disease-causing bacteria and toxins or viruses that threaten the human of health beings and other living organisms (SFDPH, 2014).

Chemical hazards refer to toxic substances which, when humans are exposed to them, cause extensive carcinogenicity, irritation, flammability, reactivity, corrosiveness and sensitisation. Examples include pesticides, equipment oils, cleansers, dissolved metals and high quantities of food additives (SFDPH, 2014). Physical hazards refer to unsafe circumstances which have the potential to cause death, sickness and injury. Examples include carbonated metal objects, broken glass

and staples (SFDPH, 2014). Mechanical hazards are generated through electrical operation of equipment and appliances. They normally occur at the location of operation (e.g., a drill bit), electrical distribution (e.g., pulleys, electrical belts and axles on engine supported rotators) and with mobile components (e.g., gears, pulleys and shafts). Psychological hazards are concerned with mental well-being and behavioural disturbances; for instance, suicidal thoughts, bullying, harassment, criminal motives, murder motives, alcohol and drug abuse, wilful environmental negligence and consumer green aggression.

Corporations have a responsibility to ensure that environmental hazards are reduced through managing environmental risk. Environmental risk is defined as the actual or possible threat of severe impacts on the natural environment's living elements through waste, carbon emissions, effluents and a decrease in natural resources as a result of a firm's practices (Sharfman and Fernando, 2008; Li et al., 1997). Risks linked to environmental hazards are subject not only to prevalent physical conditions but also depend on anthropogenic practices, conditions, choices and culture. Thus, in order to obtain protection from environmental hazards and reduce their risk, it is important to identify the possible sources which can increase the risk, assess the source's prospects and intensity and then develop mechanisms which can effectively control them (Lee et al., 2015a).

A corporate environmental risk evaluation guide should include indicators such as toxic substances, the state of technologies, equipment and other appliances, manufacturing procedures, the vulnerability of receptors and environmental health and safety standards (Bozovic-Stamenovic et al., 2015; Qi et al., 2012). Such indicators are supported by enforcement of environmental legislation; companies that do not incorporate environmental management approaches are liable to fines and even suspension of their business permits (Webster and Ayatakshi, 2013). Therefore, while pursuing economic development, companies should not consider environmental issues as secondary goals (Ambec, Cohen, Elgie and Lanoie, 2013).

Stakeholders (the public, the media, NGOs, and so forth) have expressed growing concern regarding pollution and natural environmental risks owing to numerous highly visible events. In some cases, the community may comprise economically disadvantaged people who are not empowered to defend their environmental rights

as a result of the absence of communication networks, capacity and freedom (Shin et al., 2008; Kumar et al., 2012). In relation to moral hazards, a company should not integrate green investment initiatives which do not reflect optimal social capacity (Chang and Sam, 2015). Corporations should fund the integration of green technologies to reduce environmental risks (Lai and Wong, 2012; Chen, 2008).

Such technologies must be able to control shocks, sustain their purpose and framework and offer feedback while they manage and adapt to transformation and the variability of environmental hazards (Lin et al., 2013). The resilience of environmental technologies is concerned with the strengths, expertise, raw materials and proficiencies applied and deployed to withstand serious environmental risks and hazards (Khor and Udin, 2013). If unsafe technologies and systems are incorporated, environmental risk prevention will not succeed. The firm will be left with few approaches and inducements to reduce the probability of environmental hazards, thereby increasing losses to values greater than the company's total assets. Hence, it is important for corporations to consider employing insurance as an approach to effectively control environmental risk. Insurance is capable of distributing the environmental risk, promoting segregation of such risk, managing and supervising conduct and supporting loss minimisation standards.

2.4 Theoretical framework

This section comprises two main parts, namely, Stakeholder theory and the Goal-Framing theory.

2.4.1 Stakeholder Theory

The origins of the Stakeholder theory can be traced to Adam Smith and his *Theory of Moral Sentiments* (Mainardes, Alves and Raposo, 2011). Schilling (2000) adds that the concept of stakeholder recognition can be identified in Mary Parker Follett's work, *The New State* published in 1918 that challenged the political ideas of the time by claiming that humankind is only able to exist as a result of relationships with the world around it. In the business context, *The New State* noted that organisations adopt management and business goals that can be transformed to reflect and

support the company's role in the community (Schilling, 2000). More recently, Freeman (1984) proposed that corporate management teams employ terms that are oriented to the concept of "stakeholder". This concept was influenced by the work of James Emshoff, Richard Mason and Ian Mitroff (Fontaine, Haarman and Schmid, 2006).

Freeman's (1984) *Strategic Management: a Stakeholder Approach* sought to promote the strategic management of corporations in the new millennium. He (1984) argued that companies should become more responsive to the interests of other corporate stakeholders when implementing strategic decisions. Therefore, Freeman defined stakeholders as "any group or individual that can affect or be affected by the realisation of a company's objectives" (Freeman, 1984:46). In his more recent definition, Freeman defines a stakeholder as "those groups who are vital to the survival and success of the organisation" which is a modified form of the 1984 version (Fontaine et al., 2006:6).

Thus, the stakeholder theory posits that all corporate stakeholders deserve recognition, and that the policies, operations and practices of a corporation should take their interests into account (Haigh and Griffiths, 2007). Norton (2007) and Haigh and Griffiths (2007) note that corporate stakeholder groups include, amongst others, customers, suppliers, shareholders, the local community, the media, government, employees and the natural environment. The natural environment is considered a corporate stakeholder because it is the habitat for living and non-living things that sustains corporate activities (Haigh and Griffiths, 2007). The global increase in natural disasters (IPPC, 2014), shifts in weather patterns and increased carbon emissions (IPPC, 2007), have impacted and will continue to impact on business operations (Eyraud et al., 2013). Thus, organisations are morally or persuasively compelled to take the exigencies of the environment into account and consider its capacity to provide productive resources and the limitations that may be imposed if these resources are not preserved (Mohiuddin, 2014). Consequently, all business resources, namely natural, physical, financial and human assets, are part of the natural environment (Mohiuddin, 2014).

The natural environment is unable to directly speak for itself (Norton, 2007) and human beings are thus called upon to represent it in structures and corporate decision-making processes. The natural environmental is thus inherently bound by both political and economic power (Haigh and Griffiths, 2007). This is important as some researchers point out that the natural environment is not able to put a price on its raw materials (oil, water, clean air), unlike individuals that are considered the firm's stakeholders owing to "economic exchange" factors (Mohiuddin, 2014).

Some scholars have also noted that the natural environment is not able to engage in mutual interaction, lacks coercive influence and is unable to impose power in traditional "economic exchange" since it cannot bargain and lacks control (Norton, 2007). Hence, it is important that the natural environment is represented on corporate boards as current global corporate operational practices have given first preference to other stakeholders' interests (for example, consumers, employees, the media, government, and competitors), undermining the demands of the natural environment (Norton, 2007; Haigh and Griffiths, 2007). Corporations should not only focus on economic imperatives, but should pay adequate attention to the natural environment (Haigh and Griffiths, 2007). By embracing the natural environment as an important corporate stakeholder, the inseparable, interdependent attributes of the global corporate economy and the worldwide natural environment should spur long-run environmentally responsible approaches to business operations (Haigh and Griffiths, 2007).

In developing green investment initiatives companies should recognise that they are also accountable to many internal and external stakeholders who demand various expectations from the organisation's performance hence it is best for the firm to institute a procedure that lessens conflict. Some of the notable stakeholders who will be discussed in this section are namely, green government, green consumers, green employees, green investors and environmental interest groups.

Green government

Some governments have often utilised various policies that seek to support environmentally oriented objectives (Burnett and Hanson, 2008). For instance some

governments have supported employment of green standards in procuring products for private entities and introduction of green building standards (Wang et al., 2013a). Moreover, legislation that the government can introduce so as to limit or encourage firms to support green investment conducts are: green packaging materials standard laws, recycling laws, laws that avoid use of dangerous packaging substances, building storage frameworks and integrating discount on tax structures (Wang et al., 2013a; Cuerva et al., 2014; Lin et al., 2013).

Whilst traditional pollution prevention practices which are command and control have been utilised by governments to manage carbon emissions and foster clean technologies, some governments have also utilised market-oriented tools such as FITs and green certificates systems as important instruments which spur environmental protection (Jaraitė and Kažukauskas, 2013).Therefore, government interventions through supporting a “green economy” has been instrumental in increasing environmental consciousness of companies, spur lowered cost associated with green inputs and improves co-ordination required in establishing green markets thereby overpowering excess inertia (Yin and Powers, 2010).

Thus the heightening diminishing rate of natural resources and environmental challenges have put huge pressure on governments to have greater responsibility towards fostering practices which promote green investments and ultimately generation of environmentally compatible commodities (Smith and Crotty, 2006). Environmental regulatory government entities can also integrate suspension as well as revocation policies for an enterprise to stop its operations temporarily or even on a permanent basis as part of their extended administrative responsibility and sanctioning duty (Garnaut, 2008; Qi et al., 2012; Mnguni and Tucker, 2012). Hence, environmental regulation through green government intervention is of significant value to ecosystem protection, lessens climate change and protects well-being of societies (Wei et al., 2011; Jaraitė and Kažukauskas, 2013).

Green consumers

The concept of green consumption has become apparent as a major constituent in corporate policy discussions with reference to environmental effects of consumption (Chen, 2010). Evidence suggest that an increasing number of consumers are now

interested with environmental damage, depleting natural resources and heightening natural hazards caused by climate change thereby demanding firms to integrate green initiatives (Jansson and Marell, 2010).Therefore green consumer's knowledge about the natural environment has been the greatest stimulator which have motivated them to demand green oriented commodities in addition to showing green based behaviour (Aerts and Cormier, 2010).

As such, when consumers view that the company's green investment practices promote societal interests, they tend to develop positive feelings about the firm which also stimulates their buying desire (Han, Hsu and Sheu, 2010). In addition, when society-serving objectives are achieved, improved competence about the firm is realised by the fact that the company can legitimately undertake its business operations (Moon and DeLeon, 2007).Current research also highlights that green consumers are prepared to pay a high price on green commodities than non-green products (Veisten, 2007). In this respect, consumer willingness to purchase green products even at a higher price provides opportunities for governments to set-up, construct and regulate corporate supply frameworks on environmental issues.

This implies that green consumers have ability to seek governmental assurance that environmental products produced by the firm meet required environmental standards (Dawkins and Fraas, 2011). Green consumers are therefore, individuals who express their interests in products attributes namely, ability to recycle and state of product chemical composition thereby demonstrating preference to products which are organic, energy saving and comprised of biodegradable packaging material. Hence, both environmental issues and health reasons explain why green consumers demonstrate greater preference towards green products. In this way firms which do not incorporate green activities will experience increased consumer boycotts and loss of revenue thereby depriving the company of specific customer bases and even lose their business operational licenses (Lavorata, 2014).

Green employees

Green employees view regarding environmental sustainability represent psychological approaches which have in recent years put pressure on firms to

incorporate environmentally sound initiatives (Yu et al., 2009). In this regard, employees view about the company's policy and procedures indicate personalised value-oriented schemas deployed to reflect workplace information and environment along with adopted behaviours and norms (Waldman et al., 2006). Green employee reports about the firm's environmental performance are also more nuanced and have greater impact when compared to their manager's perceptions (Wee and Quazi, 2005).

Research postulates that employees are now showing high preference and appreciation to work in environmentally oriented firms as such environments encourage improved job satisfaction (Fraj, Matute and Melero, 2015). For example, corporate environmental practices such as incorporating ISO certifications support good health and safety of the worker so employees become more committed to their work (Johnstone and Labonne, 2009). Furthermore, green buildings at the workplace support employee psychological gains and enhance better health and productivity benefits hence employees recommend such structures (Bozovic-Stamenovic et al., 2015). Studies show that employees prefer to undergo environmental training since such environmental knowledge increase their employability and marketability when they seek jobs in environmentally aware companies (Perron, Côté and Duffy, 2006). Green employees have also shown high preference and wants to be identified with companies which demonstrate creative and innovative environmental ideas (Amel et al., 2009).

Green employees have also been identified as "visible agents for change" who are instrumental towards incorporation of green new behaviours, expertise and ideas. Therefore a green reputation is imperative to attract and retain highly qualified employees who possess distinct knowledge to increase firm productivity (Daily et al., 2007; Del Brio et al., 2007). And is it is widely accepted that green employees represent the most valuable asset for any organisation. Accordingly, employees in a company with a green image stay longer instead of moving to another firm (Del Brio et al., 2007). Arguably, companies can utilise their green profile as a screening mechanism which attracts highly qualified and productive workforce. Green employees play an important role in this competitive economy as they are able to provide solutions to difficult problems besides encouraging customer loyalty

(Santolaria et al., 2011). In this respect, green employee dedication is significant towards ensuring firm continuance and survival (Chang, 2011; Johnstone and Labonne, 2009).

Green investors

Many institutional investors have begun to consider natural environmental demands on issues that involve decision making since business practices have resulted in substantial environmental damage (Bose and Pal, 2012). Hence, integrating the environment as an investment priority have resulted in investors requiring schemes, enterprises and portfolios that support environmental responsibility agendas and that promote positive compliance to environmental regulations on the firm's part (Griffin and Sun, 2013; Rao and Holt, 2005). Supporting this view, investors are also interested in making investments that produce environmental and social advantages, along with generating positive financial benefits (Antonietti and Marzucchi, 2013).

Therefore, green investors now prefer corporate practices that finance, monitor and evaluate practices which protects the natural environment through accounting and measuring environmental costs, cash flows, profitability, time value of money, along with data analysis (Menguc and Ozanne, 2005;Griffin and Sun, 2013). In this case, investors hold the perception that positive environmental performance by the company is a sign of production and allocation efficiency, superior supervision and control frameworks, and minimised danger of firm disasters (spills, accidents and so forth) (Garay and Font, 2012; Chien and Peng, 2012).

Thus investors can determine the way enterprises conduct their business activities so as to minimise externalities, along with reducing costs from environmental damages since they possess large and long-term portfolios in capital markets (Chung and Tsai, 2007). Hence, green investment is important to improve corporate productivity and creates better relations with the public. In addition, sound corporate green investment policies propel environmental sustainability, improve disclosure and fairness requirements concerning environmental issues and it builds suitable regulatory platforms on the firm's environmental performance (Chien and Shih, 2007). As well, investments options such as environmental auditing results in

improved green life cycle of a product (Chang and Chen, 2012; Chung and Wee, 2011).

Environmental interest groups

In the present day numerous environmental interest groups have emerged when compared with historical times (Norton, 2007). These interest groups are usually developed by particular individuals or entities who voluntarily interact to promote their environmental demands in support of public green interests (Mohiuddin, 2014; Chung and Wee, 2011). Varied activities that environmental interest group utilise to achieve, their environmental objectives are namely, “informal, discreet lobbying; formal lobbying; collecting and sending letters or petitions from the public; producing scientific research and reports; taking legal action; organizing demonstrations and marches; staging media stunts; promoting consumer boycotts; engaging in non-violent direct action; engaging in violent direct action” (Binder and Neumayer, 2005: 529).

In this regard many environmental interest groups worldwide have indicated willingness and capability to promote and support environmental preservation, efficient natural resource use and environmental restoration initiatives in a coordinated approach in relation to firm performance (Haigh and Griffiths, 2007; Fielding, McDonald and Louis, 2008). Environmental advocates have also been reported to provide technical assistance to firms in order to promote adoption of new environmentally compatible technologies (Yin and Powers, 2010). Some interest groups offer companies prospects to acquire the much needed green experience at very reduced risks (Lun, 2011). In some cases, environmental interest groups have also employed media to inform decision makers’ about public perceptions regarding particular environmental issues besides setting up policy discussions and agenda by deploying media (Binder and Neumayer, 2005).

Therefore, since the environment, green government, green consumers, green employees, green investors and environmental interest groups are corporate stakeholders, the stakeholder theory was an appropriate one for this study. Firms’ greening initiatives should recognise the demands of such significant corporate

stakeholders as the survival of the modern day firm lies on meeting the interests of the environment and the society at large.

2.4.2 Goal-Framing Theory

The goal-framing theory (Lindenberg, 2008; Lindenberg and Steg, 2007), has been linked to corporate environmental behaviour (Oikonomou, Becchis, Steg and Russolillo, 2009). Lindenberg and Steg (2007:117) assert that "goals frame the way people process information and act on it". Therefore, when people set a goal, they are more likely to be receptive to information that can assist in actualising the goal. Since the framed goals affect how people receive, process and act upon information (Lindenberg, 2008), the goal framing theory fits the context of corporate environmental behaviour as corporations set goals that are dictated by adherence to emerging environmental and social issues (Chang and Chen, 2013; Wei et al., 2011). In the corporate context, profitability is the core goal; but to achieve this goal, the corporation must maintain a sound corporate image; hence corporate image has also become a vital goal (Chien and Peng, 2012).

In order to achieve its profit and image goals, the corporation becomes more receptive to environmental policies and thus works towards a practical application of public environmental expectations by adhering to regulations through environmental consciousness (Chen et al., 2006; Santolaria et al., 2011). Thus, it is evident that profitability, corporate image, environmental legislation and environmental consciousness represent multiple corporate motivations which influence a company's environmental behaviour in adopting green investment practices; hence, they are not homogenous (Lindenberg, 2008). Activating the focal goal (in this case, profitability) is the main influence on corporate environmental information processing since it represents the goal-frame (Lindenberg and Steg, 2007). The other goals, namely, corporate image, environmental legislation and environmental consciousness can capably heighten or minimise the ability or strength of the focal goal (profitability).

This implies that the company not only supports profitability but other goals as well. It is possible that all the goals can be simultaneously active (Lindenberg, 2008; Managi, Opaluch, Jin and Grigalunas, 2005; Potts, 2010; Wu et al., 2011).

Consequently, when background goals, namely, corporate image, environmental legislation and environmental consciousness are compatible with the focal goal (profitability), they are able to empower and strengthen profitability. However, if the background goals are in conflict with one another, they are likely to weaken the focal goal (profitability) (Lindenberg and Steg, 2007).

In some cases the constraints maybe so serious that goals (environmental legislation, corporate image, profitability and environmental consciousness) adds less significant difference to the results thereby making it difficult to investigate such motivations. Nonetheless, the goal-framing theory also adds that environmental behaviour is also categorised within the domain of morality in person's mind. This perspective indicates that normative issues exercise a major-role in motivating the company to participate in green investment practices. In this regard, the company's behavioural choices lie on the decision the firm make regarding what is right or wrong.

Given global environmental change issues such as climate change as a result of global warming and the heightening greenhouse gas emissions that results in pollution; such environmental concerns eventually stimulates the company's pro-environmental conduct which results in high engagement with green investment initiatives. Lindenberg and Steg (2007:118) also postulates that "….environmental intent is only one of the factors affecting behavior, and in many cases not even the most important one." As such, firm participation in green investment activities which is a pro-environmental behaviour may be the desire to achieve cost efficiency that improve firm profitability, desire to create a positive green image in light of green stakeholders' demands and the desire to meet green regulatory interests so as to avoid litigations which may increase firm costs.

Lindenberg and Steg (2007:123) further highlights that "Emotional reactions to environmental problems also appear to be related to pro-environmental behavior." As such the current global environmental challenges, amongst others, expanding desertification, rising sea levels, extended deforestation, increasingly periodic heat waves, frequent hurricane and cyclone activity along with high prevalence of destructive floods are most likely to trigger intense emotions within individuals in the company such that they become more pro-environmental aligned thereby increasing

investment in green practices. Thus, the goal-framing theory highlights that emotional affinity to natural environmental issues influence environmental protection behaviour.

Arguably, individuals who are constituted with high environmental concern are also highly interested in the environmental consequences such that they tend to participate more in green investment initiatives so as to minimise the associated negative environmental consequences. It follows that "……high environmental concern is associated with acting more pro-environmentally" (Lindenberg and Steg, 2007:125). Hence, such corporate norms (feelings of moral obligation) of engaging in improved green investment activity are stimulated when the company is conscious of the adverse effects of business as usual activities to both the human society and the natural environment and when such a company actually understand that they can just take the responsibility to avert the negative effects of climate change and pollution.

The goal framing theory was appropriate for this study as the researcher sought to demonstrate how the variables, namely, profitability, corporate image, environmental legislation and environmental consciousness influence firms' green investment initiatives (Oikonomou et al., 2009; Chan et al., 2012; Berrone and Gomez-Mejia, 2009; Chang and Chen, 2013). As well, the theory also highlights that moral obligation issues also stimulate the company to participate in green investment practices. Previous studies that support the goal framing theory in corporate environmental behaviour practices include Oikonomou et al. (2009) and Lindenberg and Steg (2007).

2.5 Summary of Chapter 2

This chapter initially reviewed the literature on green investment practices. Common green initiatives were identified at both international and African levels. Common green programmes include green buildings, green loans, carbon management models, green supply chains, environmental certification (ISO 14001), eco-design, energy efficiency models and waste management. The second section examined the role of corporate green investment practices in sustainable development. Amongst other things, such practices propel green innovation, enhance the preservation of the natural environment, promote health and safety, foster green education and

encourage reduced use of fossil fuels. This chapter also presented the theoretical framework adopted for this study. The stakeholder theory highlights that including the natural environment as an important stakeholder along with green government, green consumers, green employees, green investors and environmental interest groups demands in the company would promote corporate environmental initiatives. Finally, the goal-framing theory illustrates how the corporate objectives of profitability and good reputation may propel corporate environmental goals; therefore, contemporary corporate environmentalism should mean that the goal of corporate profitability incorporates environmental initiatives to ensure success.

CHAPTER 3

HYPOTHESIS DEVELOPMENT

ENVIRONMENTAL LEGISLATION AND CORPORATE GREEN INVESTMENT PRACTICES

3.1 Introduction

This chapter consists of two main sections. The first presents international findings on the relationship between environmental legislation and corporate green investment activities. This is followed by a review of the African perspective. The final section provides a summary of Chapter 3.

3.2 The International Perspective

Environmental legislation advanced at the end of the twentieth century and has continued to evolve (Burnett and Hansen, 2008). The global literature notes that there is a positive relationship between environmental legislation and firm green investment initiatives. For example, the Environmental Protection Agency (EPA), an agency based in the United States (US), was created to protect the natural environment and human health through developing environmental regulations that comply with established law. It has been found that firms that comply with regulations commit fewer environmental offences and are thus liable for less fines and charges. Furthermore, facilities which voluntarily report to the EPA experience fewer subsequent inspections (Stafford, 2007). The EPA motivates firms to adopt environmental compliance practices in line with industry-specific standards (Decker and Pope, 2005) and promotes approaches that minimise carbon emissions (Gray and Shimshack, 2011).

Therefore, whilst the contexts of EPA related studies are different; 631 000 regulated waste plants extracted from the EPA's RCRAInfor database (Stafford, 2007); four studied industries - chemical, pulp and paper, iron and steel, petroleum refining (Decker and Pope, 2005) and U.S state industrial pollution (Gray and Shimshack, 2011) - the regulations stimulated green investment activities. Other US studies pertaining to the association between environmental legislation and corporate environmental practices were also identified for the purpose of this study.

US environmental laws require companies to adopt environmental initiatives that reduce pollution (Burnett and Hansen, 2008) and are thus fundamental in discouraging environmental offences. Furthermore, firms that violate environmental requirements experience a decrease in the market value of their equity due to high legal charges (Karpoff, Lott and Wehrly, 2005). In addition, environmental regulations trigger spill-over effects in that, if one industry is fined, other industries that commit environmental crimes will be charged, thereby stimulating firms' cooperation in order to avoid fines (Shimshack and Ward, 2005). Companies that do not meet environmental benchmarks suffer diminishing stock returns (Wei et al., 2011). These US-based findings are similar in that they suggest that non-adherence to environmental laws generates negative financial effects, although not in the same way or to the same extent. This suggests that there is a positive relationship between corporate environmental initiatives and environmental regulation.

Other studies in the US point to a favourable relationship between environmental legislation and corporate green investment initiatives. For instance, environmental regulations are instrumental in fostering superior green competitiveness as they cause managers to invest more in environmental practices (Berrone and Gomez-Mejia, 2009) and garner organisational support for other green laws such as those promoting renewable energy sources (Menz, 2005; Yin and Powers, 2010) like wind energy (Menz and Vachon, 2006).

Menz (2005), Yin and Powers (2010) and Menz and Vachon (2006) investigated the Renewable Portfolio Standard (RPS) (a regulation that requires an electricity supplier to supply a minimum percentage of its electricity to its customers in the form of renewable energy) and concluded that the RPS had a positive correlation with growth and the adoption of green energy within US enterprises. Green energy is one of the environmental practices that US companies have adopted in order to comply with environmental regulations and maintain their market competence. Menz (2005); Yin and Powers (2010); Menz and Vachon (2006) and Berrone and Gomez-Mejia (2009) highlight, that environmental laws induce firms to adopt a green strategy.

Research conducted in the state of Oregon, US also demonstrates that environmental laws cause enterprises to adopt independent environmental management initiatives (Jones, 2010); stimulate firms to adopt expanded

environmental activities, leading to over-compliance (Wu, 2009) and motivate companies to adopt environmental activities that align with other firms in order to optimise the financial benefits (Khanna, Koss, Jones and Ervin, 2007). Jones (2010), Wu (2009) and Khanna et al. (2007) investigated the construction, food, wood, computer and electronics, and transport and accommodation industries in Oregon and generated similar findings. While the size of the industries was not the same, these researchers agree that environmental regulations stimulate firms to adopt green practices.

Studies in European corporate settings support the view that environmental laws influence firms' green investment activities. For instance, environmental regulations have been instrumental in promoting energy efficiency (Barker et al., 2011) and have caused Spanish ceramic tile manufacturers to place environmental issues at the top of their business agenda in order to minimise costs and enhance performance (Gabaldón-Estevan et al., 2014). As such, environmental regulations promote transformation in manufacturing technology and the productive capacity of firms (Bokusheva, Kumbhakar and Lehmann, 2012) and when they take the form of environmental certification (that is ISO 14001: 2004 and ISO 9001: 2000) they promote green investment practice and competitiveness (Bernardo et al., 2009; Lagodimos, Chountalas and Chatzi, 2007).

Bernardo et al. (2009) and Lagodimos et al.'s (2007) studies on the impact of ISO regulations on European firms' green investment initiatives generated similar findings to those of Bokusheva et al. (2012), Barker et al. (2011) and Gabaldón-Estevan et al. (2014) who examined European environmental laws in general and noted that environmental laws motivate green activity on the part of firms. These outcomes illustrate how European governments have employed environmental legislative instruments to demand that firms adopt green investment practices. The current study aimed to bridge the African corporate settings "gap" by investigating whether environmental regulations spur improved corporate green investment initiatives.

Studies conducted in Germany also show that environmental legislation has been significant in forcing companies to minimise their carbon emissions, prevent the generation of hazardous materials and improve recycling procedures (Horbach et al., 2012) in addition to improving environmental product innovation (Rehfeld, Renning

and Ziegler, 2007). Rehfeld et al. (2007) analysed 371 manufacturing companies while Horbach et al. (2012) examined 2 952 German firms in diverse industrial sectors (energy, water services, mining and manufacturing, and service industries). Their results point to the significance of environmental regulations in spurring corporate green activity. Studies in Organisation for Economic Co-operation and Development (OECD) countries produced similar results.

Since environmental regulations influence firms to voluntarily embrace environmental initiatives (Johnstone, Serravalle, Scapecchi and Labonne, 2007), they are positively related to pollution reduction investment frameworks (end-of-pipe) (Frondel et al., 2007) as firms adopt a number of environmental supervision and control instruments (Johnstone and Labonne, 2009). The regulations also encourage increased environmental innovation in firms (Lanoie et al., 2007). While the scope of companies examined in the seven OECD countries (Japan, France, the USA, Hungary, Canada, Germany and Norway) was different, Johnstone et al. (2007), Frondel et al. (2007), Johnstone and Labonne (2009) and Lanoie et al.'s (2007) studies yielded similar findings and demonstrated that environmental regulations spur green investment initiatives.

In Australia, environmental laws put pressure on large companies to introduce cleaner production practices and to disclose their carbon emissions annually to the state regulator (Garnaut, 2008). Corporate executives become more aware of climate change and green compliance responsibilities (Price Waterhouse Coopers (PWC), 2008), thereby driving environmental innovation and environmental competitiveness (Ford, Steen and Verreynne, 2014.). Garnaut (2008), PWC (2008) and Ford et al.'s (2014) studies show that legislation is causing top management to become more involved in corporate green issues.

Studies in the UK have also found that environmental regulations motivate firms to implement green practices over and above what is required by the law (Jahdi, 2007). The law encourages companies to implement eco-innovation programmes (Demirel and Kesidou, 2011) and a lack of such programmes reduces the attractiveness of green energy adoption (Tassou et al., 2011). In addition, environmental laws support the incorporation of sustainability initiatives and mitigate 'greenwashing' tactics by firms by putting pressure on the company to disclose their sustainability activities

(Geerts, 2014) as well as motivating them to adopt clean technologies besides stimulating green product innovation (Smith and Crotty, 2006).

UK firms are also encouraged to incorporate microgeneration appliances (solar power, wind power, biomass, geothermal, and combined heat and power (CHP) in new and upgraded buildings (Roberts and Sims, 2008). The introduction of environmental legislation has resulted in high energy efficiency (Ekins, Summerton, Thoung and Lee, 2011) and induced firms to support environmentally sound manufacturing approaches in addition to promoting the production of environmentally friendly commodities (Webster and Ayatakshi, 2013). Studies by Geerts (2014), Smith and Crotty (2006), Roberts and Sims (2008), Ekins et al. (2011) and Webster and Ayatakshi (2013) in the UK suggest that firms' heightened environmental participation is associated with the impact of environmental legislation.

Environmental legislation has also been found to improve firms' environmental consciousness and environmental performance in Asian countries (Qi et al., 2012) where governments have encouraged firms to embrace green initiatives (Chung and Wee, 2011) such as greening their supply chains (Chen and Sheu, 2009). Environmental laws are the principal reason why Asian companies have adopted environmental benchmarks (Angel and Rock, 2005) and they have empowered firms to overcome inertia, stimulated the incorporation of new environmentally-oriented perspectives, encouraged corporate environmental consciousness and inspired the removal of out-dated equipment and investment in environmentally friendly technology (Eiadat et al., 2008). Eiadat et al. (2008); Angel and Rock (2005); Qi et al. (2012), Chung and Wee (2011) and Chen and Sheu (2009) note that environmental regulations motivate green practices among firms in China, Taiwan, Malaysia, Jordan and Thailand.

Environmental regulations encourage firms to set eco-innovation standards (Popp, Hafner and Johnstone, 2011) by putting pressure on companies to support green innovation (Popp, 2006). This has led to significant reductions in carbon emissions (Sterner, 2012). In the same vein, green laws that are instituted in one country can motivate green innovation in other industries in different countries (Jacob et al., 2006). Studies by Popp (2006), Popp et al. (2011), Sterner (2012) and Jacob et al. (2006) in different countries, including Japan, the US, Finland, Canada, Germany,

and Sweden illustrate that firms are highly likely to implement green investment activities as a result of environmental legislation. Studies that span global contexts demonstrate similar results.

The *Fortune* global survey found that companies that operate in countries whose civil law imposes mandatory environmental regulations implement extensive sustainability programmes (Kolk and Perego, 2008). Such regulations force firms to increase the portion of resources allocated to environmental initiatives, thereby increasing the probability of corporate environmental reporting (Sinkin et al., 2008). Kolk and Perego (2008) and Sinkin et al. (2008) investigated the same companies and highlighted that some firms comply with environmental statutes which improve corporate environmental engagement in order to remain in business. Moreover, environmental regulations have a positive effect on the long-term environmental outlook and performance of the firm (Peuckert, 2014). Whilst Peuckert's (2014) research sourced data from 43 countries, its outcomes are compatible with those of Kolk and Perego (2008) and Sinkin et al. (2008) who analysed *Fortune* global firms and demonstrated that environmental laws spur green investment initiatives by companies.

3.2.1 International literature which demonstrates a zero and/or neutral relationship between environmental legislation and corporate green investment practices

Some studies in international contexts have found that environmental legislation and corporate green investment activities produce a zero or neutral association. For example, environmental regulations influence companies' propensity to adopt green initiatives but not the decision to incorporate green practices, such that environmental certification generates diverse environmental performance among firms (King, Lenox and Terlaak, 2005). This suggests that the effects of environmental legislation vary significantly across firms (Barla, 2007) and in some cases there are no consistent and significant favourable effects on corporate environmental performance (Hertin, Berkhout, Wagner and Tyteca, 2008). This exposes two weaknesses of environmental law: the failure to measure firms' environmental performance and how exactly environmental standards are expected to promote corporate environmental performance (Nawrocka and Parker, 2009). King et al. (2005), Barla (2007), Hertin et al. (2008) and Nawrocka and Parker's

(2009) studies produces mixed findings on whether or not environmental regulations motivate green practices among firms, although all these studies examined the operation of ISO environmental certification in corporate contexts.

Similarly, the enforcement of environmental laws shows a negative association with the stock market when an environmental offence is filed but there is no relationship with the settlement date (Badrinath and Bolster, 1996), such that when command and control laws are compared with other less stringent regulations there is no considerable variance in the results in terms of a firm's environmental performance (Sharma, 2001). In this regard, the purpose of environmental legislation is somewhat contradictory, as some firms can take advantage of ambiguity in the legislation and pretend to be environmentally oriented in order to mislead the regulator (Barlett and Steele, 2003). While Badrinath and Bolster (1996), Sharma (2001) and Barlett and Steele's (2003) studies were all carried out in industrial settings (although the locations were different) they produced conflicting findings on the effects of environmental laws on firms' environmental performance.

There is no evidence of a definite relationship between environmental legislation and competitive organisational environmental performance (Jenkins, 1998) as well as no relationship with company environmental engagement (Triebswetter and Wackerbauer, 2008). While such legislation has been found to have a considerable impact on eco-innovation in some situations, eco-innovation and environmental accomplishments have not been absolutely related to environmental regulations (Belin et al., 2009). Furthermore, stringent regulations result in improved green innovation among firms, but there is mixed evidence on a strong association with total firm environmental performance (Ambec et al., 2013) and when green laws are enforced that promote corporate eco-innovation activities there is no connection with a firm's environmental competitive performance (Dong et al., 2014).

In some surveys green legislations have found a small but positive relationship with large polluting firms' (that is, the petroleum and plastics industries) greening practices, but no statistically significant effect was discerned on pulp and paper or steel firms that are also responsible for pollution (Morgenstern et al., 2002). Dong et al. (2014), Jenkins (1998), and Triebswetter and Wackerbauer (2008) found that

there were no relationships whilst Morgenstern et al. (2002), Belin et al. (2009) and Ambec et al.'s (2013) findings are mixed.

Some North American companies adopt environmental certification such as ISO 14000 but use it to gain legitimacy and as marketing tool without having any positive environmental impact while in Western Europe, it has been found that companies that accept such standards achieve improved environmentally-oriented results (Wiengarten, Pagell and Fynes, 2013; Boiral, 2007). Similarly, some suppliers use ISO 14000 as a marketing instrument without having a positive environmental impact (Jiang and Bansal, 2003). Gavronski, Paiva, Teixeira and Ferreira de Andrade (2013) study on the effect of environmental ISO standards in Brazil found that some firms were environmentally oriented, while others used environmental regulations to market their firms and reap rewards and a third group used such regulations to both improve environmental performance and market their companies.

Studies by Wiengarten et al. (2013), Boiral (2007), Jiang and Bansal (2003) and Gavronski et al. (2013) show mixed results, indicating that, amongst other motives (rewards, legitimacy, and actual environmental engagement) some firms use environmental legislation as marketing tools.

Moreover, administrative-oriented (direct) environmental legislation has been found to have a strong and significant favourable effect on corporate environmental innovation, in contrast with market-oriented environmental legislation that shows a strong positive association with corporate transformation towards green development practices (Zhao, Yue Zhao, Zeng and Zhang, 2015). Some studies conclude that ISO 14001 certified firms have more established; systematic and formal environmental management frameworks than Eco-Lighthouse certified companies (Granly and Welo, 2014). Thus, environmental law affects industries differently. In the agro-processing industry, it has been found to negatively affect environmental efficiency, while the opposite is the case in the manufacturing industry (Bynoe, 2004). Industry regulations have produced less effective results than government green legislation (Vogel, 2008). Hence, regulations can be both an opportunity and threat and should be complemented by voluntary environmental activities as laws tend to be more effective in the long-run (Korhonen, Patari, Toppinen and Tuppura, 2015).

3.2.2 International literature which indicates that environmental legislation does not influence corporate green investment practices

This section begins by examining previous studies which demonstrate that environmental laws do not influence firms' green investment initiatives in the USA. Environmental legislation that imposes certain specifications discourages innovation since it requires the adoption of particular technology and environmental benchmarks (Managi et al., 2005). For example, regulations that require companies to adopt inefficient water and air pollution reduction techniques have been found to reduce production capacity by up to 9% (Boyd and McClelland, 1999). Furthermore, such legislation enables regulators to use the information disclosed by companies to build a case against organisations thus discouraging corporate environmental initiatives (Peters and Romi, 2013).

These studies investigated the USA's most polluting industries, paper manufacturing plants (Boyd and McClelland, 1999); the oil and gas industries (Managi et al., 2005); and 300 polluting industries that the United States Environmental Protection Agency (US-EPA) imposed sanctions on between 1996 and 2005 (Peters and Romi, 2013). Boyd and McClelland (1999) concur with Managi et al. (2005) and Peters and Romi (2013) that environmental legislation does not spur green investment practice.

Moreover, fines and penalties imposed on a firm for not being compliant cause managers to perceive such legislation as a threat, which may hinder environmental innovation as well as structural upgrading (Jackson and Dutton, 1988). Thus, legislation is not important in influencing the adoption of renewable energy (Delmas et al., 2007) since it prevents firms from achieving profitability levels that will enable investment in improved production methods, the acquisition of green technology and being able to undertake green R&D. Furthermore, regulated firms' unregulated competitors have a long-term competitive advantage (Thomas, 2009). Thus, while conducted in different industries, studies in the US (Jackson and Dutton, 1988; Delmas et al., 2007 and Thomas, 2009) found that environmental legislation does not stimulate firms' environmental engagement.

Furthermore, organisational studies in the US have shown that the improvements required in terms of environmental legislation are implemented very slowly, lack continuity, do not always apply to various corporate activities and discourage green innovation (pollution prevention practices), thereby discouraging corporate green investment (Heaton and Banks, 1997) as they result in a considerable decrease in the number of firms in various industrial sectors as a result of environmental underperformance (Pashigian, 1984). Environmental regulations have been associated with high costs and are less effective than voluntary environmental practices (Segerson and Miceli, 1998). They do not promote long-term company commitment to green designs as they cause increased depreciation of materials and thus the need for more asset replacement (Agrawal and Ulku, 2011). Pashigian (1984); Heaton and Banks (1997); Segerson and Miceli (1998) and Agrawal and Ulku (2011)'s studies in Europe concur that environmental regulations do not influence corporate green investment practices.

The enforcement of environmental regulations in non-energy intensive sectors (distribution and retail, hotel and catering and many more) has been found to offer more benefits than in energy intensive sectors (air transport, mining, utilities and many more), resulting in the economic underdevelopment of the latter (Ekins, Pollitt, Summerton and Chewpreecha, 2012). Indeed, regulation in the form of environmental taxes hampers economic progress (Cremer, Gahvari and Ladoux, 2010) since imposed standards and benchmarks restrict firms' capacity to integrate green activities, thereby discouraging greening and improved competence (Getimis and Giannakourou, 2001). It has also been found that environmental legislation does not promote environmental innovation, which results in managers overlooking environmental issues (Mickwitz, Hyvättinen and Kivimaa, 2008) and those that are undertaken are the result of the need to comply rather than management commitment to the environment (López-Gamero, Molina-Azorín and Claver-Cortés, 2010).

Studies on the impact of diverse environmental regulations on the adoption of environmentally compatible technologies in different European countries (France, Finland, Spain, Greece and other selected EU countries) also established negative

relationships between the imposition of environmental legislation and firms' green investment initiatives.

Environmental laws have a negative relationship with eco-innovation practices (Rehfeld et al., 2007) and their regulatory frameworks (waste water, air pollution and waste packaging) and do not significantly influence firm competiveness regardless of productive capacity (high or low) (Triebswetter and Hitchens, 2005). Rehfeld et al. (2007) and Triebswetter and Hitchens' (2005) multiple case studies of German firms concur that environmental legislation has failed to stimulate green investment.

A UK multiple case study also found that environmental regulations have not generated the required results owing to poor communication, resource challenges and a lack of incentives (Zhuang and Synodinos, 1997). Thus, command and control (direct) environmental laws hinder firms' green innovation capability and international competitiveness, with the result that governments are seeking policy alternatives (BIS, 2012). Some studies have suggested that environmental policy tools that offer companies incentives through market operations tend to produce better results than direct environmental legislation (Bergquist, Söderholm, Kinneryd, Lindmark and Söderholm, 2013).

Studies conducted in Canada have found that environmental legislation is negatively related to corporate environmental reporting (Li et al., 1997) as firms are exposed to potential environmental liabilities as well as negative market rating (Cormier and Magnan, 1997). These studies analysed the impact of environmental legislation on corporate environmental activities in the same industries (metallurgical, transport, forestry, food processing, utilities, mining, pulp and paper, chemical and other manufacturing) in Ontario, Canada. Li et al. (1997) and Cormier and Magnan's (1997) research illustrates that environmental legislation does not motivate environmental commitment among companies. Hanna's (2009) study points out that some environmental laws are not effective and regulators are required to enforce compliance. Thus, Li et al. (1997), Cormier and Magnan (1997) and Hanna's (2009) findings concur that environmental laws do not influence firms' green investment activities.

Globally, countries have used environmental legislation to stimulate companies to undertake green investment activities. The literature reviewed for the current study suggests that such legislation has been significant in motivating corporate green policy adoption and investment through improved environmental compliance (Earnhart, Khanna and Lyon, 2014; Sánchez-Medina, Díaz-Pichardo, Bautista-Cruz and Toledo-López, 2015). Thus, the arguments for environmental legislation as a factor that motivates firms' green investment practices appear to outweigh the arguments against it or the results are mixed. These conflicting findings motivated this study that examined the South African context in order to identify outcomes that are country-specific.

The following section examines environmental laws and company green practices from the African perspective.

3.3 The African perspective

The African literature suggests that environmental legislation has a positive association with firms' green investment practices. For instance, environmental regulations are important in stimulating green innovation which ultimately reduces greenhouse gas emissions resulting from corporate operations (Tyler, Du Toit and Dunn, 2009b) as they spur energy efficiency and promote mechanisms which achieve zero-carbon targets in industries (power production, oil refineries, other energy-intensive firms and synfuels) (Mbadlanyana, 2013). Thus, regulations such as a carbon tax reduce firms' carbon footprint, improve green R&D and enhance green innovation capacity (McNamara and Curran, 2013). South African studies generally confirm that industrial carbon emissions can be reduced through the introduction of tough green legislation, positively impacting climate change mitigation.

Other South African studies suggest that environmental laws motivate firms' green investment activities. For example, the introduction of environmental legislation has enabled the South African Department of Energy to promote company green investment initiatives. Effective February 2012, companies are now required by law to disclose their carbon footprint (Mnguni and Tucker, 2012). Such regulations put pressure on firms to introduce green investment principles that reduce their carbon emissions (CDP, 2014) and encourage them to formulate green policies (Ali and

Ahmad, 2013) that identify the green initiatives they plan to adopt (Maia, Giordano, Kelder, Bardien, Bodibe and Du Plooy, 2011). Mbadlanyana (2013), Mnguni and Tucker (2012), CDP (2014), Ali and Ahmad (2013) and Maia et al.'s (2011) studies illustrate that environmental regulations are significant in stimulating green initiatives among South African companies. Non-greening firms will ultimately be forced to introduce corporate green investment programmes.

While various South African studies have shown that environmental legislation spurs corporate green activity, the lack of stringent enforcement compared to countries such as the US, Germany and Japan has yielded poor results (SAPIA, 2008). Strong laws enhance green intervention and monitoring practices (BuaNews, 2011a) and motivate environmentally sound activities in firms that deal with fluorocarbons (Stats SA, 2010). They also impose stringent responsibilities on specific firms that emit high levels of pollution, thereby promoting cleaner production (Bowman Gilfillan, 2014). Studies by SAPIA (2008), BuaNews (2011a), Stats SA (2010) and Bowman Gilfillan (2014) support tough command and control environmental regulations as principal instruments to spur green investment activity. As such, they support the South Africa's Climate Change Response Policy's strategic priorities to promote corporate environmental sustainability.

Environmental legislation in South Africa also promotes green company buildings (Mnguni and Tucker, 2012; CIDB, 2009). Various regulations (the Companies Act 71 of 2008, JSE listing requirements, case law and the King III Report) (Esser, 2011) set out the environmental practices expected of South African firms, including disclosing their carbon footprint, undertaking green programmes and establishing environmentally friendly frameworks (Property24, 2012). South African environmental regulatory tools also encourage firms to implement climate change mitigation initiatives that go beyond compliance (Bowman Gilfillan, 2011) and govern the implementation of Clean Development Mechanisms (CDMs) that lead to cleaner manufacturing initiatives (Tucker, 2012).

Mnguni and Tucker (2012), CIDB (2009), Esser (2011), Property24 (2012), Bowman Gilfillan (2011) and Tucker (2012) scrutinised existing South African environmental regulatory instruments (namely, the South Africa National Building Regulations and Building Standards Act 103 of 1977 as amended, the National Environmental

Management Act: Air Quality Act of 2004, South African National Environmental Act of 1998, Companies Act 71 of 2008, JSE listing requirements, and the King III Report) and reached similar conclusions. Overall, they highlight that the introduction of environmental legislation (and other laws that include provisions relating to the environment) positively influence the adoption of green practices by firms.

Environmental regulations influence organisations to become environmentally oriented in order to promote rights that enhance human well-being, environmental preservation and healthy indoor air quality (Hesloop, 2006); monitor mining operations (sidestream, upstream and downstream) and support environmental protection (Yazini, 2012); and adopt energy efficiency and other carbon reduction practices in order to reduce the risks of non-compliance with environmental regulations (closure of the company, hefty penalties) (Tshesane and Seroka, 2012), and empower the evolution and advancement of green technologies (Vermuelen, 2013). Tshesane and Seroka (2012) and Vermuelen (2013) found that regulation of corporate energy usage motivates green investment practices in South Africa. Hesloop (2006) and Yazini (2012) also concluded that South Africa's pollution prevention laws propel corporate green investment practice.

3.3.1 African literature which illustrates that environmental legislation does not influence corporate green investment practices

Some studies conducted in African corporate settings found that environmental legislation does not influence corporate green investment activities. Environmental laws were found to have negative consequences for business operations and overall economic performance. South Africa largely depends on coal (a fossil fuel which emits high carbon emissions) for energy (SAICA News, 2009). Regulations have restricted the production output of polluting companies (South African Treasury, 2010). This puts a strain on already limited company resources which makes it difficult for firms to integrate Green Supply Chain Management (GSCM) practices (Tech-pro, 2014).

Studies on high carbon emitting companies by SAICA News (2009), the South African Treasury (2010) and Tech-pro (2014) agree that environmental laws do not result in improved green performance. Reports also adds that such regulations are rigid and lack specificity which negatively affects firms' capacity to negotiate

environmental policy (Preston, 2011). Some laws are not applicable at company level and are mired in bureaucracy, which negatively impacts integration by firms (Eneh, 2011). Preston's (2011) study of South African companies and Eneh's (2011) research in Nigeria conclude that environmental regulations lack the capacity to stimulate environmental participation by firms.

In a separate but related argument, other South African studies highlight that some companies have integrated extended green programmes (evidenced through reporting, target setting, mitigation activities and green management) in the absence of green legislation requirements (Green, 2011). In the same vein, environmental regulations have not been developed to cover issues relating to commercial employment of green technologies; hence, support for environmental policy at corporate level is low (Zeroco2, 2012). Finally, while the legislation has changed continuously, corporate commitment to integrating green energy technologies and other carbon-offset plans has been negatively affected (Burger, 2011) because, while such legislation addresses international concerns, it does not take the specific interests of the South African economy and society into account (Tshautshau, 2013). Therefore, whilst these studies examined diverse issues, they all conclude that environmental legislation has not motivated corporate green investment.

South African environmental regulatory mechanisms have managed to control emissions at source, but some emissions standards are not clarified which results in ineffective implementation of environmental practices (PMG, 2013). For example, there is considerable uncertainty as to how effective the proposed carbon tax will be in changing South African industries' practices (Mathews, 2013). Regulatory uncertainty in relation to climate change issues has hampered companies' ability to develop green initiatives and even to expand to international markets (McKay, 2013). Unequal development of environmental legislation and public policies that address climate change as well as a lack of legal clarity (PMG, 2013; Mathews, 2013; and McKay, 2013) have a negative effect on the green investment initiatives of some South African corporations.

Studies point out that South Africa's environmental regulations are comprised of numerous, dispersed and unrelated laws with conflicting indicators which does not motivate enterprises to expand their environmental practices (Department of Trade &

Industry, 2013) and has therefore not boosted corporate accountability in relation to green issues (TRF, 2014).

From the above analysis, it is clear that there are conflicting opinions on whether or not environmental legislation influences firm green investment practices in the African context. Furthermore, there is a paucity of research on this issue. Much of the literature takes the form of blogs, company websites, online newspapers and the views of the editors of firms' websites that have not conducted actual studies on the companies involved, but merely echo their views. Therefore, the current study represents original research that sought to determine whether environmental legislation spurs firms' green investment practices.

Table 3.1 below illustrates a summarised analysis of the relationship between environmental legislation and corporate green investment practice from examined literature.

Table 3.1: Relationship between Environmental Legislation and Corporate Green Investment Practice from Examined Literature

Author and Date	**Main finding**	**Method**	**Implications for further study**
Gray and Shimshack (2011)	Positive relationship	Investigated the impact of Environmental Protection Agency and the US government green practices.	Economists and other important firm stakeholder perspectives about environmental regulations is significant.
Wei et al. (2011)	Positive relationship	Examined firm environmental law suits filed in US circuit courts from 1980 to 2001.	Which pollution reduction measures can the company adopt to minimise costs. Examine other US environmental laws

			besides the EPA Superfund statute.
Sinkin et al. (2008)	Positive relationship	Scrutinised US government sustainability reports, and Business Council for Sustainable Development (WBCSD) reports	How diversified natural resources regulatory tools can be effectively employed to sustainably improve company value.
Wiengarten et al. (2013)	Mixed relationship	Studied EMS (ISO 14000, firm internal EMS) adoption in North American and Western Europe companies.	Explore more encompassing environmental performance measures than ISO 14000 along with investigating an expanded corporate responsibility strategy that embrace both environmental and social concerns.
Granly and Welo (2014)	Mixed relationship	Compared EMS frameworks of 9 ISO certified and Eco-lighthouse certified Norwegian metal processing small and medium firms.	Which policy measures could be adopted to support effective compatible operation of ISO and Eco-lighthouse certifications.
Zhao et al. (2015)	Mixed relationship	Examined the impact of	Study the coordination, along with ground of

		administrative-based environmental regulation (command-and-control regulation) (AER) and market-based environmental regulation (MER) on Chinese electric iron and steel state controlled companies.	playing roles between AER and MER.
Delmas et al. (2007)	Negative relationship	Analysed how economic deregulation has an effect on company policy and its environmental quality in the electric utility industry.	How social differentiation (consumer social issues) besides environmental differentiation (green consumer behaviours) can be utilised to command premium pricing on the market.
Cremer et al. (2010)	Negative relationship	Investigated Environmental tax implementation in France.	Compute optimised tax frameworks for other countries, besides France.
Bergquist et al. (2013)	Negative relationship	Appraised environmental compliance of Swedish firms from	Survey context specific environmental policies and determine their

		1970 to 1990 using case based methodological techniques.	effectiveness.

Hence, from the foregoing literature review, the first research hypothesis is stated thus:

$H0_1$: Environmental legislation does not influence green investment practices in JSE listed firms.

3.4 Summary of Chapter 3

Chapter 3 reviewed the international and African literature on the relationship between environmental legislation and corporate green investment practices. Whilst some previous studies found that environmental legislation influences green investment practices, others found a negative association between environmental legislation and firm green investment practices. However, some studies produced mixed findings in this regard. The implications of these studies include amongst others, investigating context particular green regulations and ascertain associated impacts; extending environmental law effect on corporate green practice research to other regions then compare findings and surveying compatibility of diversified environmental legislations in corporate operational activity.

CHAPTER 4

HYPOTHESIS DEVELOPMENT

CORPORATE IMAGE AND CORPORATE GREEN INVESTMENT PRACTICES

4.1 Introduction

This chapter is made up of two main sections, namely, the international perspective and the African perspective on firm image and green investment practices. The final section presents a summary of Chapter 4.

4.2 The international perspective

Corporate image has been defined as the perceptions held by a firm's external and internal partners (Melo and Garrido-Morgado, 2011). The international literature emphasises that corporate reputation promotes corporate green initiatives. Studies conducted in the US note that firm reputation influences organisational green investment practice. It follows that the need for a positive corporate image puts pressure on firms to voluntarily integrate initiatives to reduce pollution (Innes and Sam, 2008). Firms that do not have a good reputation relationship with their customers are motivated to integrate green practices such as the EPA's Green Lights (GL) voluntary programme (Moon and DeLeon, 2007). Effective green marketing policies also sustains a firm's favourable image since consumers' preference for green goods has become of great importance to firms' success (Han et al., 2010).

Innes and Sam (2008) and Moon and DeLeon's (2007) studies found that the need for a positive image influences firms' green investment activities. Han et al.'s (2010) study on the US hotel industry concurs. These studies demonstrate that firms with reduced green investment engagement are highly likely to experience negative market performance (response) when compared with firms with extended green practice adoption.

Studies conducted in the US reveal that a positive corporate image is connected to customers' willingness to purchase the firm's commodities and spread a positive

message about the enterprise (Han, Hsu and Lee, 2009). Given that today's consumers are increasingly green conscious, enterprises need to incorporate green practices in their activities, thereby enhancing customer satisfaction and their reputation and growth (Han and Kim, 2010). Han et al. (2009) and Han and Kim (2010) note that the need to enhance the firm's reputation motivates the incorporation of green practices as such activities are tools for corporate legitimacy.

Corporate image issues affect managers' political contexts (Independent directors, CEOs, Non-CEO founders, prior CEOs, political directors, democratic directors, republican directors, President's vote, Congress delegation). Managers respond to sustainability issues due to the increased political sensitivity of such issues and the impact on corporate visibility (DiGiuli and Kostovetsky, 2014). Firms with poor environmental reputations are exposed to negative political and public exposure (Cho and Patten, 2007). DiGiuli and Kostovetsky (2014) and Cho and Patten (2007) used the KLD database to examine whether American companies' reputation is associated with green initiatives. In the political context, stakeholder views were more favourable when the firm incorporated green investment activities. Thus, corporate environmental engagement has been used by firms as an efficient instrument to manage political pressures and crises.

Other studies on corporate reputation show that firms with a large or growing customer base had expanded green programmes while those with non-green (fossil fuel) programmes were in the process of reducing the number of non-green programmes as the firm's customer base increased in order to preserve their image (Delmas et al., 2010). Thus, environmentally certified commodities or management procedures motivate firms' environmental participation as they provide evidence to customers of the company's commitment to environmental preservation (King et al., 2005).

These studies confirm that many consumers favour green commodities and companies that are environmentally conscious benefit from increased willingness and loyalty on the part of green buyers to purchase their products. On the other hand, firms with poor green images create corporate brands that do not meet socially responsible standards and consumers tend to punish such brands. Hence, firms are expected to develop sustainable mechanisms that improve their brand's

marketability (Lee et al., 2015a). An organisation's involvement in long-term greening activities shows conformance to stakeholder requirements which, in turn, preserves the company's image (Byrd, Bosley and Dronberger, 2009).

Sustainability is instrumental in determining consumer perceptions of the firm, as consumers are more favourably inclined to social responsibility activities and demonstrate greater satisfaction and loyalty when sustainable practices are integrated (Gupta and Pirsch, 2008). For instance, eco-labelling policies address information asymmetry between manufacturers and customers, promote the credibility of a product and bestow a positive green image on a firm (Crespi and Marette, 2005). In addition, public reporting of corporate environmental information boosts stakeholder confidence in the firm, thereby promoting a positive reputation which can propel the firm to engage in further environmental practices (Yoeli, Hoffman, Rand and Nowak, 2013). Hence, a firm's participation in green investment initiatives protects its image as corporate visibility coupled with a reputation for addressing environmental issues is associated with sound environmental performance (Dawkins and Fraas, 2011).

Gupta and Pirsch (2008); Crespi and Marette (2005); Yoeli et al. (2013) and Dawkins and Fraas' (2011) studies on Canadian companies note that company reputation is associated with green investment activities. A study of high polluting Canadian industries shows that 'greenwashing' creates a bad image of a firm and is negatively associated with economic performance from a stakeholder point of view (Walker and Wan, 2012). Therefore, companies should ethically demonstrate their green responsibility through satisfying their stakeholders' green requirements. For instance, organisations that introduce green energy (hydro, wind, solar) create a positive green brand and green reputation (Berkhout and Rowlands, 2007). The Canadian literature notes that stakeholder approval increases when the company acquires a green reputation.

Aerts and Cormier's (2009) analysis of US and Canadian companies found that corporate environmental legitimacy was positively correlated to annual reporting on environmental issues (economic data) and positive media publicity, while negative environmental legitimacy resulted in unfavourable publicity. Companies that are

members of the Dow Jones Sustainability Index (DJSI) are perceived as having achieved a good sustainability image (Robinson, Kleffner and Bertels, 2011). Hence, companies regard climate change issues as a market opportunity that offers reputational benefits besides reaping financial benefits from the carbon market (Hoffman, 2005). Aerts and Cormier (2009), Robinson et al. (2011) and Hoffman's (2005) comparisons of US and Canadian firms note that, since society approves of companies engaging in environmental practices, companies seek to promote a green image.

Furthermore, green supply chain activities promote co-operation between the consumer and the firm and build mutual relationships that mitigate the negative environmental effects of the firm's operations and its products, as well as resolve green-related challenges (image protection) (Vachon and Klassen, 2006b). Mutually beneficial stakeholder relationships that build a company's green image are developed when the company adopts green practices which benefit it financially. Disclosure of environmental practices and statistics to the media (outside stakeholders that monitor firms' operations) and the firm's market value influence sustainable financial performance (Cormier and Magnan, 2007). Thus, an enhanced corporate green image is also instrumental in improving corporate financial performance. Voluntary environmental activities that do not merely imitate competitors' green initiatives lead to high media visibility and meet stakeholders' demands as they reduce confrontation and external threats and thus preserve corporate reputation (Aerts, Cormier and Magnan, 2006).

The international literature shows that green innovation and positive dissemination of important green information to consumers protects corporate image (Dangelico and Pujari, 2010). Environmental disclosure is heavily influenced by stakeholders (financial analysts' forecasts and affiliation to environmental organisations). Firms should thus initiate engagements that reduce negative environmental externalities and support the sustenance of a favourable environmental reputation (Aerts, Cormier and Magnan, 2008). Green company practices are positively associated with improved financial performance because companies that adopt such practices attract and retain workers, consumers, and suppliers as well as investors (Yu et al., 2009). Dangelico and Pujari (2010), Aerts et al. (2008) and Yu et al.'s (2009) research

results indicate that corporate stakeholders' perceptions of a firm (image) are capable of promoting the incorporation of green practices which then generates improved financial performance through the impact of intangible factors which include stakeholder loyalty and satisfaction.

Moreover, firms are building a green reputation by disclosing their environmental preservation activities on their company's websites to interested stakeholders (Biloslavo and Trnavčevič, 2009). For instance, a company can introduce eco-labelling; this green investment initiative shows a positive relationship with green buying and firm image. Customers are willing to pay a premium price for eco-products as they regard them as energy-efficient (Sammer and Wustenhagen, 2006; Veisten, 2007). It follows that corporate green practices encourage firms to set themselves apart from their rivals by showing that they perform better in terms of environmental preservation and protection (Cooke, Cripps, Irwin and Kolokotroni, 2007).

Firms with improved environmental image rating are also likely to enjoy higher share prices than those with a poor environmental image (Hussainey and Salama, 2010) as investors regard corporate environmental initiatives as responsible behaviour that improves employees and other stakeholders' satisfaction (Fraj et al., 2015). Stakeholder pressure (expectations and perceptions) affects managers' views on environmental issues, thereby influencing pro-green organisational activities (Papagiannakis and Lioukas, 2012). These study results indicate that the adoption of environmental practices, management and reporting promote a positive corporate environmental image. Thus, environmental initiatives are no longer perceived as a peripheral but as a principal practice for modern corporations.

Surveys conducted in Germany show that green image demands (supplier demands and green stakeholder perceptions) offer sufficient inducement for upstream companies to adopt green programmes (Horbach, 2008). Green benefits (improved reputation, customer loyalty) play a major role in extending green innovation (Kammerer, 2009). Corporate sustainability activities enable employees to implement environmental policies, and improve their commitment and sense of ownership, thereby bolstering the firm's overall image (Wehling et al., 2009). Horbach (2008), Kammerer (2009) and Wehling et al.'s (2009) studies found that the

need to improve the firm's reputation influenced corporate green investment activities among German companies.

Studies conducted in Spain produced similar results. For example, environmental activities (ecolabeling, green best practices, and environmental management systems (EMS)) have been adopted by hotels to satisfy customers' demands (Ayuso, 2006). As more and more of today's customers are influenced by green considerations, hotels have adopted environmental certification to protect their corporate image and improve overall firm performance. Pro-environmental activities lead to the development of a positive image through stakeholder satisfaction (Gonzalez-Benito and Gonzalez-Benito, 2005).

Studies in other European organisational settings have revealed the extent of customers' environmental awareness that has prompted firms to produce and promote environmentally sound products (Jansson and Marell, 2010). Hence, socially responsible (environmental) behavior has a positive connection with brand reputation (Blombäck and Scandelius, 2013). Likewise, green innovation and environmental consciousness are positively connected to a firm's external image (Hillestad et al, 2010). Companies that adopt a social sustainability perspective build their corporate reputation by adding green activities to their organisational culture (removing unwarranted environmental impacts) (Ratnayake and Liyanage, 2009). Therefore, firm engagement with green investment practices enhances the maintenance of a sound corporate reputation and heritage.

Moving to Asia, the Japanese pulp and paper industry's environmental practices determine its image (Hidayat, 2011). Corporate image is negatively affected by irresponsible supply chain activities that jeopardise a firm's contracts, marketing processes and sub-contracting activities, as well as harm its environmental brand and integrity (Lee and Kim, 2009). Furthermore, improved worker identification with the firm that flows from sustainability practices increases employee commitment, attraction and retention (Kim, Lee M, Lee HT and Kim, 2010). A company's choice of zero-carbon benchmarks and energy efficiency mechanisms significantly determines its green corporate reputation (Komarek, Lupi, Kaplowitz and Thorp, 2013). The findings of studies by Kim et al. (2010), Lee and Kim (2009), Hidayat (2011) and Komarek et al. (2013) show that, the quest for a positive firm image promotes

corporate green activity. Similar organisational outcomes have been found in one of Asia's largest countries, China.

The incorporation of green practices in Chinese manufacturing companies' supply chains satisfies customer demands and enables firms to acquire organisational legitimacy (Zhu et al., 2011). Stakeholders include customers, the government, shareholders, creditors, employees and the general public who are perceived as important partners that are one of the main forces that drive companies to adopt environmental management initiatives (Liu and Anbumozhi, 2009). In Hong Kong (Chan and Wong, 2006; Kucukusta, Amy Mak and Chan, 2013; Jayantha and Man, 2013) companies are implementing environmental management practices in line with public expectations (Chan and Wong, 2006). For instance, environmental sustainability programmes initiated by hotels significantly influence visitors' decisions on where to stay, preparedness to pay, brand reputation factors and views on service quality (Kucukusta et al., 2013). Green building certification also builds a positive green reputation (Jayantha and Man, 2013).

In Taiwan, a sovereign state located in East Asia, green brand reputation, green contentment and green trust have been found to have a positive relationship with consumers' purchasing behaviour. Consumers are willing to pay high prices for green commodities (Chen, 2010). In the same vein, a Taiwanese company's core green attributes are positively connected to corporate green innovation and green reputation (Chen, 2008). Along with green innovation, green products impact on a company's competitiveness and its green image, thereby creating a win-win context (Chen et al., 2006). Studies by Chen (2010), Chen (2008) and Chen et al. (2006) on Taiwanese electronics companies highlight that corporate reputation stimulates green investment activity.

Furthermore, green initiatives enhance a company's reputation among multiple stakeholders (investors, customers) (Chen et al., 2012b). A firm's green self-conceptions are positive connected to green development (innovation) through the indirect impact of environmental participation and legitimacy (Chang and Chen, 2013). Hence, green investment by a company has a positive relationship with green image and the ultimate legitimacy of the firm. Corporate sustainability practices and a firm's reputation generate a positive connection with corporate brand equity

(loyalty, quality, association, satisfaction) and brand performance (Lai, Chiu, Yang and Pai, 2010). Similarly, green corporate self-conceptions and image can be developed once a company has strengthened its environmental leadership, green competitiveness, green corporate identity and environmental culture (Chen, 2011).

In the south east Asian country of Malaysia, public policy suggests that environmental reporting should be perceived as a strategic policy to maintain a company's environmental reputation (Sumiani, Haslinda and Lehman, 2007), as sustainability programmes promote positive social perceptions (Saleh, Zulkifli and Muhamad, 2010) which legitimise the firm's business operations (Bakar et al., 2011). Sumiani et al. (2007), Bakar et al. (2011) and Saleh et al.'s (2010) findings on Malaysia concur with those of studies conducted in India, a country in south Asia. The organisational image built by means of awards, certification and social rankings drives the sustainability activities of Indian firms (Kansal et al., 2014). Companies implement environmental initiatives and disclose such information thereby promoting their corporate image. Similar findings have been made by studies conducted in New Zealand, an island nation surrounded by the Pacific Ocean.

Environmental participation and reporting by New Zealand companies are proactive mechanisms to acquire corporate legitimacy. Most companies seek to maintain a positive environmental reputation (Van Staden and Hooks, 2007) as corporate image has a positive relationship with customer views, buyer value and loyalty (Cretu and Brodie, 2007). Organisations with a good corporate reputation are able to charge premium prices for their commodities. Similar findings have been reported in Australia, which is located south east of New Zealand.

Pellegrino and Lodhia (2012) report that Australian firms demonstrate their commitment to mitigating climate change using various media platforms, thus boosting their corporate image. The practice and reporting of sustainability measures enhance consumer belief and trust, improve their confidence and build relationships between the firm and its stakeholders (Pomering and Dolnicar, 2009). Corporate social responsibility (CSR) disclosure (environmental, social and governance) and practice have been used to sustain corporate image; transparency fosters corporate stakeholder engagement (Golob and Bartlett, 2007). Pellegrino and Lodhia (2012), Pomering and Dolnicar (2009) and Golob and Bartlett (2007) outline how corporate

reputation issues have motivated firms to adopt green practices. Various other studies have also supported the argument that corporate image propels green investment activity.

Similarly, De Villiers and Van Staden (2011) conclude that corporations tend to report environmental information when they have suffered a poor green image or are experiencing an environmental crisis. Thus, sustainability investments are not necessarily motivated by philanthropic considerations, but are an important component of a comprehensive policy that seeks to generate goodwill and to sustain sound political connections through reducing the negative images that result from media and other stakeholders' scrutiny (Borghesi, Houston and Naranjo, 2014). Undesirable environmental and/or social behaviour produces a bad company image, which also affects the firm's legitimacy in the second-order (Bebbington et al., 2008).

Hoejmose et al. (2014) add that Responsible Supply Chain Management (RSCM) is a strong motivator and stimulator of the creation of a good company image as it shields the firm from bad media reports and prevents consumer boycotts. Thus, there is a positive association between RSCM and corporate image. A company's adoption of a sustainability initiative demonstrates effective risk management techniques that yield goodwill and moral capital for the firm (Lai et al., 2010). As such, stakeholder demands can act as an informal regulator by putting pressure on firms to integrate green investment practices. The failure of such initiatives will have a negative impact on shareholder value (loss of corporate image, revenue) (McKinsey & Company, 2008). Furthermore, Leonidu LC, Leonidu CN, Palihawadana and Hultman (2011) note that the use of global green advertisements has grown considerably and companies use them to develop their green image.

While some green schemes are capable of directly generating high profits, others promote the firm's green business image (Norton, 2010). As such, firms with high green ratings perform better financially than those with poor environmental rankings (Jackson and Singh, 2015). Hence, green corporate reputation exercises play an important role in stimulating green product innovation as well as in boosting financial performance (Amores-Salvadó, Castro and Navas-Lopez, 2014). It follows that a company's recycling practices (containers, waste) and energy conservation initiatives promote positive customer views of its green reputation. Ultimately,

improved organisational environmental performance results in a positive institutional green image and enhances competitiveness (Jeong et al., 2014).

4.2.1 International literature which indicates a zero and/or neutral relationship between corporate image and corporate green investment practices

Some international studies have produced mixed results on the connection between corporate image and corporate green investment activities. For instance, supplier interest has a positive association with green development (product and process) of goods and procedures, while consumers' interests have a strong connection with green product development but a weak association with green process development (Lin, Zeng, Ma, Qi and Tam, 2014). D'Souza, Taghian and Sullivan-Mort (2013) study illustrates that environmental procedures are considerably more important to the firm but such procedures are not a significant predictor of firm image. However, stakeholder environmental sensitivity and corporate environmental marketing practices were identified as important predictors of firm image (D'Souza et al., 2013). Both studies identified stakeholders' green demands as a significant factor that stimulates firm green initiatives although Lin et al.'s (2014) study went further to determine the strength of that relationship. The current study also examined the strength of the relationship between the variables under study and corporate green investment activities.

In terms of the significance of a firm's sustainability practice and ethical behaviour, various stakeholder groups (firm owners, workers, clients, and the community) rate the corporate image differently. Companies that adopt extensive sustainability initiatives are not rated highly and corporate image ratings also illustrate significant differences when compared to profitability criteria (Walker and Dyck, 2014). Orlitzky (2013) highlights that some companies use sustainability practices as opportunistic measures that are not systematically associated with the firm's economic objectives. Therefore, stakeholder perceptions of a firm's sustainability practices are difficult to interpret and hence inconclusive, indicated through increased noise trading which generates high market volatility that ultimately favours perceived pro-sustainability firms (Orlitzky, 2013).

An evaluation of the survey findings reveals that while there are notable differences among them, both Walker and Dyck (2014) and Orlitzky (2013) show that companies that adopt sustainability initiatives can receive lower image ratings than non-sustainability practicing firms. Some schools of thought highlight that corporate visibility (that is, slack visibility, sector visibility, stakeholder visibility) influences a firm's sustainability performance although high profit making companies are not motivated by visibility issues to expand their sustainability practices (Walker and Dyck, 2014).

In Chinese corporate contexts, sustainability disclosure is positively associated with company reputation but chief executive officer/chairman duality generates a negative relationship with firm image and company financial performance and the size of the company produces a positive connection with firm reputation (Lu, Abeysekera and Cortese, 2015). A related study that examined the impact of coercive isomorphism on Malaysian firms' sustainability disclosure illustrates that company owners regard sustainability disclosure as a mechanism that enhances a firm's sustainability image, while family oriented firms do not perceive sustainability disclosure as a significant tool that enhances their reputation (Othman, Darus and Arshad, 2011).

Thus, chief executive officer/chairman duality (Lu et al., 2015) and family oriented firms (Othman et al., 2011) produced a negative association with firm reputation. In family oriented firms, the chief executive officer/chairman duality function is usually present within the family ranks; hence, these surveys concur on this issue. Furthermore, Lu et al. (2015) (using corporate financial performance values) and Othman et al. (2011) (using organisational owners - investor or capital owners) agree that, in terms of sustainability reporting, there is a positive relationship between corporate reputation and firm performance. Such mixed findings have also been noted in US corporate contexts.

For example, a survey on whether companies use graphs to develop their corporate social responsibility reports found that graphs that illustrate unfavourable social performance produce high impression management, while there was no significant association between corporate environmental performance and impression management in the deployment of environmental graphs (Cho, Michelon and Patten,

2012b). Therefore, the study generated mixed results due to firms' desire to preserve their public corporate image. Moreover, Brown, Guidry and Patten (2010) report that in relation to sustainability disclosure and perceptions of firm image (as measured by *Fortune Most Admired Ratings*) there were no significant changes in image ratings but the quality of the report generated a positive association with perceived corporate image. While Brown et al. (2010) focused on sustainability in general; Cho et al. (2012b) examined social and environmental sustainability perspectives independently, thereby producing conflicting results on the evaluated variables.

Studies have also shown a negative association between environmental ratings and affiliation to the Dow Jones Sustainability Index (DJSI) and Trucost Environmental Performance ratings. The same study also indicate a positive correlation between environmental reporting and environmental image and affiliation to the DJSI amongst the worst performers (Cho, Guidry, Hageman and Patten, 2012a). Meng, Zeng, Shi, Qi and Zhang (2014) explain that well-performing firms report very detailed environmental information whilst poor performers only improve their reporting after violations and the imposition of penalties.

However, Meng et al. (2014) study also indicate a nonlinear association between firm performance and environmental reporting in emerging economies thereby concluding that environmental reporting is not effectively employed as a valid indicator to differentiate between good and poor performers. By determining a framework for firm image (using the *Fortune* Index) positive correlations between corporate sustainability (environmental issues, diversity issues, community relations, product issues, employee relations) and reputation are revealed although they vary from industry to industry as a result of moderation effects (Melo and Garrido-Morgado, 2011). An analysis of the studies by Cho et al. (2012a), Meng et al. (2014) and Melo and Garrido-Morgado (2011) shows that they produced mixed results that are often conflicting.

Lombart and Louis (2014) note that a firm's social responsibility and price reputation have a positive connection with the "agreeableness" and "conscientiousness" of a retailer while they have a negative relationship with the retailer's "disingenuousness." However, no positive association was found between customers' perceptions of

sustainability, a favourable firm's (retailer) reputation and customer loyalty; thus, sustainability is not a purchase standard for customers (Lavorata, 2014). Furthermore, product image and corporate reputation (that is identified as part of corporate image) have a direct impact on consumer purchase intentions while social responsibility (another aspect of corporate image that they identified) has an indirect impact on consumer purchase intentions (Ko et al., 2013).

4.2.2 International literature which indicates that corporate image does not influence corporate green investment practices

Contrary to the findings reported in previous sections of this chapter, some studies have found that corporate image issues do not determine corporate green investment activities. For example, affiliation to the DJSI does not earn a firm a sustainability image since the entity's operations largely depend on disclosed internal and external sustainability information (Crane and Matten, 2007); hence, corporate environmental performance ratings are negatively associated with green reputation (McGinn, 2009). Consumers may not buy eco-friendly commodities since they regard them as having lower performance attributes than conventional commodities (Luchs et al., 2010). Hence, consumers perceive eco-based companies as underperforming.

Furthermore, some schools of thought note that it is difficult for companies that invest in nuclear energy to promote a green corporate image (Wang and Chen, 2012). Such companies have used the services of environmentalists to repair the firm's reputation rather than address environmental problems which environmentalists regard as corporate misdeeds (Beder, 2002). The need to boost the corporate image does not motivate for environmental practices; instead, stakeholder groups are persuaded to change their perceptions. Sustainability practices are used to react to stakeholder pressures through extended disclosure on webpages and through brochures (Snider, Hill and Martin, 2003). Therefore, corporate environmental performance has a negative effect on firm image (Brammer and Pavelin, 2006b).

Most companies communicate the same green practices to their customers, making it difficult for consumers to distinguish the activities specific to a particular company (Crittenden VL, Crittenden WF, Ferrell LK, Ferrell OC and Pinney, 2011). Thus, there

is a negative association between corporate image and green practice adoption (Crittenden et al., 2011) as greening reduces consumers' intention to purchase the firm's products (Sen and Bhattacharya, 2001). As well, poor corporate environmental performance in the past generates negative perceptions of the industry which can affect the achievement of a positive corporate reputation (Azapagic, 2004). Previous negative perceptions of the company work against current corporate environmental activities regardless of the firm's commitment.

The international perspectives examined above show that corporate image has been considered to be a factor that impacts on corporate green investment. Most studies concur that corporate image promotes green investment initiatives, demonstrated by high levels of disclosure of information on corporate sustainability practices (Sobhani, Zainuddin, Amran and Baten, 2011; Bonilla-Priego, Font and Del Rosario Pacheco-Olivares, 2014). However, some studies have found that corporate image does not promote corporate green investment activities, while others produced mixed outcomes. Hence, this study is significant as it examined whether or not corporate image can be used as a factor to spur corporate green investment practices in the South African context.

The following section examines the relationship between firm reputation and firm green practice in African corporate settings.

4.3 The African Perspective

A number of studies have shown that corporate image motivates corporate green investment activity in African settings. For example, South African firms have been rated as among the highest emitters of carbon globally; hence, green programmes such as CDMs and carbon trading can create a positive image of the country and its industries (Gore and Tucker, 2008). It is against this background that the South African climate policy strategy promoted by the country's EMG and other environmental interest groups such as World Wildlife Fund (WWF) has disputed the green reputation of companies as a result of their inability to adopt effective green technologies, expanded reliance on western technologies and a lack of collaboration in implementing green or low-carbon practices in the South African organisational setting (Zeroco2, 2012).

Voluntary participation by South African organisations in green investment initiatives (corporate carbon reporting practices) is important to dispel negative public perceptions that companies are not prepared or committed to engage in activities that mitigate climate change (CDP, 2010). A recent survey of South African government departments, the private sector, academic institutions, public institutions, civil society and international agencies found that the adoption of Electric Vehicles (EVs) is desirable to sustain sound natural environments and promote a green reputation (Dane, 2014).

The Promotion of Access to Information Act of 2000 enables the South African public to access information on companies' environmental practices (Gore and Tucker, 2009). Companies that do not integrate green investment activities experience increased negative publicity. For example, with reference to South Africa's Air Quality Act (emissions principles in section 21) some multinational firms in the city of Durban earned a bad reputation after the South Durban Community Environmental Alliance (SDCEA) raised concerns that local communities were affected by these firms' emissions which resulted in ailments such as asthma and even death (PMG, 2013). Thus, South African companies can create a bad corporate image due to negative environmental practices. In terms of the country's environmental legislation, stakeholders can report firms that they perceive are guilty of practices that damage the natural environment (Bowman Gilfillan, 2014).

Diversified energy efficiency and management practices in South African corporate environments have been identified as green initiatives that are motivated by green image issues. A survey found that improved green reputation is one of the major motivators for South African companies' adoption of green initiatives such as energy efficient IT infrastructure (Franco, 2013). Green activities generate a corporate green image which can be a useful instrument to market the company's products. Energy intensive firms can improve their green reputation by assuming a leadership role in adopting green technologies and energy management frameworks to green buildings (Engineering News, 2014). In the same vein, corporate energy efficiency policies engage both external and internal partners (builds relationships), influence firm profitability and enhance the firm's local and international green reputation (Gouws et al., 2012). Therefore, while corporate image has supported the adoption of energy

efficient technologies in South Africa, it has also spurred the integration of carbon disclosure and management activities.

For example, 89% of South African CDP firms that participated in a survey indicated that improved business prospects are associated with green investment (green image growth, new green business opportunities) and 82% were beginning to view non-adoption of climate change issues as a possible commercial risk (revenue loss, image loss, market loss) (Tyler, 2008). In the same vein, 87% of the companies understood climate change business prospects (green image growth, new green business opportunities, increased market share) and their associated risks (revenue loss, image loss, market loss) while 23% had adopted targets to reduce carbon emissions (Incite Sustainability, 2008). Thus, it can be concluded that South African firms' participation in green investment practices boosts their green image and recognition.

Moreover, the incorporation of green programmes encourages the development of a company's green brand image and offers marketing benefits that stimulate increased stakeholder participation in greening their supply chains (SGS, 2014), since up to 25% of a firm's carbon emission levels and carbon emissions issues are "visible" to employees, consumers and investors (UNIGLOBE, 2014). Hence, South African organisations' green practices produce a favourable green brand, indicate sound corporate governance and enable such firms to attract and retain employees (Bonellie, 2013). For instance, in 2013, South African corporations had a carbon reporting response rate of 83% which was the second highest worldwide (CDP, 2014). Thus, the literature on corporate environmental disclosure in South Africa supports the view that firm image motivates green investment practices.

In contrast, South African companies that have not embraced green practices are highly likely to earn negative reports from their stakeholders at both local and international levels (SAPA, 2009). Companies that participate in green investment practices could build positive relationships with stakeholders and reputable organisations such as the World Commission on Environment and Development (WCED) and the Green Energy Efficiency Fund (GEEF) which would serve to dispel public doubt on whether they are genuinely engaged in activities that minimise

carbon emissions (CDP, 2012). Information on green initiatives can be made available to the public, thereby preserving firm reputation (CDP, 2009).

In line with CDP (2009) and CDP (2012), Vermuelen (2013) found that developing an environmentally friendly culture fosters widespread adoption of green technologies as it enhances a firm's reputation. Similarly, greening promotes the growth of positive green reputation, increases market share and promotes competitive advantage (Van den Berg, Labuschagne and Van den Berg H, 2013; Smith and Perks, 2010). For example, green wine industries are able to attract both visitors and consumers and the green brand itself can positively influence demand owing to the enterprise's green reputation (Kruger and Saayman, 2013). Hence, company sustainability activities are motivated by the desire to create a green image in addition to complying with environmental regulations (Trialogue, 2007). Green investment initiatives by South African eco-friendly corporations enable these firms to assume leadership roles and responsibilities in addressing climate change (Ali and Ahmad, 2013).

4.3.1 African literature which indicates that corporate image does not influence corporate green investment practices

Some studies in African contexts demonstrate that corporate image does not influence corporate green investment activities. For instance, South Africa's automobile industry was negatively affected by the introduction of a carbon emissions tax in 2010. Furthermore, the proposed carbon tax could significantly increase green costs (Parker, 2013). Therefore, negative perceptions are already associated with the greening of firms. In such a situation, corporate image cannot stimulate the greening of firms. The implementation of a carbon tax in South Africa will cripple business enterprises and only the strong will survive in the long run (Creamer, 2013). Therefore, stakeholders have viewed greening as a retrogressive issue.

It is for this reason that many stakeholders perceive that companies will suffer financial losses if they adopt sustainability initiatives (Viviers, Bosch, Smit and Buijs, 2008). As such, investment in sustainability practices remains low and such investments are underperforming. Under such circumstances, corporate green image does not influence corporate green initiatives. Moreover, traditional

investment methods have continued to outperform environmental, social and governance (ESG) investments owing to investor scepticism regarding the performance yielded by sustainability practices (Preston, 2011).

In such circumstances, corporate reputation fails to stimulate greening activity in corporate operational frameworks. Furthermore, one of Africa's principal problems is that strategies that support environmental preservation and green investment practices have focused on natural capital which has made markets inefficient and benefited the rich while the majority of Africans remain poor (Sharife and Bond, 2013). Therefore, stakeholders have not identified that the problem is that environmental issues have not been incorporated into business operations. In addition, energy intensive industries which form the backbone of the South African economy largely depend on fossil fuel consumption. Green investment practices will eventually reduce their production capacity, result in food price instability and disrupt business activity (Copeland, 2012). In the end, stakeholders have not supported corporate green initiatives and/or criticised firms which do not integrate green activities.

While some of the African literature highlights that corporate image influence does not influence corporate green initiatives, there is a paucity of academic literature on this subject, with most sources taking the form of corporate stakeholders who use the Internet as the primary means to report their perceptions and information. This study aimed to fill this gap by examining whether or not corporate image promotes green investment practices by considering the actual companies involved.

Table 4.1 below describes a summarised analysis of the relationship between corporate image and green investment practice from examined literature.

Table 4.1: Relationship between Corporate Image and Green Investment Practice from Examined Literature

Author and Date	Main finding	Method	Implications for further study
Jackson and	Positive relationship	Investigated 20 US	Studies should consider

Singh (2015)		food & beverage firms using Multidimensional scaling approach.	a larger sample size, consider financial data over multiple number of years and use several diversified proxies of green and firm financial performance.
Jeong et al.,(2014)	Positive relationship	Examined the effect of eco-friendly practices on green image of a US café using Questionnaire techniques with seven-point Likert scale type questions.	Research should be conducted on diversified forms of café's to improve generalisation of results. Analyse more green image determinants.
Robinson et al.(2011)	Positive relationship	Analysed North American firms listed on the DJSI using Computing cumulative abnormal returns (CARs) on added and deleted stocks.	Use other firms from other countries that are listed on stock exchanges with sustainability indexes then compare the results.
Othman et al.(2011)	Mixed relationship	Scrutinised 117 firms in 3 sensitive sectors of 2007 using a self-constructed index.	Use interview based studies, besides use of annual reports to examine other firms which are not in sensitive sectors.

Cho et al.,(2012a)	Mixed relationship	Explored Environmental image of 92 US companies. Employed the environmental disclosure 95-point index scale.	Conduct more studies on firm image using other techniques since affiliation to DJSI is motivated through company self-disclosures.
D'Souza et al.,(2013)	Mixed relationship	Analysed how firm environmental activities spur stakeholder view of image using both factor and regression analysis.	Include more variables for study in relation to environmental marketing and firm environmental practices.
Crane and Matten (2007)	Negative relationship	Examined business ethics; Corporate citizenship; sustainability performance of global firms.	A focus on growing influence of firms in other continents such as Asia, besides Europe is important.
Luchs et al., (2010)	Negative relationship	Investigated sustainability liability of firms.	Examine more attributes of a product in relation to sustainability liability using diversified industries.
Wang and Chen (2012)	Negative relationship	Scrutinised the Japanese nuclear law framework.	Need to examine nuclear regulations in various countries and find out how they can

			be improved.

Therefore, from the above literature review, the second research hypothesis is:

$H0_2$: Corporate image does not influence green investment practices in JSE listed firms.

4.4 Summary of Chapter 4

Chapter 4 reviewed the international and African literature on the relationship between corporate image and green investment activities. While some previous studies found that that corporate image influences green investment practices, others found a negative association between corporate image and green investment practices and yet others produced mixed findings. The implications of these studies include amongst others, implementing interview and questionnaire based studies besides content analysis of firm documents; adding more variables (marketing, technological perspectives) in the study in order to promote grounded analysis of corporate image as an influencing factor of corporate green initiatives; increasing sample sizes and implementing longitudinal analysis about corporate green image surveys.

CHAPTER 5

HYPOTHESIS DEVELOPMENT

PROFITABILITY AND CORPORATE GREEN INVESTMENT PRACTICES

5.1 Introduction

This chapter presents a literature review on the influence of profitability on corporate green investment practices. This review is presented in two major sections; the first reviews the international literature and the second the African literature. The last section presents a summary of Chapter 5.

5.2 The International Perspective

Profitability is the main objective of any business enterprise. However, business operations have also generated much environmental damage (pollution, high carbon emissions, an increase in waste, climate change, deforestation) which have resulted in increased stakeholder interest in issues relating to the natural environment (Norton, 2007; IPPC, 2007). Therefore, studies have found that, in today's business world, profitability spurs firms' adoption of green practices.

In the US, a positive correlation has been found between environmental performance and financial performance among companies in major polluting sectors (Clarkson et al., 2011), reducing the risk of legal action, minimising the cost of equity capital, reducing the cost of debt and increasing tax gains (Sharfman and Fernando, 2008) besides generating a positive increase in stock prices as early as the day of announcement (Bose and Pal, 2012). Companies that report on carbon emissions (climate change disclosure) also increase their profitability, with the share prices of small firms increasing by 2.32% over days -2 to 2 and those of large companies increasing by 0.48% over days -2 to 2 (Griffin and Sun, 2013). Thus, firms that engage in greening activities experience an increase in profit.

Similarly, firm green investment in environmental planning initiatives and environmental problem solving processes have a positive association with manufacturing performance (competitive benefits, cost-effectiveness) since the firm is empowered to make use of its suppliers' procedures, technology and expertise

(Vachon and Klassen, 2008). Companies that do not adopt sound green policies (low-cost implications and attention to green energy systems) as a zero-carbon strategy will experience high production expenses that reduce their local market share and force them to shed jobs (Bassi and Yudken, 2009).

The adoption of green product projects such as Environmental New Product Development (ENPD) schemes specifically generates a positive relationship with the determinants of market performance (cross functional co-ordination, supplier participation and market focus) thereby improving the performance of the firm (Pujari, 2006). Environmental performance shows a positive connection to environmental disclosure, and therefore overall financial performance (Clarkson, Li, Richardson and Vasvari, 2008) since environmental risks are reduced, cost savings are generated through environmental management models and the customer base is sustained. Vachon and Klassen (2008), Bassi and Yudken (2009), Pujari (2006) and Clarkson et al. (2008) illustrate that financial gains spur firm environmental participation. Studies of European organisations confirm these results.

Carbon pricing (a mechanism to reduce deployment of fossil fuels through increased adoption of green energy technologies) of plants through emissions trading practices offers incentives that enable regulated companies to maintain better environmental and financial performance through improved environmental efficiency and plant productivity (Jaraitė and Di Maria, 2012). Corporate green investment policies enhance productivity since financing green technologies minimises negative environmental externalities and achieves high resource efficiency (Antonietti and Marzucchi, 2013). It follows that green production mechanisms have a positive correlation with the company's environmental performance, thereby improving its financial status (Sezen and Çankaya, 2013) as profits increase significantly as a result, amongst others, of cost reductions in eco-products' life-cycles (Plouffe et al., 2011).

Moreover, green investment appraisals of integrated industrial parks produce a net value of 3% to 10% more than when plants are established on an individual basis. This is attributed to the gains obtained by sharing carbon capture facilities in pursuit of lower emissions (Midthun et al., 2012). If these firms engage in carbon trading practices there is a positive relationship with firm financial performance

(depreciation, tax plus earnings before interest) (Smale, Hartley, Hepburn, Ward and Grubb, 2006). Hence, the integration of green initiatives results in superior overall performance since the company is able to obtain strategic benefits through forecasting green prospects and addressing green challenges across the entire supply chain. Companies that voluntarily report environmental information have less debt and more diverse shareholders (Brammer and Pavelin, 2006a).

In Germany, cleaner production mechanisms protect the environment and promote overall economic development (Böhringer et al., 2012). Green technologies present significant opportunities to overcome business crises and risks due to the economic, environmental and social gains they offer (Deutsche Bank, 2008). In the same vein, green initiatives create new market bases and improve a firm's competitiveness since energy and resource efficiency reduce the cost per unit (Rennings and Rammer, 2009). Studies by Böhringer et al. (2012), Deutsche Bank (2008) and Rennings and Rammer (2009) demonstrate that profitability promotes organisational green investment activity among German companies. This is also the case in Spain.

Spanish companies' adoption of green-oriented steam co-generation models has promoted energy efficiency, reduced carbon emissions and generated a 60% improvement in financial performance (Aguilar et al., 2011). Thus, corporate environmental engagement improves financial competitiveness (Garay and Font, 2012). Furthermore, social responsibility initiatives have a positive impact on overall firm performance and competitiveness (Gallardo-Vázquez and Sanchez-Hernandez, 2014) which also results in firm environmental responsibility generating a positive association with company environmental commitment and financial performance (López-Rodríguez, 2009).

In the same vein, industry-client environmental collaboration has a positive correlation with competitiveness that is generated by innovation and new market bases (Junquera et al., 2012). Environmental innovation and collaborate R&D strengthen a firm's competitive advantage (De Marchi, 2012). Therefore, corporate environmental initiatives address perceptions of risk by improving technical knowledge and the efficient use of resources, which encourages private investors' engagement in green technology development (Horbach et al., 2012). Junquera et

al. (2012), De Marchi (2012) and Horbach et al. (2012) highlight that profitability influences corporate green investment initiatives in Spain.

Corporate green supply chains strongly determine firms' competitiveness and financial performance in Asian countries (Rao and Holt, 2005). Joint green activities among suppliers, environmentally sound practices and superior internal control measures have a positive association with financial performance (profitability and cost-effective procedures) (Lun, 2011). In relation to cost-effective corporate green practices, the adoption of cogeneration schemes (as part of energy management) has been regarded as very effective in generating power since these plants minimise emissions and also produce high financial returns as they increase energy efficiency and also have lower operational expenses (Mujeebu, Jayaraj, Ashok, Abdullah and Khalil, 2009). Thus, besides preserving the environment, firms participate in ecological practices to acquire a green reputation and enhance market performance.

Studies in Asia have found that the greening of a firm's products and procedures is positively correlated to the firm's green competitive benefits and green product success (Wong, 2012) and operational performance (Lai and Wong, 2012), while green practices in the supply chain improve logistics efficiency and minimise waste (Zhu, Sarkis and Lai, 2008a). Wong (2012), Lai and Wong (2012) and Zhu et al.'s (2008a) studies on the Chinese corporate sector found that financial gains stimulate the adoption of green practices. Furthermore, there is a positive association between organisational performance (learning procedures and institutional support) and green supply chain management (GSCM) initiatives, thereby generating a competitive advantage (Zhu et al., 2008b). Green operational and production activities (cleaner production) have a positive impact on a company's profitability (Zeng, Xu, Dong and Tam, 2010b) since cleaner production technologies reduce manufacturing expenses (Kong and White, 2010).

Therefore, Zhu et al. (2008b), Zeng et al. (2010b) and Kong and White's (2010) survey results indicate that financial benefits motivate the integration of green activities in corporate settings. Taiwanese firms that integrate green policies in their business operations are likely to experience more positive long-term financial benefits than those that do not incorporate green investment practices (Chien and Peng, 2012). In particular, green initiatives in the supply chain generate a positive

relationship with environmental management frameworks, relationships with other partners and firm profitability (Tseng and Chiu, 2013). Supply chain policy that is appropriately aligned with efficient environmental activity yields better performance outcomes (Wu, Wu YJ, Chen and Goh, 2014). Green practices produce improved operational results such as reduced costs, superior quality merchandise, better delivery services and flexible systems (Chung and Tsai, 2007).

Moreover, a research study on the impact of "task environment on reverse logistics resource" demonstrates that greening produces high profits (Huang et al., 2012); the study found a positive relationship between corporate environmental and financial performance. Green product innovation has a positive association with environmental performance and competitive advantage (new customer bases, high financial benefits) (Chiou et al., 2011). Therefore, sound green innovation promotes efficiency, empowers the firm's core business models and enables the achievement of a green reputation which ultimately results in positive financial performance (Chen, 2008).

As well, internal and external green activities have a positive association with green performance which improves competitiveness (Yang et al., 2013). More specifically, greening the supply chain generates a positive relationship with firm financial performance (Chien and Shih, 2007). Hence, Huang et al. (2012), Chiou et al. (2011), Chen (2008), Chien and Shih (2007) and Yang et al. (2013) show that the quest for profitability motivates green investment initiatives in the Taiwanese corporate sector.

In Malaysia, environmental certification (as a company environmental initiative) generates a positive correlation with corporate financial performance (Ann, Zailani and Wahid, 2006). Firms that adopt measures such as the ISO 14001 standards improve their environmental procedures, and achieve financial gains as well as avoid risks (penalties, clean-up expenses and legal action). This enhances the company's reputation among internal and external partners (Sambasivan and Fei, 2008). There is a positive correlation between socially responsible initiatives and investor ownership since the company is able to sustain organisational ownership while participating in corporate social responsibility (environmental, social, governance) practices (Saleh et al., 2010). In particular, proactive environmental behaviour has a

positive correlation with financial performance, stakeholder needs, institutional learning and environmental performance (Sambasivan et al., 2013).

Studies in Australia show that the environmental orientation of a firm is positively correlated with financial performance (market share plus profit after tax) (Menguc and Ozanne, 2005). For example, a company's announcement of a carbon pollution reduction scheme (CPRS) has mixed impacts on corporate profit (Ramiah et al., 2013). Organisations that do not produce carbon emissions reports and introduce climate change strategies increase their market risk (Griffiths, Haigh and Rassias, 2007). Integrating environmental technologies and appliances in business frameworks therefore offers sustainable business opportunities that enhance the achievement of positive financial performance, protect and preserve the environment and enhance competiveness (Potts, 2010).

Brazilian companies that meet ISO 14001 requirements and LEED (Leadership in Energy and Environmental Design) certification enjoy significant financial benefits as a result of increased sales of green products, reduced environmental liabilities and recycling. Furthermore, measuring their carbon emissions footprint spurs energy saving scenarios and reverse logistics earn revenue by returning empty containers (Tomasin et al., 2013). Similarly, the greening of the firm's supply chain (collection and waste management activities) promotes increased market share, increases profits, reduces environmental risks and enhances environmental efficiency (De Figueiredo and Mayerle, 2008). Hence, consistent with the findings of other international studies, research conducted in Brazil by Tomasin et al. (2013) and De Figueiredo and Mayerle (2008) demonstrates that firms engage in green investment initiatives as they anticipate an increase in financial gains.

It follows that environmentally compatible manufacturing procedures are no longer regarded as an obligation but as an important strategic initiative since they enable a firm to achieve long-term competitiveness (Cagno et al., 2005). Thus, companies which are facing increasing risks in relation to climate change are induced to promote green practices (Hoffman, 2005). It is clear that there is a positive association between a firm's financial performance and its environmental performance (Pogutz and Russo, 2009). The introduction of green ideas in product design, production processes and marketing initiatives is important in order to

outperform traditional or competing commodities (Chen, 2008) as firms that do not integrate green investment decisions in their business practices are usually green screened and excluded from investment portfolios. This hampers growth, investment capacity and profitability (Ramiah et al., 2013).

In contrast, firms that embrace eco-innovation (supply, commodities, market, and process) enjoy improved returns on assets, reduced earnings retention and improved corporate equity (Przychodzen and Przychodzen, 2015). In addition, eco-innovators face fewer financial risks and have a better cash flow than non-eco-innovators (Przychodzen and Przychodzen, 2015). Greening is thus an attractive and effective strategy that is capable of offering benefits with minimal or no cost implications (Molina-Azorín et al., 2009). For instance, incorporation of Environmental Management Capability (EMC) in green plans and activities offers financial and environmental gains (Wong et al., 2012) since carbon emissions are responsible for decreased market value and the market "penalises" companies with undesirable environmental profiles (Lee et al., 2015a).

5.2.1 International literature which indicates that the association between profitability and corporate green investment practices generates mixed findings

Some international studies on corporate green investment activities have produced mixed findings on the relationship between profitability and such activities. For example, a meta-regression evaluation of portfolios shows a negative association between environmental performance and financial performance (Horváthová, 2010). The study also found that, with time, a positive association can be determined (Horváthová, 2010). It is against this background that company environmental innovations designed to achieve energy or resource efficiency have a stronger positive association with company competitiveness (Ghisetti and Rennings, 2014). On the other hand, the study also outlines that firm environmental innovations designed to reduce externalities generate a negative relationship with firm competitiveness (Ghisetti and Rennings, 2014).

An evaluation of Horváthová (2010) and Ghisetti and Rennings' (2014) surveys demonstrates that they identify both positive and negative associations between environmental and financial performance although they scrutinised particular green

investment practices' (energy efficiency activities, reducing negative environmental externalities) relationship with corporate performance.

Similarly, procedure-oriented environmental activities (with respect to carbon management) generate a negative relationship with financial performance but results-oriented environmental activities show a positive relationship (Busch and Hoffman, 2011). In the same vein, an environmental procedure-oriented dimension produces a positive correlation with corporate financial performance and an environmental results-oriented dimension indicates no meaningful relationship with corporate financial performance (Delmas, Etzion and Nairn-Birch, 2013). Hence, Busch and Hoffman (2011) and Delmas et al.'s (2013) studies agree that a favourable relationship exists between procedure-oriented environmental initiatives and company profitability. Waste prevention practices generate profits but pollution reduction practices do not produce financial gains (King and Lenox, 2002). The outcomes of King and Lenox's (2002) study are compatible with those of Delmas et al. (2013) but conflict with those of Busch and Hoffman (2011) (zero against a negative relationship).

Other researches spotlights that Environmental certification (ISO 14001) generates reduced Return on Assets (ROA) but operating revenue remains unchanged (Zhao, 2006). In the same vein, stringent ISO 14001 standards improve a firm's environmental performance but environmental performance (ISO 14001 standards, emissions generated, recycled substances) has no impact on financial performance (gross profit margins) (Link and Naveh, 2006). Thus, the adoption of environmental certification in corporate contexts has a positive effect on certain firms' financial performance indicators whilst it generates zero impact on other firms (Zhao, 2006 and Link and Naveh, 2006).

However, Christmann (2000) notes that the debate on a direct association between environmental certification and firm performance continues. The researcher observes that it is possible that the relationship between corporate environmental certification and firm performance could be zero, positive, negative and/or mixed. Siregar and Bachtiar's (2010) findings suggest a zero relationship between corporate social disclosure (environmental, governance and social issues) and firm

performance although a positive relationship was anticipated in the long-term. A number of studies note that the nature of the relationship between profitability and corporate green investment activity remains unknown.

Elsayed and Paton (2005) concluded that environmental performance has a neutral impact on financial performance. Telle (2006) notes that while it cannot be ascertained if greening pays, this question should be viewed in terms of when or to whom it affords financial gain. Hence, there are insignificant findings on the relationship between organisational, environmental and financial performance (Graves and Waddock, 1999; Gonzalez-Benito and Gonzalez-Benito, 2005) since there is no clearly defined association between social responsibility (environmental, governance and social) and financial performance (Surroca et al., 2010).

In addition, the application of mis-specified frameworks as a result of excluding certain elements as well as the inability to include moderating or mediating determinants of a firm's strategy and its natural environment produce inconsistent findings on the connection between environmental and financial performance (Russo and Minto, 2012). Therefore, the association between corporate social responsibility and financial performance is difficult to determine since there is an apparent contradiction in defining and measuring the variables considered in existing studies (McWilliams, Siegel and Wright, 2006). For this reason, there are conflicting views on this association (Wagner, Schaltegger and Wehrmeyer, 2001).

Furthermore, different methodological and theoretical approaches have produced varying results on the relationship between a firm's social performance and financial performance (return on equity, return on sales, growth in sales) (Ruf, Muralidhar, Brown, Janney and Paul, 2001). Delmas and Nairn-Birch (2011) deployed Tobin's q and found that coal emissions have a negative effect on financial performance but the effect was modified when other measures (Return on Assets and Return on Equity) were employed. Thus, the association between social responsibility activities and financial performance remains open to debate (Lu, Chau, Wang and Pan, 2014).

Moreover, carbon emission reduction practices have a significantly positive connection with corporate financial performance but there is no relationship with

operational performance (Gallego-Álvarez, Segura and Martínez-Ferrero, 2015). For instance, a significantly positive relationship between environmental and performance is evident during the pre-global recession period (2001 to 2007), but a there is zero association during the recession period (2008 to 2010) (Muhammad, Scrimgeour, Reddy and Abidin, 2015). It is sometimes difficult to establish a significant connection between environmental performance and firm profitability (positive or negative) as the economies in question are immature and still developing (Pintea, Stanca, Achim and Pop, 2014). In other situations, corporate environmental reporting has no association with corporate profitability and investors favour social disclosure more than environmental disclosure such that companies with high levels of reporting on social issues are more valued (Qiu, Shaukat and Tharyan, 2014).

In other circumstances, a positive and bidirectional association is evident between environmental and financial performance (Endrikat, Guenther and Holger Hoppe, 2014). The relationship can be stronger when the environmental policy is proactive whilst the connection weakens when the policy is reactive (Endrikat et al., 2014). For example, environmental performance has a positive impact on corporate financial performance but a resource slack generates a moderating impact whilst company munificence does not have a significant impact on the association (Qi, Zeng, Shi, Meng, Lin and Yang, 2014). Nevertheless, socially responsible investment "concerns" lead to improved market valuation and financial benefits while socially responsible investment "strengths" only cause firm market value (Pätäri, Arminen, Tuppura and Jantunen, 2014). On the other hand, financial performance does not cause socially responsible investment (Pätäri et al., 2014).

5.2.2 International literature which indicates a zero and/or negative relationship between profitability and corporate green investment practices

Some international studies have found a zero or negative connection between profitability and corporate green investment practices. More specifically, numerous European studies have produced evidence to support the view that profitability and green investment initiatives can generate zero or negative associations. For instance, incorporating green activities such as proactive corporate environmental policies will not result in improved financial benefits (Aragón-Correa and Rubio-

Lopez, 2007) as studies of share portfolios indicate negative associations between company climate change practices and stock returns (Ziegler, Busch and Hoffmann, 2009) thereby demonstrating a negative relationship between environmental and financial performance (Wagner, Van Phu, Azomahou and Wehrmeyer, 2002).

The adoption of coal fired Carbon Capture Storage (CCS) electricity projects shifts investors' focus from efficiency to investment costs which range between 1400 Euros/Kw and 3000 Euros/Kw. Such projects are expected to make up 16% of Europe's energy production capacity by 2025 (Lohwasser and Madlener, 2012). Therefore, profitability produces negative relationships with a firm's environmental performance. In line with this argument, Cañón-de-Francia and Garcés-Ayerbe (2003) show that ISO 14001 certification has a negative effect on the stock prices of pioneering companies, middle level polluting companies and small companies.

On the other hand, some European studies indicate that profitability generates a zero relationship with environmental performance. For example, there is no relationship between green supply chain performance and overall firm performance (De Giovanni and Esposito Vinzi, 2012). Similarly, there is no connection between firm profitability and socially responsible (environmental, social, governance) practices (Aras, Aybars and Kutlu, 2010). Furthermore, firm performance has no relationship with voluntary environmental reporting (Cormier and Magnan, 2005) and green activities (process or product stimulated) do not have an effect on financial performance (Gilley, Worrell and El-Jelly, 2000). Whilst De Giovanni and Esposito Vinzi (2012), Aras et al. (2010), Cormier and Magnan (2005) and Gilley et al.'s (2000) studies in Europe showed a zero association between profitability and corporate environmental engagement, some US studies also found zero and/or negative relationships.

Corporate sustainability practices are linked to the underperformance of company stocks (DiGiuli and Kostovetsk, 2014). For example, a negative association exists between pollution reduction costs and firm productivity because environmental accountability imposed by legislation reduces productivity as the company is forced to commit to non-productive practices such as law-suits, waste management and environmental auditing (Gray and Shadbegian, 1995). More specifically, pollution reduction and end-of-pipe practices and pollution reduction in particular have been

found to impact negatively on Returns on Sales (ROS) (Sarkis and Cordeiro, 2001). In the same vein, pollution disclosure generates a negative change in market price movements (Shane and Spicer, 1983).

Thus, there is a generally negative association between socially responsible performance and firm performance (stock market measures and accounting-based measures) (McGuire, Sundgren and Schneeweis, 1988). For instance, the adoption of ISO 9000 has weak effects on a company's economic achievements (Wayhan, Kirche and Khumawala, 2002). Other global studies have shown similar outcomes. For example, voluntary carbon emission minimisation activities (that is, joining the EPA's Climate Leaders - Ceres, CL or GHG) have been found to reduce a firm's market value (Thorburn and Fisher-Vanden, 2011). Thus, carbon emission mitigation is likely to financially benefit a company's stakeholders rather than the firm itself, since such action rests on moral and social arguments (Sprengel and Busch, 2011). Hence, there is a negative relationship between the firm's environmental performance and financial performance (stock market responses) (Worrell, Gilley, Davidson and El-Jely, 1995).

Furthermore, a negative correlation has been found between firm performance and socially responsible practices (Crisóstomo, Freire and Vasconcellos, 2011). Zaho (2008) highlights, that, green investments are not compatible with shareholder wealth maximisation goals since ISO environmental certification results in reduced ROA. Similarly, it has been found that when firms announce their environmental policy, this significantly reduces stock returns (Fisher-Vanden and Thorburn, 2008). Therefore, corporate green investment initiatives do not improve a company's market value and no statistically significant variance in terms of firm value can be determined between green and environmentally neutral companies (Fernando, Sharfman and Uysal, 2010.).

Thus, environmental performance is negatively related to financial performance (Lioui and Sharma, 2012) since firms are unable to translate favourable environmental outcomes into profit (Kurland and Zell, 2011). Environmental pro-activeness alone will not produce financial gains (Berrone, Surroca and Tribó, 2007). Furthermore, green practices in supply chain operations have a negative association

with economic performance (Zhu et al., 2007). In this regard, Crisóstomo et al. (2011), Kurland and Zell (2011), Berrone et al. (2007) and Zhu et al.'s (2007) research points to negative connections between environmental and firm performance.

While some studies have found that profitability motivates corporate green investment initiatives (Tu and Huang, 2015) others conclude that profitability has a negative relationship with such investment. Yet other studies point to a neutral and/or zero association between profitability and corporate green investment activities. The current study is therefore important for an emerging economy such as South Africa in that it demonstrates how the use of non-expensive natural capital that is widely available in such economies can be effectively employed to generate improved corporate financial gains.

The following section investigates profitability and green investment from an African perspective.

5.3 The African Perspective

Previous studies in Africa have found that profitability issues stimulate green investment. For instance, the South African literature argues that a "new climate green fund" as part of corporate climate change policy is desirable in order to maintain company performance and productivity (BuaNews, 2011b). In the same vein, it is anticipated that firms will reap increased profit as well as environmental benefits by becoming involved in green programs such as CDMs (Gore and Tucker, 2008). CDMs aim to promote sustainability and enhance the adoption of environmentally sound technology that achieves the Kyoto Protocol's operational efficiency targets at minimal cost (Tucker, 2012). South African firms' adoption of CDMs attracts capital for green initiatives, improves co-operation between the public and private sectors and creates new green business prospects, thereby improving firms' economic performance (Department of Energy, 2014).

As such, corporations that seek to sustain competitiveness and thus remain in business are required to integrate green or low-carbon initiatives in their operational activities (SAICA News, 2009). Low-carbon or green investments propel economic

development and full employment and protect the natural environment through effective resource efficiency (CDP, 2010) and also improve profits through new green business ventures, increased green product differentiation and improved buyer loyalty (Bonellie, 2013). Studies by SAICA News (2009); the CDP (2010) and Bonellie (2013) note that profitability motivates South African firms' participation in green investment practices.

Carbon reduction schemes also help South African companies to identify prospects for green improvement, minimise operational costs and improve resource efficiency (SGS, 2014). A company's green stance is motivated by value-driven green technologies that do not transfer costs to customers or impose high costs on the firm. Energy efficiency offers substantial financial benefits to South African companies since small green investments (such as process reorganisation) yield high profits while large green investments (such as machinery and equipment replacement) offer even higher profits (Department of Trade and Industry, 2013). Therefore green practices such as energy efficiency make "sound economic sense" as firms that adopt such initiatives obtain good returns on their investment in the form of both reduced costs and a reduction in carbon emissions (Property24, 2012).

Furthermore, effective energy management policies lead to the removal of environmentally-motivated trade barriers in local and international markets, thereby enhancing competitiveness (Tshesane and Seroka, 2012). Similarly, Franco (2013) notes that cost reduction is the key driving force of firms' engagement with green practices such as energy efficient IT. Energy efficiency projects secure competitiveness through reduced investment risks, better product quality, less exposure to high energy prices and favourable firm value (Greenfinder, 2014a). For example, the adoption of Electric Vehicles (EVs) by South African firms reduces operating expenses since these vehicles are cheap to maintain and are highly energy efficient (Dane, 2014). The South African National Treasury awards a "Supplementary Depreciation Allowance" to companies that invest in energy saving technology to promote the use of such equipment (Tucker and Mandlana, 2009).

Studies have also found that green investment practices by South African firms ultimately result in cost savings, strategically position the firm's brand in the market and expand its market base. For instance, the adoption of ISO 14064 and ISO 14000

improves investor confidence in South African corporations and enables improved monitoring of carbon emission risks and environmental liabilities, thereby sustaining firms' economic performance (Ali and Ahmad, 2013). In addition, the adoption of renewable energy technology schemes attracts international and some local green investors, thereby enhancing business prospects (The Africa Report, 2014). Investors in growing economies are willing to pay a premium of between 23% and 28% for shares in firms that demonstrate superior sustainability practices (Rose, 2003). As such, when South African firms comply with global standards on carbon reduction, their investment portfolios and market value improve (CDP, 2014).

CDP (2014) notes, that, environmental initiatives generate a sound business context. Conversely, when companies fail to recognise the significance of green investment activities, business opportunities and enhanced competitiveness are sacrificed. Therefore, it is concluded that green investment initiatives have a positive relationship with competitive advantage (Van den Berg et al., 2013). It follows that a company's risk levels, policies, financial performance and green practices are interdependent. Graham (2010) identifies the key risks associated with business sustainability as energy security, waste control and carbon emissions requirements. The study notes that South African organisations that are not in line with sustainable development goals will be incapable of handling such risks since they will not be able to comprehend their origin and impacts.

Shedding more light on Graham's (2010) argument, Viviers et al. (2008) demonstrate that socially responsible (environmental, social and governance) funds compare positively with traditional funds, particularly in the long run. Therefore, companies that embrace clean technology build local industry, secure global markets, facilitate improved trading prospects and demonstrate improved environmental and firm performance (Morithi, 2014). For example, firm greening activities which use sunflower oil (waste) to generate green energy (biofuel) produce R1.2 million in turnover and 30% gross profit in the first year of operation (Naidoo, 2014).

In addition, South African corporations that engage in green initiatives reduce overheads and develop a unique selling position that strategically sets the company apart from its rivals (Franco, 2013). For instance, the implementation of a "nutritional model based on carbohydrate digestion" reduces greenhouse gases; increases milk

output, promotes efficiency and has positive financial advantages (Milk SA, 2011). Similarly, a green dairy firm which establishes an Ultra-High Temperature (UHT) processing plant generates a low carbon footprint and achieves energy efficiency which ultimately translates to significant economic development and improved company financial performance (Fourie, 2011). The early adoption of green investment practices thus enables cost reduction through energy efficiency and reduced transport costs and enhances a firm's competitive advantage (Tech-pro, 2014).

5.3.1 African literature which demonstrates that profitability does not influence corporate green investment practices

Some studies in Africa have found insignificant relationships between profitability and corporate green investment practices. For example, the carbon tax policy is highly likely to face opposition from companies as it will negatively affect profitability and competitiveness (Argus Media, 2013). The proposed tax will put South African companies under considerable financial pressure owing to heavy dependence on coal and traditional operating mechanisms. The South African Chamber of Commerce and Industry (SACCI) has expressed concern that it could lead to South African companies closing down or experiencing production stoppages because investors are unwilling to engage in green initiatives (Allix, 2013). The tax will negatively affect the performance of some companies such as the steel industry that use coal as they have limited alternative energy resources.

Moreover, green energy adoption in South Africa is in its infancy, which results in expanded market volatility and therefore higher risk, reducing investor confidence (Pegels, 2009). Investment in clean energy remains insignificant and unreliable as a result of insufficient data, which hampers full participation and negatively affects firm performance (Burger, 2011). For example, in terms of Millennium Development Goal (MDG) number 7 on environmental sustainability, South African companies and the country's green investment initiatives to mitigate climate change were affected by severe long-term market uncertainty (Stats SA, 2010). Therefore profitability will not stimulate corporate green practice. Furthermore, with the introduction of green activities, carbon intensive firms will face greater competition from their competitors

that have low carbon attributes (Copeland, 2012). Hence, international competitors that do not incorporate green investment initiatives have financial cost advantages.

Ultimately, green investment initiatives in South Africa are perceived as investments which produce financial losses. For example, greening buildings generates a 1% to 5% premium cost when compared to traditional buildings (Volschenk, 2011). Moreover, there is growing doubt regarding the ability of green investments to generate profit due to challenges associated with the auditing of emissions, obtaining verifiable data and identifying emission sources (James, 2014). In addition, insurance policies that cover a firm's environmental risks are in short supply; hence, companies are not motivated to consider environmental programmes (Bowman Gilfillan, 2014). All these problems affect South African companies' ability to make sound decisions on green issues and reduce the firm's ability to manage associated risks. Hence, the environmental information these companies disclose in their annual reports does not influence the firm's financial performance (Godschalk, 2011).

The financial implications of integrating green investment practices in African corporate settings remain open to debate. While some studies demonstrate that profitability promotes firms' greening practices, others show that this is not the case. However, these conclusions mainly rest on corporate stakeholders' perceptions without a thorough scrutiny and examination of the companies involved. The current study bridged this gap by investigating if profitability spurs corporate green investment initiatives in South Africa. Profitability remains the main objective of any firm; hence, its scrutiny in relation to company green investment practices is significant especially in developing economies such as South Africa where investor confidence needs to be sustained.

Table 5.1 below illustrates a summarised analysis of the relationship between profitability and corporate green investment practice from examined literature.

Table 5.1: Relationship between Profitability and Corporate Green Investment Practice from Examined Literature

Author and Date	Main finding	Method	Implications for further study

Przychodzen and Przychodzen (2015)	Positive relationship	Investigated state owned firms in Poland and Hungary using accounting based measures from 2006 to 2013.	Focus should extend to interviews, questionnaires instead of wed-based reports. Focus should also investigate marketing and technological innovations.
Griffin and Sun (2013)	Positive relationship	Examined whether greening pays on four polluting US industries using longitudinal data of 1990 to 2003.	Should take into account the time variations in firm greening performance so as to understand the company's strategic actions and the time lag related with resource constraints.
Clarkson et al. (2011)	Positive relationship	Scrutinised firm green practice of 84 firms using their 172 greenhouse gas disclosures through CSR newswire from 2000 to 2010.	Consideration should take into account of climate change disclosures.
Muhammad et al. (2015)	Mixed relationship	Surveyed Australian state owned firms before (2001-2007) and during (2008-2010) the global recession using	Stakeholder view about ethicality of firms require investigation. Specific and relevant environmental practice of firms to its stakeholders require

		ASX database and National Pollutant Inventory.	research.
Ghisetti and Rennings (2014)	Mixed relationship	Studied if greening pays on German firms. Used the Mannheim Innovation Panel (MIP) of 2009 and 2011. Econometric analysis was completed.	Panel data analysis could be employed to tests the data as it is able to include other variables (technology level, managerial quality) which can influence firm profits.
Busch and Hoffman (2011)	Mixed relationship	Analysed 821 firms from the DJSI using questionnaire and COMPUSTAT database approaches. Regression and ANOVA methods analysed the data.	Longitudinal analysis is important since it considers time variation.
DiGiuli and Kostovetsk (2014)	Negative relationship	Used CSR rankings of Kinder, Lydenberg, Domini to examine Republican and Democratic leaning US firms using accounting based measures (sales, stock returns,	More profitability indicators can be used and other type of firms can be considered using methods that consider time variation.

		return on assets).	
Thorburn and Fisher-Vanden (2011)	Negative relationship	Appraised firms on US and European stock markets using the Carhart four factor model from 2001 to 2006.	Other stock markets in other regions can be studied.
Ziegler et al. (2009)	Negative relationship	Explored 39 Climate Leaders firms and 72 Ceres firms using regression analysis.	Study of corporate membership with other green-oriented organisations is significant.

From the foregoing literature review, the third research hypothesis is therefore stated as:

$H0_3$: Profitability does not influence green investment practices in JSE listed firms.

5.4 Summary of Chapter 5

Chapter 5 presented a review of international and African literature on the relationship between profitability and corporate green investment initiatives. While some studies have found that profitability influences green investment practices, others found a negative association between profitability and corporate green investment practices. Yet other studies produced mixed findings on this issue. The implications of these studies include amongst others, exploring diversified company profitability measures using longitudinal surveys; adding other variables (technology level, managerial quality) in panel data analysis which can influence firm profitability and undertaking studies using interview based methods which can be used to support web and document analysis.

CHAPTER 6

HYPOTHESIS DEVELOPMENT

ENVIRONMENTAL CONSCIOUSNESS AND CORPORATE GREEN INVESTMENT PRACTICES

6.1 Introduction

This chapter is made up of two main sections, namely, the international perspective and the African view on environmental consciousness and corporate green investment practices. The last section presents a summary of Chapter 6.

6.2 The International Perspective

As result of different mega-developments, including global pressure to address environmental degradation, green innovation and research and tough environmental legislation, corporations are under increased pressure to act in an environmentally conscious manner (Chan and Hawkins, 2010). Studies conducted in the US demonstrate that environmental consciousness spurs green investment initiatives. Innes and Sam (2008) note that companies that are responsible for high pollution levels are under pressure to change their ways as environmentally conscious consumers can substitute non-green commodities with green products.

Innes and Sam (2008) thus found that environmental activities are significantly associated with a firm's environmental awareness and hence it's environmental performance. Highly environmentally conscious companies generate better environmental performance ratings than their non-environmentally conscious counterparts. Management's level of environmental awareness, stance and beliefs are fundamental motivators to adopt environmentally conscious practices (Marshall, Cordano and Silverman, 2005). Effective environmental management practices (better product and operational designs) that are supported by the management team lead to corporate environmental consciousness and performance while weak environmental initiatives produce decreased corporate environmental engagement.

Furthermore, a company's environmental training programmes promote environmental consciousness at corporate level. Education is important in fostering long-term transformation (Antonietti and Marzucchi, 2013) as workers that are

environmentally aware and attentive have a tendency to adopt green conduct (Amel et al., 2009) that stimulates the green emancipation of companies (Wagner, 2010). Thus, a positive association is established between environmental awareness and organisational green investment initiatives. Similarly, Vachon and Klassen (2006a) highlight that co-operative green activities among suppliers and consumers improve firms' environmental consciousness and promote environmental technology adoption, improved environmental planning and quality, superior environmental performance and enhanced delivery.

Another study by these researchers of North American companies yielded similar results and demonstrated that the integration of environmentally friendly technology is positively related with practices that reduce pollution and with improved environmental management models (Vachon and Klassen, 2007). Thus, a proactive environmental policy promotes institutional learning and supports superior human resource activities which improve workers' environmental awareness and expertise and overall environmental participation (Waldman et al., 2006). An organisation's environmental conduct is therefore influenced by diverse motivators that include the availability of environmental information, environmental consciousness and environmental concern (Perron et al., 2006). These survey findings illustrate that environmental awareness has a positive relationship with corporate green investment activities. Studies conducted in Europe have produced similar results.

In Europe, corporate environmental leadership has led to the growth of "green-green" businesses that exhibit high levels of environmental awareness which translates into improved green profiles of companies' manufacturing processes and products (Runhaar, Tigchelaar and Vermuelen, 2008). Both medium and large organisations are under pressure to develop mission statements, practices and goals with regard to the natural environment. Being "green-green" is associated with superior competitiveness, and environmental accountability and leadership (Guziana, 2011). Factors that foster positive firm environmental performance include "environmental knowledge", "environmental values", "environmental attitudes", "revealed willingness to act" and "actual behaviour" (Zśoka, 2008). Thus, corporate green practices are promoted when the organisation becomes more environmentally aware (Bohdanowicz, 2005).

Moreover, environmentally aware practices are important to ensure environmental sustainability and organisations are prepared to use environmental knowledge to satisfy customers' green demands (Bohdanowicz, 2006). Corporate environmental initiatives promote the green interests of stakeholders. For example, high levels of green consciousness supports green innovation which promotes green advancement in products, procedures or enterprise models, thereby enhancing the organisation's environmental sustainability (Triguero et al., 2013). In the same vein, the adoption of Environmental Management Systems (EMS) stimulates corporate environmental consciousness and encourages firms to formulate comprehensive environmental objectives and activities to achieve them (Wagner, 2008). Therefore, improved green consciousness applied through broadened adoption of green practices generates financial rewards and market growth opportunities as the company minimises environmental risks whilst promoting environmental efficiency (Azevedo, Carvalho and Machado, 2011).

Firms with green policies and practices promote green consciousness and knowledge in their operations as well as environmental disclosure (Sullivan, 2009). Green supply chains improve green production through utilising green R&D (Andiç et al., 2012). Hence, green awareness is acquired through broadened green production approaches which have a positive effect on the firm's environmental performance (Sezen and Çankaya, 2013). Environmental consciousness and green knowledge (capability) as well as regulations influence investment in eco-innovation (Kesidou and Demirel, 2012). The challenges to corporate environmental engagement include, amongst others, poor environmental consciousness and knowledge, financial constraints and inadequate infrastructure. Companies with an effective environmental strategy demonstrate high levels of environmental consciousness (among employees, practices, shareholders) and improved environmental performance when compared with companies with no environmental strategy.

For instance, high levels of green knowledge and awareness of Quality Management (QMS) motivates innovative green practices (Cuerva et al., 2014). Thus, improved consciousness of corporate green-based strategy is a major driver of green innovation (Santolaria et al., 2011). A resource-based perception of the company brings about a positive correlation between a proactive environmental strategy and improved environmental performance (López-Gamero, Molina-Azorin and Claver-

Cortes, 2009). Thus, there is a positive association between environmental practices and environmental awareness.

As well, environmental awareness is raised by means of environmental education and training that encourage employees to be task stimulated and to be able to adapt to environmental changes, thereby encouraging the firm to implement pro-environmental activities (Wee and Quazi, 2005). Corporate green innovation, the exchange of green knowledge and the adoption of environmentally sound technology foster the greening of the firm by increasing green knowhow and awareness of how to manage environmental risks, reduce costs and achieve energy efficiency (Jalali Naini et al., 2011). A firm's environmental awareness, knowledge, policy and conduct generally determine its engagement with environmental issues (Mostafa, 2009).

Numerous studies in Asia have also highlighted that environmental awareness spurs firm green investment practices. For example, a shift to green technology heightens environmental awareness and supports the development of solutions to different environmental challenges (Shin et al., 2008). When an organisation adopts environmental activities, this fosters improved environmental awareness and ensures that the firm's strategic plans are based on a culture of such awareness (Lee and Rhee, 2007). Shin et al. (2008) and Lee and Rhee (2007) highlight that environmental consciousness and conduct are significant in stimulating the adoption of green activities. Conversely, environmental consciousness could be improved by adopting environmental technologies and initiatives, in addition to satisfying the demands of green stakeholders (Min, 2011).

Green Supply Chain Management (GSCM) stimulators (legislation, marketing demands and competitive forces) have also heightened environmental consciousness and improved environmental performance (Zhu, Sarkis and Geng, 2005). Moreover, firm total quality management (TQM) and environmental management systems (EMS) improve institutional learning and hence environmental consciousness which leads to improved GSCM performance (Zhu et al., 2008b). Min (2011), Zhu et al. (2005) and Zhu et al.'s (2008b) findings are supported by Lai and Wong (2012) who found that the high levels of green consciousness generated by adopting Green Logistics Management (GLM) improve a company's capacity to

preserve resources, and minimise waste and emissions as well as improve operational efficiency.

In addition, while companies operate in different contexts, the integration of environmental practices in green supply chain activities improves environmental consciousness, indicated by such firms' tendency to adopt green practices at various business levels (Zhu et al., 2008a). Similarly, carbon management initiatives improve environmental awareness and are important in creating an enabling environment that promotes the company's green policy (Liu, 2012). Therefore, environmentally conscious practices within and outside the firm have a strong relationship with green buying, collaborative consumer efforts and green investment recovery which enhances a firm's overall environmental and financial performance (Chan et al., 2012).

In Taiwan, it has been found that environmental awareness is a "partial mediator" between corporate social responsibility and green human capital, green relational capital (all forms of association and links between the company and all stakeholders) and green structural capital (systems, policies, patents, trademarks, procedures which the company has established over time) (Chang and Chen, 2012). Likewise, the main factors that produce improved GSCM are environmental commitment and environmental consciousness in relation to product life cycle issues, product recycling processes and suppliers' management capability (Hu and Hsu, 2010).

Green innovations (energy efficiency, pollution reduction, waste management, green product development) are significant environmentally conscious approaches that improve a firm's environmental performance in order to comply with green regulations (Chen et al., 2006). Co-operative green programmes with suppliers, senior management's engagement and attentiveness to consumers' green demands also considerably improve environmental awareness that translates into increased green purchasing by companies (Yen and Yen, 2012). Hence, environmental awareness enables the company to increase its environmental investments, leading to superior green advancement (Chang, 2011).

Similar outcomes have been observed in the Malaysian corporate sector. For instance, ecodesign and reverse logistics are cost-effective methods that improve

environmental awareness, thereby stimulating improved production of environmentally compatible products that enhance both financial and environmental performance (Eltayeb et al., 2011). Environmental regulations, competition, customer demands and sustainability principles motivate environmental consciousness among firms and result in increased adoption of green initiatives (eco-designs, supply chains, reverse logistics, certification) (Hsu et al., 2013b).

For example, “reverse logistics” and “green product designs” promote a company’s participation in environmental issues and are the result of improved environmental awareness which spurs firms to sustain green policy and access the benefits associated with green practices (Khor and Udin, 2013). Therefore, integrated green initiatives result from improved environmental awareness that leads to corporate commitment to environmental activities (Rahman, Ahmad and Rosley, 2013). Environmental consciousness promotes corporate green investment practices.

Turning to Hong Kong, Chan and Hawkins (2010) note, that, an environmental team spirit in all departments spurs expanded participation in environmental activities and is, in turn, stimulated by managers that are environmentally conscious. Hence, the adoption of environmental activities is negatively affected by a lack of environmental knowledge and expertise (Chan, 2011). Such knowledge and expertise translates into broader corporate environmental engagement. Consequently, “environmental awareness”, “environmental knowledge” and “environmental concern” are positively related with the adoption of green activities in enterprises (Chan et al., 2014). Thus, in line with other international research, these studies suggest that environmental consciousness motivates Hong Kong’s firms’ green investment practices.

Company affiliation with environmental groups and high levels of environmental consciousness among employees are positively related to pro-environmental practices (Fielding et al., 2008). In contrast, a lack of environmental awareness propelled by employees’ disinclination to participate in the firm’s environmental programmes delays corporate environmental initiatives and stymies success. Therefore, firms that adopt cleaner manufacturing practices facilitate environmental consciousness which enables them to adopt pollution prevention (P2) schemes (Cagno et al., 2005). Furthermore, environmental standards such as ISO 14001 certification generate positive environmental awareness that results in certified firms

introducing numerous and diverse environmental management mechanisms (Johnstone and Labonne, 2009) in addition to enhancing their reputation in environmentally aware markets, thereby influencing other firms to follow suit (Nishitani, 2010).

Environmental networks are also particularly important for small and medium enterprises since such networks are the foundation for developing broader environmental programmes (Halila, 2007). Likewise, environmental training and management initiatives and employee empowerment in an ISO certified firm improve environmental awareness, leading to enhanced environmental performance (Daily et al., 2007). Workers' commitment to environmental practices is positively correlated to the firm's capacity to reap the benefits of environmental activities (Del Brio et al., 2007). Employees responsible for green issues are able to use diverse sources of data from within and outside the firm that offer a comprehensive view of environmental issues. Firms that disseminate environmental knowledge generate heightened employee consciousness, thereby promoting practices to improve environmental performance.

Challenges to organisational greening, including a "lack of environmental awareness" and "poor management skills", can be controlled by engaging companies in the early stages of green strategy development which encourage them to become more green-focused (Engau and Hoffman, 2009). Environmental education facilitates environmental behaviour (Rahman et al., 2013). Thus, green innovation is propelled by internal forces (green leadership, green capability and a green culture) and external factors (green regulations, green investors and green customers) which cultivate the green consciousness required to promote greening practice (Chen et al., 2012a). Furthermore, a firm's sustainability policy expands green awareness in the supply chain, thereby fostering effective environmental approaches that minimise environmental degradation (Kumar et al., 2012). It follows that environmental awareness stimulates companies to incorporate green initiatives and innovation which then improve both corporate environmental goals and environmental performance.

Chou and Chou (2012) identify the three factors that promote the IT sector's greening goals as "awareness", "translation" and "comprehension." An IT firm's

green consciousness with regard to “green use”, “green design”, “green manufacturing” and “green disposal” determine the environmental effects of IT adoption (Murugesan, 2008). Hence, repeated green IT innovation, early green IT practice integration, shared green visions and stakeholder incorporation are important assets which improve environmental awareness in relation to green IT applications (Rahim and Rahman, 2013). Wu et al. (2011) suggest that stimulators for greening firm supply chains are cleaner manufacturing initiatives, green buying, green design, green certification, green innovation and distinct green quality which serve to improve a firm’s overall environmental consciousness and hence its greening capability.

Kopnina (2014) points out that, corporate environmental activities are facilitated by technological growth such that self-interest, the natural environment and economic issues can be positively integrated while firm resource efficiency spurs long-term development. Therefore, increased awareness of green lifestyles, green buildings and environmental issues significantly promotes corporate green practices (Bozovic-Stamenovic et al., 2015). Furthermore, corporate environmental training generates a positive association with a company’s level of environmental control (Jabbour, 2015). Companies with broader environmental control frameworks experience improved environmental performance capacities as consciousness is broadened (Phan and Baird, 2015).

In addition, voluntary pollution prevention projects have a positive relationship with an increased volume of environmental patents, thereby indicating that improved firm environmentalism is a catalyst in financing clean technologies (Chang and Sam, 2015). It is for this reason that a company’s environmental orientation and level of environmental innovation predict the extent of its green investment practice (Gabler et al., 2015). For example, a reduction in both environmental input and output inefficiencies in high-income nations leads to improved environmental efficiency, while rising environmental input and output inefficiencies in low and middle income nations explain why these countries’ environmental efficiency is declining (Li and Wang, 2014). Thus, an increase in corporate environmental consciousness is the prime reason why companies introduce broader environmental control frameworks (Djekic, Rajkovic, Tomic, Smigic and Radovanovic, 2014). Hence, it is important to recruit managers with high levels of green consciousness as they enable eco-

industries to achieve sustainable performance and growth (Qu, Liu, Nayak and Li, 2015).

6.2.1 International literature which demonstrates a neutral and/or zero association between environmental consciousness and corporate green investment practices

Various international studies have demonstrated that the relationship between environmental consciousness and corporate green initiative adoption is zero and/or neutral. For example, some surveys document no statistical association between individual environmental behaviour and favourable or improved environmental performance (Schaper, 2002). Secondly, there is no association between green practice adoption and practices undertaken to improve the environmental performance of small and medium companies (Acutt and Geno, 2000). Schaper (2002) and Acutt and Geno's (2000) studies in Australia concur that environmental awareness and green investment practices in the corporate context have zero correlation. Thus, increased levels of concern for the environmental do not necessarily translate into improved environmental conduct (Olli and Wollebaek, 2001). Similar findings have been made by studies in the UK.

For example, there is no correlation between corporate greening practices and activities to manage the natural environment (Tilley, 1998). Furthermore, there is no relationship between a firm's environmental attitude and environmental initiatives (Hutchinson and Chaston, 1994). Petts, Herd, Gerrard and Horne (1999) illustrate that a gap exists between the firm's environmental attitudes and the practices it adopts to manage environmental challenges. In the same vein, a gap has been identified between company owners' attitudes and their environmental conduct (Tilley, 1999). Hence, these studies demonstrate a zero relationship between environmental consciousness and green practice (Tilley, 1998; Hutchinson and Chaston, 1994; Petts et al., 1999 and Tilley, 1999). On the other hand, some studies have shown more mixed results.

Simpson, Taylor and Barker (2004) demonstrated that most service companies do not perceive that environmental benefits are linked to expanding their environmental practices, but the opposite was true of manufacturing companies. Thus, service companies' environmental consciousness did not facilitate green activities, but it did stimulate green practice in manufacturing firms. Some scholars have posited that

gender issues explain the variances. For example, Eckersley (1992) evaluated environmentalism and political theory and noted that ecofeminists support the view that women are better positioned to comprehend natural environmental issues than their male counterparts since the former are regarded as life givers and women experience unity with the natural environment (the patriarchal hierarchy of God). Thus, women's environmental awareness would motivate corporate green investment practices more than men if women were in leadership positions.

In contrast, Van Liere and Dunlap (1980) analysed the social foundations of environmental concerns and stated that women are more likely to participate in environmental activities if such practices are associated with private, personal or family issues than in corporate contexts. Similarly, McStay and Dunlap's (1983) study demonstrates that women are more prone to make choices concerning individual conduct while men tend to show interest by influencing other people's environmental decisions and conduct (being very active in public). Thus, McStay and Dunlap's (1983) study outcomes illustrate that, in contrast to men, environmental awareness among women is unlikely to motivate broader green practice incorporation in a corporate context. However, Hines, Hungerford and Tomera (1987) meta-analysis of human environmental conduct found no association between gender and environmental conduct.

Some studies have linked corporate green initiative incorporation in relation to environmental consciousness to age. Petts, Herd and O'hEocha (1998) research outlines that, while country studies demonstrate that the youth show less interest in environmental issues than older people, young company managers that participated in focus groups showed keen interest in such issues. Therefore, environmental awareness among young people spurs green practices. However, Hallin (1995) found that older people reacted positively to environmental issues but had a negative association with new environmental paradigms/worldviews. The fact that the "green economy" is a feature of the modern era means that older people in corporate contexts are not always aware of such issues (Hallin, 1995).

Zhang, Wang and You (2015) highlight that consumer environmental consciousness has a monotonic relationship with retailers' financial advantages while it generates a convex association with manufacturers' financial benefits. This study also adds that

the volume of orders for environmentally sound commodities is positively related to consumer environmental consciousness for both retailers and manufacturers. Environmental collaboration with consumers stimulates firms' environmental performance indirectly by motivating the firm to introduce green practices which increase market share and reduce costs (Grekova, Calantone, Bremmers, Trienekens and Omta, 2015). In contrast, corporate environmental collaboration with suppliers results in high awareness that translates to improved environmental performance through cost reduction although such collaboration does not empower the firm to improve its internal environmental sustainability performance (Grekova et al., 2015).

While Grekova et al. (2015) and Zhang et al.'s (2015) research outcomes contradict each other, they suggest that stakeholder influence (especially consumer environmental awareness) motivates a company's own consciousness, thereby spurring green investment initiatives. Kacan's (2015) study found a zero statistically significant relationship between gender and the level of consciousness of green energy sources, but identified meaningful variances among the groups under study concerning the level of awareness of green energy. Hörisch (2015) determined that corporate environmental orientation produced a zero association with environmental crowdfunding (financing environmental projects). Thus, Kacan (2015) and Hörisch's (2015) studies offer inconsistent evidence on the relationship between environmental awareness and green investment activity.

Fraj et al. (2015) shows that a proactive corporate environmental policy and innovation spur improved company environmental performance but a green orientation does not have a positive relationship with a firm's environmental competitiveness. In the same vein, companies with low green awareness respond positively to government interventions in the form of financial subsidies and tax credit policies while carbon pricing systems have been found to have a marginal impact on support for greening practices (Liu, Yamamoto and Suk, 2014). Hence, Fraj et al. (2015) and Liu et al.'s (2014) studies show that, while some green investment practices motivate greening activities among firms through increased environmental awareness, others do not stimulate firms' green investment capability.

Equally important, it has been found that people that are concerned about climate change are not prepared to pay for activities which spur greening although they are willing to adopt practices which reduce the impact of climate change (Dienes, 2015). Moreover, improved environmental awareness as a result of “stakeholder pressures” and “environmental management practices” stimulates firms to introduce broader environmental initiatives while consciousness of “sources of greenhouse gas emissions” is not important in motivating firms’ greening practices (Tatoglu, Bayraktar and Arda, 2015). Hence, the effectiveness of a firm’s environmental management procedures is an antecedent of the firm’s environmental performance whilst the same procedures mediate the relationship between corporate environmental performance and institutional factors (top management support, group work, reward systems, worker engagement, and training practices) (Tung, Baird and Schoch, 2014).

In this regard, employees who support organisational environmental practices continue to support a company’s green investment practices even if the firm fails to act in particular circumstances (a breach) but employees that show low levels of support for company environmental activity develop a negative relationship in event of a breach (Paillé and Raineri, 2015). Therefore, individual green mindfulness is positively connected to pro-environmental conduct and the association with the natural environment is indirectly affected by this connection (Barbaro and Pickett, 2015). For instance, Garbie (2015) highlights that environmental awareness among industrial firms was high, as proven by the large number of environmental sustainability initiatives. In contrast, environmental awareness was low among government controlled entities and their focus was on economic sustainability.

6.2.2 International literature which demonstrates a negative association between environmental consciousness and corporate green investment practices

Some global research has found a negative association between environmental consciousness and green investment practices. For example, voluntary environmental certification is characterised by a reduced degree of environmental “maturity” in both eco-management and audit scheme (EMAS) adopters and non-adopting companies (Iraldo et al., 2009). Thus, there is no positive association between an environmental “co-operation strategy” and environmental performance

(Bönte and Dienes, 2013). Despite heightened consciousness of the strategic value of carbon-intensive mechanisms, there is little evidence that climate change has led to revolutionary pro-environmental change in firms' daily business operations (Okereke and Russel, 2010). Environmental conduct rarely translates into sound environmental practices (Tilley, 2000).

Green, McMeekin and Irwin (1994) explored corporate technological environmental innovation and R&D and found that some companies re-evaluates their environmental technological capacities, resulting in reduced R&D practices, thereby reducing environmental innovation. Hence, environmental consciousness did not influence environmental innovation. Thus, environmental awareness has a negative correlation with firms' environmental practices. In addition, corporate environmental policy and environmental management initiatives fit poorly with frameworks for corporate green practice (Schaefer and Harvey, 1998). Despite the potentially large savings which could result from incorporating environmental practices, many business owners are sceptical that environmental investment can generate positive outcomes (Groundwork, 1998).

For example, the green consciousness associated with eco-innovation in French firms has not promoted green R&D, thereby suggesting a negative relationship between eco-innovation and green R&D (Belin, Horbach and Oltra, 2011). Furthermore, Borghesi et al. (2012) determined a negative association between eco-innovation companies and green R&D. Likewise, environmental benchmarks such as ISO 14001 certification (when implemented alone) will not result in sound organisational environmental consciousness and hence, improved environmental performance (Aragón-Correa and Rubio-López, 2007). Therefore, in line with the international literature, these research findings demonstrate that environmental awareness does not motivate corporate green investment practice in European corporate settings.

For example, company managers' green attitudes and knowledge have improved as a result of legislative pressure but such awareness has not resulted in the adoption of sound environmental technologies (Gadenne, Kennedy, and McKeiver, 2009) since many firms do not perceive environmental practices as a significant source of

improved environmental performance, or as an issue that is important among their suppliers and customers (Gerrans and Hutchinson, 2000). The managers that participated in Hutchinson and Gerrans' (1997) study expressed concern regarding broad environmental issues, but this was not reflected in their firms' business operations. Harris and Crane (2002) found that, although companies were environmentally conscious, few had adopted green initiatives that met the expectations of environmental activists and standards. For instance, there were few environmental variances among environmentally certified firms and non-certified firms (Darnall et al., 2005).

Ditlev-Simonsen (2010) found that, while companies had extensive knowledge of environmental issues such as pollution control, energy efficiency and waste management, activities were not implemented to manage these issues. A related study confirmed that companies that do not adopt solid waste management practices had better environmental performance indicators than those that had adopted such practices in the past (Sarkis and Dijkshoorn, 2007). In the same vein, the architects surveyed by Ofori and Kien (2004) were aware of the environmental effects of building materials, but did not integrate green design mechanisms. On the other hand, environmental consciousness may not motivate green marketing practices because, while most consumers are highly environmentally conscious, they are loyal to conventional commodities (Alsmadi, 2007). Thus, Ditlev-Simonsen (2010), Sarkis and Dijkshoorn (2007), Ofori and Kien (2004) and Alsmadi's (2007) research demonstrates that environmental awareness is negatively associated with green investment practices.

Kanda, Santiago and Olof (2015) discovers that companies in the environmental technology sector were conscious of environmental practices but only a few pursued such activities. While there is widespread awareness of the significance of biofuels (a form of green energy), green energy adoption has not improved and investment in green technologies remains low (Erakhrumen, 2014). A related study found that proximity to nuclear plant facilities does not improve environmental consciousness and therefore does not influence attitudes on the safety of nuclear energy (Cale and Kromer, 2015). While Leadership in Energy and Environmental Design (LEED) certification frameworks have been improved (to the level of the latest version (v.4)),

they have not resulted in increased environmental awareness that facilitates activities to address current corporate environmental challenges (Suzer, 2015). Corporate environmental rankings and company annual reports show an inverse association between awareness and environmental performance (Cong, Freedman and Park, 2014).

Thus, numerous studies have shown that environmental consciousness promotes green investment initiatives and policy as demonstrated by the adoption of eco-efficiency in corporate budgeting (Burritt and Schaltegger, 2001; Burritt and Saka, 2006); the greening of industry operations and markets (Green, 2003; Vachon and Klassen, 2006b; Schaltegger and Burritt, 2014; Lee, Park and Kim, 2015b) and improved environmental performance (Bhattacharya, Mohapatra, Kumar, Dey, Brady, Tiwari and Nudurupati, 2014; Schaltegger and Burritt, 2014). However, some studies have demonstrated a negative association between environmental consciousness and corporate green investment initiatives, while others produced mixed results. The current study therefore aimed to generate results that reconcile these conflicting outcomes so that clear findings could be produced in South African contexts.

The following section investigates environmental awareness and corporate green activity from an African perspective.

6.3 The African Perspective

The African literature indicates that environmental awareness spurs firm green practices. For example, firm consciousness of green practices is significant in promoting environmental activities, and communication and co-ordination of green initiatives among private companies, government departments and other economic sectors in order to mitigate climate change (Department of Environmental Affairs and Tourism (DEAT), 2004). The private and public sectors in South Africa are involved in activities that aim to reduce carbon emissions and in education and campaigns to promote environmental consciousness (BuaNews, 2011b). The DEAT (2004) and BuaNews (2011b) note that “business unusual” practices in South African contexts are green investment initiatives that promote environmental consciousness and

encourage green policy integration by corporations since they are likely to alter traditional business operations.

Heightened environmental awareness among businesses promotes improved green decision making and planning with regard to climate change issues, improves research and facilitates sound environmental management (BuaNews, 2011a). For instance, carbon pricing in South Africa's industrial and economic sectors will improve green consciousness that could result in more widespread adoption of green technologies while traditional technologies will become less attractive (Tyler et al., 2009b). Heightened awareness of the negative effects of carbon-intensive approaches (coal technologies) has fostered the development of nuclear power stations, the synfuels industry and Carbon Capture and Storage (CCS) as new green programmes that can be adopted by South African firms (Zeroco2, 2012).

Green (2011) illustrates that the Climate Disclosure Project (CDP) has raised environmental consciousness and transformed South African firms' environmental mind-set, enabling companies to restructure and align their operations with green investment requirements. Companies with access to climate technology patterns, commodities and green technology transfer green awareness which spurs the development of green platforms and green innovation (Morithi, 2014). Green (2011) and Morithi (2014) posit that a systematic climate change plan increases firms' green consciousness and provides the green knowledge required to manage the transition to a low-carbon economy.

Argus Media (2013) notes that despite anticipated opposition on the part of South African companies, green practices such as a carbon tax will act as efficient green consciousness drivers and encourage widespread adoption of green or low-carbon activities. Engaging green expertise to present and disclose non-financial information stimulates environmental consciousness that results in improved adoption of efficient low carbon or green investment activities such as the proposed carbon tax system (SAICA News, 2009). In contrast, the lack of green expertise hampers environmental awareness in South African companies and has resulted in a little or no green investment (Gore and Tucker, 2008). Thus, environmental awareness motivates green investment initiatives which foster the development of low carbon or green environments within firms.

Green awareness is also important since the change to a low carbon economy is inevitable. Green consciousness creates the basis for firms to actively engage in initiatives which reduce carbon emissions (The Carbon Report, 2014). For example, green consciousness in relation to carbon disclosure and performance has improved in South Africa at both firm and industry levels (CDP, 2012). In the same vein, carbon reporting practices spur South African companies to acquire improved environmental consciousness which empowers these firms to manage climate change risks in addition to building environmental resilience (CDP, 2014). Moreover, determining products' carbon footprint improves a company's environmental awareness, and promotes ecolabeling and green marketing instruments within an organisation (SGS, 2014). Consequently, the incorporation of a carbon management model generates high levels of environmental consciousness which ultimately instils a green culture in the workplace (Vermuelen, 2013).

Similarly, Gluckman (2010) postulates that green education for employees is significant in incorporating a "Carbon Emissions Reduction Plan" in South African contexts owing to improved environmental consciousness (up to 10% of a firm's carbon emissions are generated by incorrect or poor green performance on the part of staff). Therefore, environmental awareness has increased among South African organisations, with more firms disclosing environmental information and meeting carbon emissions reduction targets in their business value chains (CDP, 2009). Given South Africa's green economy policy direction, firm green capacity and green awareness is significant in facilitating green initiatives among the country's companies.

For example, green investment incentives could be adopted to neutralise the impact of greening on firms' competitiveness, including industry exemptions and tax breaks (South African Treasury, 2010). Moreover, companies and government should integrate environmental awareness with South Africa's Indigenous Knowledge System (IKS). This would encourage both companies and society at large to participate in environmental issues and promote the development of green societies and firms (Tshautshau, 2013).

Green Futures (2009:7) demonstrates that a lack of environmental consciousness negatively impacts the adoption of corporate green investment practices. It quotes

the former South African Minister of Energy Affairs who stated in 2004 that, “Our coal is part of the wealth of this country…it is ‘brown’ not ‘green’ – yet how do you abandon it?” This implies that greening organisations adjust and capably mitigate business risks (such as unfavourable environmental reports, regulatory risks, increasing energy costs and loss of competitiveness) (Bonellie, 2013). Moreover, green training and education on important initiatives such as the “Certified Green Consultant Course” offered by Eco-Education Centres enable companies to acquire green knowledge and environmental awareness which positively equip firms with capabilities in relation to green technologies, green best practices and environmental auditing approaches (Greenfinder, 2014b).

With increasing green knowledge, some South African companies have acquired eco-friendly technology that offers 100% paperless administration characterised by high energy efficiency and minimal use of carbon paper and ink (Perks and Smith, 2012). The Green Buildings Council of South Africa’s Green Star Rating for existing and newly-constructed green buildings promotes environmental consciousness and encourages environmentally compatible and sound energy management practices (Engineering News, 2014). Moreover, green innovation enhances manufacturing green awareness which empowers companies to accomplish important environmental goals (Van den Berg et al., 2013). SAPIA (2008) notes that, improved environmental awareness through promoting environmentally friendly fuel in South Africa (as of 1996) has facilitated the adoption of new green technologies in the transport industry.

Environmental consciousness improves when CDMs are adopted that empower South African businesses to substitute carbon intensive technologies with green energy technologies (Department of Energy, 2014). For example, increased awareness of the detrimental effects of the use of fossil fuels led some South African energy companies to produce biodiesel, an environmentally compatible fuel (Naidoo, 2014). Likewise, the “green productivity South Africa (SA) toolkit” represents a corporate sustainable development practice that will increase awareness of the need to adopt green energy sources (for example, solar, wind) and avoid the use of chlorofluorocarbons in manufacturing processes (Coka, 2012).

South African corporations are also now environmentally conscious as a result of the implementation of green supply chain frameworks which generate long-term green commitment and on-going ground-breaking green innovation (CILTSA, 2013). Firms that are not environmentally responsible, lack green expertise and are therefore not environmentally aware (SAPA, 2009). Tech-pro (2014) also highlights that a lack of awareness at executive level and the lack of a single, globally-accepted green standard negatively affects Green Supply Chain Management (GSCM) adoption among South African firms.

South African companies are expected to promote environmental monitoring and control practices as well as adopt environmental crisis management procedures that broaden corporate environmental consciousness and ensure on-going commitment. Little, Maxwell and Sutherland (2007) findings confirm that CDMs improve corporate environmental awareness, thereby creating green contexts that act as a catalyst for the development of low-carbon environments. The adoption of Electric Vehicles (EVs) will encourage green consciousness which also stimulates Greenfield investments (the growth of new green projects within an industry and with other sectors) and Brownfield investments (development through the expansion or upgrade of green technologies linked to EVs) (Dane, 2014). Therefore, the ultimate success of corporate environmental practices that are designed to address environmental issues will depend on firms assuming total environmental responsibility and improved communication with all stakeholders.

6.3.1 African literature which demonstrates that environmental consciousness does not influence corporate green investment practices

Some South African studies demonstrate a negative relationship between environmental consciousness and corporate green investment practices. For example, Kasavel (2013) notes that improvements in environmental consciousness, carbon disclosure reporting and green performance in South African organisations do not lead to lower carbon emissions. Furthermore, despite widespread awareness of the benefits of paper recycling, most South African companies have not adopted such activities, as is evident in increased dumping in the country's landfill sites (PAMSA, 2012). The CIDB (2009) posits that although green programmes have

been introduced in South African organisations, the levels of green R&D and the employment of green technologies remain low. ESI-AFRICA (2012) observes that some South African corporate green programmes have not empowered companies to respond to the immediate implications of such green practices for future policies.

An evaluation of the literature on whether or not environmental consciousness motivates firm green practices reveals that while some studies have argued that environmental awareness promotes firm green investment practices, others established a negative association. Since these arguments are mainly founded on the perceptions of corporate stakeholders and media, with no actual research undertaken on the companies involved, the current study is significant in bridging this gap as well as substantiating or rejecting claims relating to the relationship between environmental consciousness and company green practices in South African contexts by generating original findings on the companies involved.

Table 6.1 below indicates a summarised analysis of the relationship between environmental consciousness and corporate green investment practice from examined literature.

Table 6.1: Relationship between Environmental Consciousness and Corporate Green Investment Practice from Examined Literature

Author and Date	Main finding	Method	Implications for further study
Qu et al. (2015)	Positive relationship	Examined eco-industrial park schemes in China by analysing manager's awareness.	Research on other sectors of the economy is important.
Triguero et al., (2013)	Positive relationship	Surveyed small and medium firms from 27 countries adapted from a	Large firms from Europe and other regions can be analysed. Other drivers of eco-

		common database. The trivariate probit model was used to generate estimated results.	innovation can also be studied.
Chan et al., (2014)	Positive relationship	Analysed 438 hotel workers from Hong Kong views using questionnaires. Structural equation modelling (SEM) was used for data testing.	The research should also scrutinise other cultural settings in China, Western countries and other Asian countries.
Grekova et al.(2015)	Mixed relationship	Studied 139 Dutch food and beverage firms. Structural equation modelling was employed.	Other industries require research. More variables can also be added for study.
Zhang et al. (2015)	Mixed relationship	Explored one manufacturing company and one retail firm. A multi-product newsvendor model was used to compare decision contexts. Sensitive analysis on the models was done.	A larger sample size require investigation.
Fraj et al. (2015)	Mixed relationship	Used a model to test 232 hotels in	Research on how company green

		Spain. Partial least squares technique was deployed in data analysis.	strategy, competitiveness and abilities can be effectually coordinated and used to realise high gains in hotels is vital.
Belin et al.(2011)	Negative relationship	Collected data from the fourth Community Innovation Survey (CIS). 3420 French firms and 788 eco-innovation friendly and 2504 other innovation German firms from 2002 to 2004 were explored. An Econometric analysis procedure was completed.	Other determinants of environmental innovation can be analysed using larger sample sizes.
Perron et al., (2006)	Negative relationship	Studied 2 Canadian electricity municipal firms using a structured questionnaire comprising 48 multiple choice questions and 6 open ended questions. ANOVA techniques	Inclusion of other factors in corporate environmental training (motivation of employees, manager's support, method of delivery, complexity of subject material) should be analysed regarding improving environmental

		analysed the data.	awareness.
Kanda et al.(2015)	Negative relationship	Investigated 693 environmental technology companies from Sweden using the collected 1020 records from diversified databases and webpages. Graphical descriptions presented the data.	Study on whether it is important to engage specialised agencies who offer environmental technology export is important. Investigation if environmental technology companies encounter peculiar problems in exporting their products is also significant.

Therefore, from the foregoing literature review, the fourth research hypothesis is stated thus:

$H0_4$: Environmental consciousness does not influence green investment practices in JSE listed firms.

6.4 Summary of Chapter 6

Chapter 6 reviewed the international and African literature on the relationship between environmental consciousness and corporate green investment initiatives. Whilst some previous studies found that environmental consciousness influences green investment practices, others concluded that there is a negative association between environmental consciousness and corporate green investment practices. Yet others surveys produced mixed results. The implications of these studies include amongst others, exploring different industries that are energy and non-energy intensive; scrutinise other determinants of green innovation using large sample sizes and expanding research to other regions.

CHAPTER 7
RESEARCH METHODOLOGY

7.1 Introduction

This chapter is made up of eight sections. The research method and design are presented, followed by the population and sample, research data and data collection procedures. The next sections discuss the data analysis procedures, research validity, research reliability and finally, the ethical considerations taken into account in conducting this study.

7.2 Research Method and Design

A researcher should set out the philosophical assumptions which underlie a study (Creswell and Clark, 2011). These include the paradigms (worldviews) which defined its development (Creswell, 2005; 2009). Paradigms are “worldviews that signal distinctive ontological (view of reality), epistemological (view of knowing and the relationship between knower and to-be-known), methodological (view of mode of inquiry), and axiological (view of what is valuable) positions” (Sandelowski, 2000:247). Creswell (2009) defines a paradigm (worldview) as the philosophical assumptions related to a specific perspective in a research study. Morgan (2007) identifies various types of paradigms, namely, positivist, constructivist, pragmatist and participatory.

The positivist paradigm is associated with quantitative techniques and hence involves the selection of variables which can be empirically observed and measured (Creswell, 2005). Mack (2010:6) elaborates that

> *“The positivist paradigm is also called the scientific paradigm. The purpose of research in this paradigm is to prove or disprove a hypothesis. Other characteristics of positivist research include an emphasis on the scientific method, statistical analysis, and generalizable findings.”*

The quantitative research method stresses the importance of determining the relationships between the variables under study (Bless and Higson-Smith, 2000).

Aliaga and Gunderson (2000:64) define quantitative research as “explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics).” In line with this view, Riff, Lacy and Fico (2014:3) define quantitative research as “the systematic assignment of communication content to categories according to rules, and the analysis of relationships involving categories using statistical methods.” Kerlinger (1964:544) describes quantitative research as “a method of studying and analysing communication in a systematic, objective, and quantitative manner for the purpose of measuring variables.” Based on the above definitions, this study adopted the positivist paradigm and a quantitative method because it sought to measure the relationship between variables using a statistical approach. Furthermore, a multiple case study was employed.

7.2.1 Case study design

Creswell (2009:61) defines a case study as *“a problem to be studied, which will reveal an in-depth understanding of a ‘case’ …which involves understanding an event, activity, process”.* Perry (2000:22) explains that if the “same study contains more than a single case, it is a multiple case design.” Therefore this study took the form of a multiple case study since the researcher examined 100 South African CDP companies listed on the JSE. Previous research that supports the use of multiple case studies to examine corporate green investment practices includes Yen and Yen’s (2012) analysis of 863 Taiwanese high-tech electronics companies, Pons et al.’s (2013) study that examined 116 Spanish manufacturing firms and 64 Slovenian manufacturing firms, Nandy and Lodh’s (2012) survey of 1 026 US-based companies, and Zeng et al.’s (2010a) examination of 125 Chinese firms. The literature notes that that there is no limit to the number of companies that can be included in a multiple case study (Creswell, 2005; 2009).

7.3 Population and Sample

Population

The population is the total set of constituents from which the researcher draws his/her sample to enhance representation (Bless and Higson-Smith, 2000). A

population is simply the aggregate of all the components (Mouton, 2001). It is the whole group that is considered for the research in line with the research objectives (Creswell, 2009). The population for this study comprised all 400 companies on the JSE (JSE, 2015).

Sampling Technique and Research Sample

Sampling enables a researcher to obtain an acceptable sample. De Vos (1998:191) describes sampling as "the element of the population considered for actual inclusion in the study." There are two main types of sampling, probability and non-probability sampling. With probability sampling, all the subjects identified in the population have an equal chance of being selected (Bless and Higson-Smith, 2000; Creswell, 2005; 2009). On the other hand, non-probability sampling "*does not attempt to select a random sample from the population of interest. Rather, subjective methods are used to decide which elements are included in the sample*" (Battaglia, 2008:523). Thus, in non-probability sampling, subjects do not have an equal chance of being selected (Creswell and Clark, 2011; Creswell, 2005; 2009). Different types of non-probability sampling include quota, snowball, convenience and purposive sampling (Bless and Higson-Smith, 2000; Creswell, 2005; 2009).

The purposive sampling technique was utilised in this study. In such sampling, the researcher selects a sample by considering potential participants' knowledge of a phenomenon (Creswell and Clark, 2011; Sandelowski, 2000). Maxwell (1997:87) notes that, "particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices." Babbie (1990:97) adds that purposive sampling identifies the sample "on the basis of your own knowledge of the population, its elements, and the nature of your research aims."

Therefore, a purposive sampling technique was used as the researcher purposely considered only those JSE listed companies that disclosed their green investment practices over a period of five years (2010 to 2014). These companies participate in the CDP, integrate green investment initiatives, adhere to JSE environmental sustainability requirements and measure, evaluate and control carbon emissions in

their operations (CDP, 2014; 2010; 2009). Hence, the CDP companies possessed the green attributes that this research focussed on. Consequently, the sample size comprised all 100 JSE listed companies that participate in the CDP.

7.4 Research Data

Secondary sources of data are data that have already been collected and are readily available from other sources which provide written descriptions of such data (Creswell, 2005; Riff et al., 2014). Hence, it is data that has been gathered for a purpose other than the research at hand and that enables the researcher to acquire an understanding of the problem. It can be employed in correlational, exploratory, evaluative and descriptive studies (Creswell, 2009). Secondary data is capable of demonstrating particular inconsistencies which motivates further study and analyses (Bless and Higson-Smith, 2000). As such, the application of quantitative research to secondary data produces broader findings that are more effective than the data in isolation (Hussey and Hussey, 1997; Creswell and Clark, 2011).

This study used secondary data retrieved from the annual sustainability reports of the 100 South African CDP firms listed on the JSE. These firms were investigated over a period of five years (2010 to 2014) through collecting information on the determinants of corporate green investment practices in JSE listed companies as stated in the research objectives. The study used two types of data, namely, external pressure data (environmental legislation, corporate image, profitability and environmental consciousness) and corporate green investment practices. The tables below illustrate the two types of data.

Table 7.1: Research data on External Pressure

Environmental Legislation	Statements pointing to environmental legislation as a factor motivating green investments, retrieved through content analysis of annual sustainability reports.
Corporate Image	Statements pointing to corporate image as a factor motivating green investments, retrieved through content analysis of annual sustainability reports.
Profitability	Statements pointing to profitability as a factor motivating green investments, retrieved through content analysis of annual sustainability reports.
Environmental consciousness	Statements pointing to environmental consciousness as a factor motivating green investments, retrieved through content analysis of annual sustainability reports.

Table 7.2 below shows how the company statements were confirmed.

Table 7.2: Criteria for company selection in indicating and/or not indicating a variable as a factor that promotes green investment practices

Category	**Corporate green investment practices**
Not Indicating	Number of average declarations over the five years less than 10
Indicating	Number of average declarations over the five years greater than 10

As shown in Table 7.2 above, the variable, external pressure fits into two categories of responses, namely, “Not indicating” and “Indicating.” Since integrated reporting was introduced in year 2010 in South Africa (JSE, 2015), the study chose 10 to be the criteria for company selection (“Not indicating” and “Indicating”) since it is able to provide an extended perspective of the company’s practices over the studied period.

Table 7.3: Research data on corporate green investment practices

Environmental Legislation related green investment practices	These are green investment practices identified by firms as being motivated by environmental legislation (see Appendix D)
Corporate Image related green investment practices	These are green investment practices identified by firms as being motivated by corporate image (see Appendix D)
Profitability related green investment practices	These are green investment practices identified by firms as being motivated by profitability (see Appendix D)
Environmental consciousness related green investment practices	These are green investment practices identified by firms as being motivated by corporate environmental consciousness (see Appendix D)

Table 7.4 shows how green investment activities were confirmed.

Table 7.4: Criteria for company selection in weak and/or strong category

Category	**Corporate green investment practices**
Weak	Average green investments over the five years less than R5 million.
Strong	Average green investments over the five years greater than R5 million.

Table 8.4 above illustrates that corporate green investment activities fit into two categories of responses, namely, “weak” and “strong.”

The researcher employed secondary research data since they are more effective, robust and reliable as a result of the sensitive nature of green issues (Delmas et al.,

2013; Gray, Kouhy and Lavers, 1995); support the use of a large sample size which minimises bias (Creswell and Clark, 2011; Creswell, 2009); and have been audited and are thus more credible sources (Bose and Pal, 2012; Clarkson et al., 2011).

7.5 Data Collection Procedures

A research instrument is the key mechanism used to gather and measure data (Mouton, 2001). This study utilised content analysis. Abbott and Monsen (1979:504) describe content analysis as, "a technique for gathering data that consists of codifying qualitative information in anecdotal and literary form into categories in order to derive quantitative scales of varying levels of complexity." Holsti (1969:14) defines content analysis as, "any technique for making inferences by objectively and systematically identifying specified characteristics of messages." Berelson (1952:18) notes that content analysis is "a research technique for the systematic, objective and quantitative description of the manifest content of communication." Clatworthy and Jones (2001: 317) emphasise that "text analysis is used in social science research for analysing textual data and involves drawing inferences from data by systematically identifying characteristics within the data." In this regard, content analysis refers to a research process that is employed to make replicable and valid inferences by interpreting and coding textual material (for example, documents, oral communication, and graphics) (Holsti, 1969; Paisley, 1969).

Paisley (1969:133) demonstrates that "text analysis is a phase of information-processing in which communications content is transformed, through objective and systematic application of categorisation rules, into data that can be summarised and compared." Therefore, content analysis was an appropriate approach to investigate corporate environmental and social sustainability issues (Bose and Pal, 2012; Chien and Peng, 2012) and is one of the most reliable methods (Gray et al., 1995) since it is generally capable of removing many redundancies (Elsayed and Paton, 2005; Clarkson et al., 2008). Krippendorff (1980:51) adds that "… content analysis research is motivated by the search for techniques to infer from symbolic data what would be too costly, no longer possible, or too obtrusive by the use of other techniques."

The researcher created a list of phrases relating to the influence of specific variables (viz., profitability, environmental legislation, corporate image and environmental

consciousness) on corporate green investment practices (see Appendix B). Gray et al. (1995) and Hackston and Milne (1996) used classification themes to examine corporate social and environmental sustainability. Weber (1990:37) clarifies that "a category is a group of words with similar meaning or connotations." Krippendorf (1980) states, that, classifications are expected to be mutually exclusive and comprehensive. The researcher carefully examined sentences and sections (paragraphs) in the annual sustainability reports of the selected firms. Sentences or phrases which were associated with the classification list for the relevant variable were extracted (Holsti, 1969). The researcher considered sentences or sentence contexts rather than independent words, as this approach improves reliability, meaning and in-depth comprehension of facts for further examination (Hackston and Milne, 1996).

The content (the variables under examination) was counted by uploading the relevant sustainability reports into Nvivo 10 software which produced the number of variables that appeared in each year's sustainability report. The use of Nvivo improves the efficiency and effectiveness of the data gathering process (Bergin, 2011; Welsh, 2002). Previous research that used the content analysis method to examine green and environmental sustainability issues includes Gray et al. (1995), Clarkson et al. (2011), Ramiah et al. (2013), Smale et al. (2006) and Delmas et al. (2013).

7.5.1 Strength of the content analysis method in corporate green investment practice studies

In the past 30 years, there have been numerous studies on corporate green investment practices (Chang and Chen, 2013; Kansal et al., 2014). Companies use annual sustainability reports and disclosure on environmental issues to demonstrate their responsibility, interests and accountability in relation to environmental issues (Delmas et al., 2013). Content analysis is one of the most effective research approaches to investigate corporate green investment practices as green issues are sensitive and therefore some companies decline to participate (Smale et al., 2006; Ramiah et al., 2013; Sumiani et al., 2007). The company's main reporting document (annual sustainability report) provides comprehensive information on corporate

green programmes (Gray et al., 1995; Brown et al., 2010; Bebbington, 2008; Hackston and Milne, 1996).

Adams and Harte (1998:784) note that "This focus on the corporate annual report is also consistent with previous social disclosure studies, since the corporate annual report is the main form of corporate communication and, particularly in the case of quoted companies, is made widely available." Neimark (1992: 100-1) observes that the "…annual report represents the world of corporate concerns in microcosm; it is a repository that is both comprehensive and compact. Moreover, because annual reports are regularly produced, they offer a snapshot of the management's mindset in each period; before they have had too much time to reflect on or fully digest the events they are describing and/or trying to influence . . . the preparers of the annual report do not have the benefit of hindsight nor an extended period of reflection, and are thus caught up in the moods and passions of their time." Given the fact that it is difficult to examine all firm communication on sustainability issues over a considerable period of time, content analysis of the company's sustainability reports is appropriate to evaluate corporate green issues (Bose and Pal, 2012; Chien and Peng, 2012).

7.6 Data Analysis Procedures

Data were analysed using the Chi-Square, Phi and Cramer's V tests. The Chi-Square test was utilised to investigate the significance of associations or relationships between two or more nominal-level variables (Panik, 2005). Sprinthall (1990) defines Chi-Square tests as a procedure employed to determine a statistically significant relationship involving groups of data. The reason for selecting Chi-Square tests for this study was that these tests make no assumption concerning the parameters of the population from which the sample is extracted (non-parametric) (Panik, 2005). Finney and DiStefano (2006) note that studies which evaluate the impact of non-normality have typically employed, amongst others, Chi-Square (χ^2) tests. The Chi-Square (χ^2) test was preferred for this study since the data were not normally distributed.

Test of Hypotheses

To test the hypotheses, data were gathered from companies' annual sustainability reports on management's declaration on how a variable (that is, corporate image, profitability, environmental legislation and environmental consciousness) independently drove or determined green investment initiatives. If management declared that a variable drove their initiative, the average number of such declarations over the five year period (2010 to 2014) from various companies was inserted in the "Indicator" row if that number was greater than 10. As well, if there was no declaration regarding the variable as a driving factor, the average number of such non-declarations over the five year period (2010 to 2014) was inserted under the "No Indicator" row if that number was less than 10.

Data on corporate green investment practices was also collected from the annual sustainability reports. If management confirmed that they undertook green investment initiatives, the average amount invested in greening over the five year period (2010 to 2014) was inserted in the "Strong" column if that amount was greater than R5 million, and if there was no declaration regarding the funding of green investment practices the average amounts of such non-declaration over the five year period (2010 to 2014) was inserted under the "Weak" column if that amount was less than R5 million. Therefore, the null hypotheses for the Chi-Square test are:

(Hyp.1) $H0_1$: Environmental legislation does not influence green investment practices in JSE listed firms.

(Hyp.2) $H0_2$: Corporate image does not influence green investment practices in JSE listed firms.

(Hyp.3) $H0_3$: Profitability does not influence green investment practices in JSE listed firms.

(Hyp.4) $H0_4$: Environmental consciousness does not influence green investment practices in JSE listed firms.

The researcher used the SPSS Version 22 to conduct the Chi-Square analysis.

Decision Rule:

Tested at alpha (α) of 0.05 significance level, the null hypothesis is rejected if $P \leq 0.05$.

Moreover, the strengths of the variables, namely, environmental legislation, corporate image, profitability and environmental consciousness against corporate green investment practices were independently examined by the use of Chi-Square based measures of association namely, Phi and Cramer's V test. Phi and Cramer's V test were used since they are a form of non-parametric statistic which tests the strength of the relationship between two variables that are identified as nominal, that is, variables whose values are simply categories (Finney and DiStefano, 2006; Panik, 2005). In this study, the two variables considered to be nominal were any variable under study (environmental legislation, corporate image, profitability and environmental consciousness) and corporate green investment practices.

7.7 Research Validity

Bless and Higson-Smith (2000) define validity as the extent to which the outcomes of a study are regarded as true. Holsti (1969) explains validity in content analysis as the evaluation of whether the coding framework is logical and the classifications or categories are distinctly specified. In this study, validity was determined by creating a scheme which guided the researcher in analysing the content of the reports. The scheme laid out the variables (corporate image, environmental legislation, environmental consciousness and profitability) by outlining their meanings, values and rules which enhanced recognition of the variables in the annual sustainability reports that were coded.

7.8 Research Reliability

This study also incorporated reliability principles. Weber (1990:12) explains that "to make valid inferences from the text, it is important that the classification procedure be reliable in the sense of being consistent…." The researcher ensured that obvious mistakes in the collected data were comprehensively checked. Furthermore, violation of the definitions and rules in relation to the codes and applications used during the coding procedure was not permitted.

7.9 Ethical considerations

Ethical principles express that the researcher should do “what is right” (Creswell, 2005; Hussey and Hussey, 1997). This study involved the examination of companies’ annual sustainability reports which are in the public domain (i.e., not protected by copyright, do not demand fees or a license to use, provide unregulated access and enhance originality and expressiveness). As such, the researcher upheld the principle of no exploitation of information for personal gain, identified and removed unfavourable consequences for the companies under study, respected these companies, and supported beneficence, justice, privacy and confidentiality of information (Hussey and Hussey, 1997; Creswell, 2009). The researcher also upheld professional confidentiality standards, adhered to approved approaches to cite quotations, recognised the resources used and employed suitable referencing methods (Mouton, 2001). Furthermore, the principles of academic confidentiality were supported and adhered to and any information detrimental to the operations of any company under study is not reported (Creswell and Clark, 2011; Riff et al., 2014).

CHAPTER 8

RESULTS, ANALYSIS AND DISCUSSION

8.1 Introduction

This chapter is made up of two main sections, namely, data analysis and the findings and discussion. The analysis presents the statistical tests (Chi-Square tests, Phi and Cramer's V tests) for each research question. This is followed by the findings and discussion of the statistical tests. The final section presents a summary of chapter 9.

8.2 Analysis of Research Question 1

Research Question 1: How does environmental legislation influence green investment practices in JSE listed firms?

Test 1: The relationship between environmental legislation and green investment practices in JSE listed firms.

Hypothesis 1

H0: Environmental legislation does not influence green investment practices in JSE listed firms.

H1: Environmental legislation influences green investment practices in JSE listed firms.

Decision Rule:

Tested at alpha (α) of 0.05 significance level, the null hypothesis is rejected if $P \leq 0.05$.

Table 8.1 Result from Chi-Square Analysis:

Relationship between Environmental Legislation and Green Investment Practices in JSE Listed Firms

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
EnvLegis * GInv	200	100.0%	0	0.0%	200	100.0%

EnvLegis * GInv Cross tabulation

			GInv		
			STRG	WEK	Total
EnvLegis	IND	Count	76	24	100
		% within EnvLegis	76.0%	24.0%	100.0%
		% within GInv	75.2%	24.2%	50.0%
		% of Total	38.0%	12.0%	50.0%
	NOTIND	Count	25	75	100
		% within EnvLegis	25.0%	75.0%	100.0%
		% within GInv	24.8%	75.8%	50.0%
		% of Total	12.5%	37.5%	50.0%
Total		Count	101	99	200
		% within EnvLegis	50.5%	49.5%	100.0%
		% within GInv	100.0%	100.0%	100.0%
		% of Total	50.5%	49.5%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	52.025[a]	1	.000		
Continuity Correction[b]	50.005	1	.000		
Likelihood Ratio	54.556	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	200				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 49.50.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.510	.000
	Cramer's V	.510	.000
N of Valid Cases		200	

Tested at α = 0.05 and the *degrees of freedom* (*df)* = 1; the Chi-Square (χ^2) shows that *P* = 0.00, which is *P*<0.05. The Phi and Cramer's V test also show that *P* = 0.00, which is *P<0.05.* Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. This shows that within the studied companies, environmental regulation influenced green investment practices.

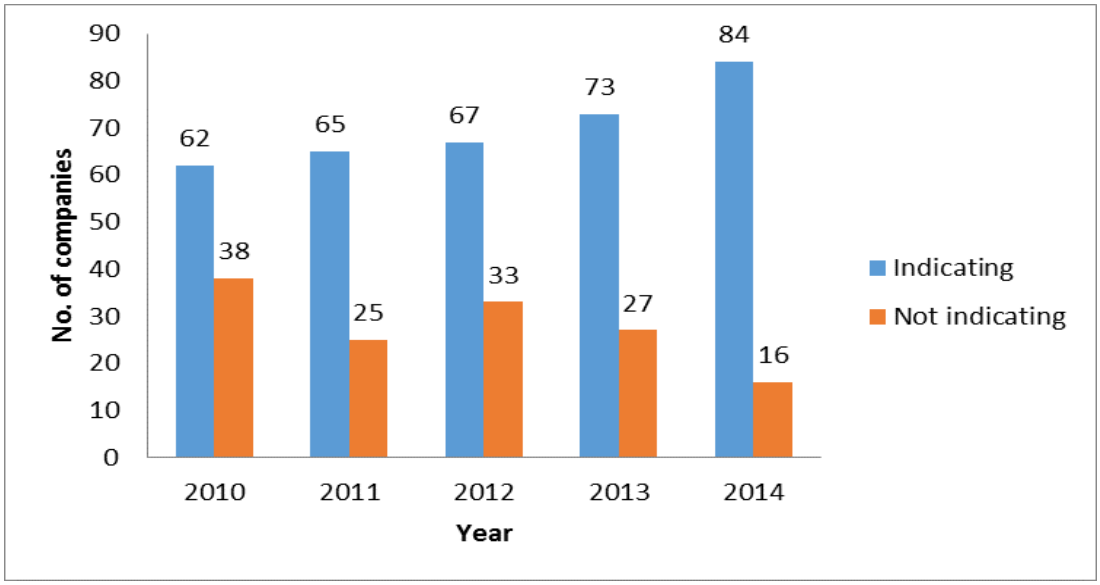
8.2.1 Findings and Discussion from Test of Hypothesis 1 (Research Question 1)

The statistical tests in research question 1 demonstrate a significant relationship between environmental legislation and green investment practices in the sample of 100 JSE listed companies. Previous research concurs with these statistical findings. For instance, Gabaldón-Estevan et al. (2014) found that environmental regulations put pressure on firms by making environmental issues a top priority; motivate companies to introduce broader environmental disclosure initiatives, thereby mitigating greenwashing behaviour (Geerts, 2014; Sinkin et al., 2008) and influence the stock returns of firms as non-complying companies experience reduced equity value (Wei et al., 2011). Environmental laws demand that firms implement independent environmental management practices (Jones, 2010; Johnstone et al., 2007); spur corporate environmental engagement in order to minimise associated fines and charges (Shimshack and Ward, 2005; Esser, 2011) and stimulate companies to introduce extended eco-innovation activities (Demirel and Kesidou, 2011).

However, some studies do not concur with the above findings. For example, it has been found that environmental legislation enables regulators to build cases against companies, which discourages continued company engagement in environmental matters (Peters and Romi, 2013); that it does not stimulate green energy adoption within corporate settings (Delmas, 2007) and that such legislation discourages corporate eco-innovation initiatives (Rehfeld, 2007). In addition, it has been suggested that environmental regulations are less effective than environmental policies implemented through market operations (Bergquist et al., 2013; South African Treasury, 2010). Figure 8.1 below indicates the increasing influence of environmental regulations on the sample of 100 JSE listed companies' green

investment activities between 2010 and 2014. It shows that the number of companies citing such influence increased from 62 in 2010 to 84 in 2014.

Figure 8.1: JSE Listed Companies Indicating the Extent to which Environmental Legislation Promoted Firm Green Investment Practice from 2010 to 2014



8.3 Analysis of Research Question 2

Research Question 2: How does corporate image influence green investment practices in JSE listed firms?

Test 2: The relationship between corporate image and green investment practices in JSE listed companies.

Hypothesis 2

H0: Corporate image does not influence green investment practices in JSE listed firms.

H1: Corporate image influences green investment practices in JSE listed firms.

Decision Rule:

Tested at alpha (α) of 0.05 significance level, the null hypothesis is rejected if $P \leq 0.05$.

Table 8.2 Result from Chi-Square Analysis:

Relationship between Corporate Image and Green Investment Practices in JSE Listed Firms

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Image * GInv	200	100.0%	0	0.0%	200	100.0%

Image * GInv Cross tabulation

			GInv		
			STRG	WEK	Total
Image	IND	Count	69	31	100
		% within Image	69.0%	31.0%	100.0%
		% within GInv	67.0%	32.0%	50.0%
		% of Total	34.5%	15.5%	50.0%
	NOTIND	Count	34	66	100
		% within Image	34.0%	66.0%	100.0%
		% within GInv	33.0%	68.0%	50.0%
		% of Total	17.0%	33.0%	50.0%
Total		Count	103	97	200
		% within Image	51.5%	48.5%	100.0%
		% within GInv	100.0%	100.0%	100.0%
		% of Total	51.5%	48.5%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	24.522[a]	1	.000		
Continuity Correction[b]	23.141	1	.000		
Likelihood Ratio	25.052	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	200				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 48.50.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.350	.000
	Cramer's V	.350	.000
N of Valid Cases		200	

Tested at α = 0.05 and the *degrees of freedom (df)* = 1; the Chi-Square (χ^2) shows that *P* = 0.00, which is *P*<0.05. The Phi and Cramer's V test also show that *P* = 0.00, which is *P*<0.05. Hence, the null hypothesis is rejected and the alternative hypothesis is accepted. This shows that within the studied firms, corporate image influenced green investment activities.

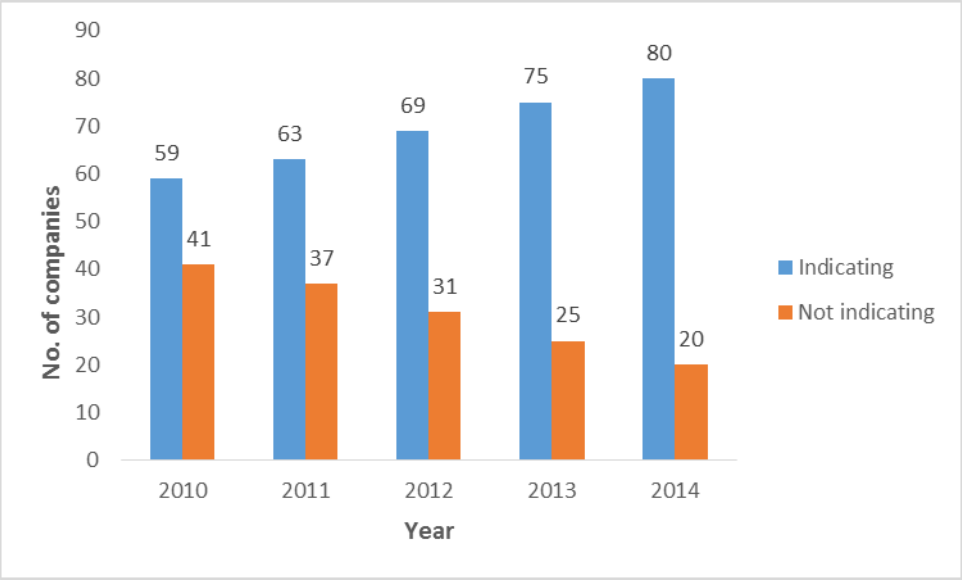
8.3.1 Findings and Discussion from the Test of Hypothesis 2 (Research Question 2)

The statistical tests in research question 2 indicate a significant relationship between corporate image and green investment practices in the sample of 100 JSE listed companies. Previous studies support these statistical results. For example, it has been found that environmental reporting improves corporate environmental legitimacy and hence its image (Aerts and Cormier, 2009; Mitchell, Hill and Stobie, 2005); greening protects enhance a firm's image since the visibility of climate change mitigation efforts is related to environmental engagement (Dawkins and Fraas, 2011) and poor firm environmental participation creates a bad reputation which negatively affects the legitimacy of the company in the second-order (Bebbington et al., 2008). Increased political and public interest in environmental issues negatively affects companies that have poor environmental initiatives (Cho and Patten, 2007) and the green image of a product adds to consumer satisfaction, demonstrated by their preparedness to pay premium prices for green commodities (Chen, 2010; Kruger and Saayman, 2013).

On the other hand, some previous research does not agree with the above findings. For instance, it has been demonstrated that firms' environmental ratings have a negative association with green image (McGinn, 2009); consumers perceive that green products are of lower quality than conventional products (Luchs et al., 2010) and there is increasing doubt that a green reputation can be built by investing in nuclear energy (Wang and Chen, 2012). Furthermore, it has been found that a firm's environmental practice has negative impacts on organisational reputation (Brammer and Pavelin, 2006b; Crittenden et al., 2011); greening decreases consumers' intention to buy the company's commodities (Sen and Bhattacharya, 2001) and some stakeholders perceive corporate green investment practices as a setback to economic development (Viviers et al., 2008; Creamer, 2013). Figure 8.2 below

demonstrates the increasing influence of company image on the sample of 100 JSE listed companies' green investment initiatives between 2010 and 2014. It shows that the number of firms citing such influence rose from 59 in 2010 to 80 in 2014.

Figure 8.2: JSE Listed Companies Indicating Whether Corporate Image Motivated Corporate Green Investment Practices from 2010 to 2014



8.4 Analysis of Research Question 3

Research Question 3: How does profitability influence green investment practices in JSE listed firms?

Test 3: The relationship between profitability and green investment practices in JSE listed firms.

Hypothesis 3

H0: Profitability does not influence green investment practices in JSE listed firms.

H1: Profitability influences green investment practices in JSE listed firms.

Decision Rule:

Tested at alpha (α) of 0.05 significance level, the null hypothesis is rejected if $P \leq 0.05$.

Table 8.3 Result from Chi-Square Analysis:

Relationship between Profit Objective and Green Investment Practices in JSE Listed Firms

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
ProFT * GInv	200	100.0%	0	0.0%	200	100.0%

ProFT * GInv Cross tabulation

			GInv		
			STRG	WEK	Total
ProFT	IND	Count	72	28	100
		% within ProFT	72.0%	28.0%	100.0%
		% within GInv	73.5%	27.5%	50.0%
		% of Total	36.0%	14.0%	50.0%
	NOTIND	Count	26	74	100
		% within ProFT	26.0%	74.0%	100.0%
		% within GInv	26.5%	72.5%	50.0%
		% of Total	13.0%	37.0%	50.0%
Total		Count	98	102	200
		% within ProFT	49.0%	51.0%	100.0%
		% within GInv	100.0%	100.0%	100.0%
		% of Total	49.0%	51.0%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	42.337[a]	1	.000		
Continuity Correction[b]	40.516	1	.000		
Likelihood Ratio	43.977	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	200				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 49.00.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.460	.000
	Cramer's V	.460	.000
N of Valid Cases		200	

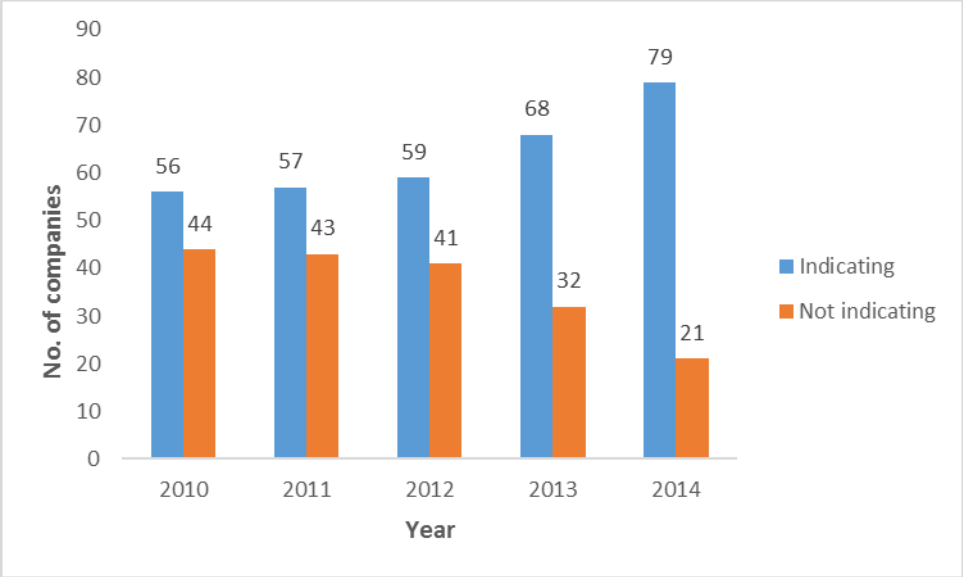
Tested at α = 0.05 and the *degrees of freedom (df)* = 1; the Chi-Square (χ^2) shows that *P* = 0.00, which is *P*<0.05. The Phi and Cramer's V test also show that *P* = 0.00, which is *P*<0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. This indicates that within the studied companies, profitability influenced green investment practices.

8.4.1 Findings and Discussion from Test of Hypothesis 3 (Research Question 3)

The statistical tests in research question 3 show a significant relationship between profitability and green investment practices in the sample of 100 JSE listed companies. Previous literature confirms these statistical findings. For example, it has been found that pollution reduction schemes generate supernormal profits for a company (Ramiah et al., 2013); green products and innovation improve operational performance and success (Lai and Wong, 2012; Van den Berg et al., 2013) and environmental pro-activeness has a positive relationship with a firm's financial performance (Sambasivan et al., 2013; Clarkson et al., 2011). High profits are generated throughout eco-products' life-cycles (Plouffe et al., 2011) and engaging in green investment activities generates increased financial gains in the long run (Chien and Peng, 2012).

In contrast, some schools of thought do not agree with the above results. For instance, it has been demonstrated that corporate environmental disclosure significantly decreases stock returns (Fisher-Vanden and Thorburn, 2008); voluntary greening activity reduces a company's market value (Thorburn and Fisher-Vanden, 2011) and sustainability activities are associated with underperformance of the firm's stock (DiGiuli and Kostovetsk, 2014; Godschalk, 2011). Moreover, negative relationships have been found between climate change activities and stock returns (Ziegler et al., 2009) and end-of-pipe corporate environmental initiatives are negatively associated with Return On Sales (Sarkis and Cordeiro, 2001). Figure 8.3 below shows the increasing influence of profitability on the sample of 100 JSE listed companies' green investment initiatives between 2010 and 2014. It shows that the number of companies citing such influence increased from 56 in 2010 to 79 in 2014.

Figure 8.3: JSE Listed Companies Indicating the Extent to which Profitability Spurred Firm Green Investment Activities from 2010 to 2014



8.5 Analysis of Research Question 4

Research Question 4: How does environmental consciousness influence green investment practices in JSE listed firms?

Test 4: The relationship between environmental consciousness and green investment practices in JSE listed firms.

Hypothesis 4

H0: Environmental consciousness does not influence green investment practices in JSE listed firms.

H1: Environmental consciousness influences green investment practices in JSE listed firms.

Decision Rule:

Tested at alpha (α) of 0.05 significance level, the null hypothesis is rejected if $P \leq 0.05$.

Table 8.4 Result from Chi-Square Analysis:

Relationship between Environmental Consciousness and Green Investment Practices in JSE Listed Firms

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
EnvCn * GInv	200	100.0%	0	0.0%	200	100.0%

EnvCn * GInv Cross tabulation

			GInv		
			STRG	WEK	Total
EnvCn	IND	Count	77	23	100
		% within EnvCn	77.0%	23.0%	100.0%
		% within GInv	74.0%	24.0%	50.0%
		% of Total	38.5%	11.5%	50.0%
	NOTIND	Count	27	73	100
		% within EnvCn	27.0%	73.0%	100.0%
		% within GInv	26.0%	76.0%	50.0%
		% of Total	13.5%	36.5%	50.0%
Total		Count	104	96	200
		% within EnvCn	52.0%	48.0%	100.0%
		% within GInv	100.0%	100.0%	100.0%
		% of Total	52.0%	48.0%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	50.080[a]	1	.000		
Continuity Correction[b]	48.097	1	.000		
Likelihood Ratio	52.432	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	200				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 48.00.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.500	.000
	Cramer's V	.500	.000
N of Valid Cases		200	

Tested at α = 0.05 and the *degrees of freedom (df)* = 1; the Chi-Square (χ^2) indicates that *P* = 0.00, which is *P*<0.05. The Phi and Cramer's V test also show that *P* = 0.00, which is *P*<0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. This shows that within the studied companies, environmental consciousness influenced green investment practices.

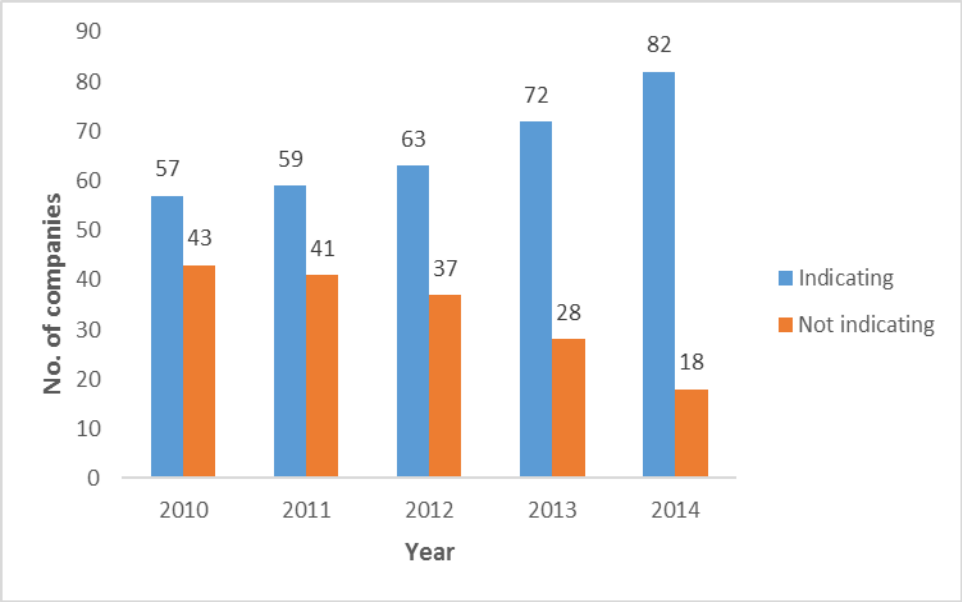
8.5.1 Findings and Discussion from the Test of Hypothesis 4 (Research Question 4)

The statistical tests in research question 4 illustrate a significant relationship between environmental consciousness and green investment activities in the sample of 100 JSE listed companies. Previous studies agree with these statistical results. For example, it has been found that environmental consciousness empowers a firm to improve its environmental investment, resulting in expanded green investment capacity (Chang, 2011; Djekic et al., 2014) and company environmental practices are positively associated with company environmental awareness along with performance (Innes and Sam, 2008; López-Gamero et al., 2009). In addition, increased awareness of firm green policy has been found to be the main motivator of corporate green innovation (Santolaria et al., 2011; Wu et al., 2011; Dane, 2014) and the adoption of environmental management practices improves a firm's environmental consciousness, thereby facilitating the integration of other environmental programmes (Johnstone and Labonne, 2009; Qu et al.,2015).

Conversely, some previous studies disagree with the above findings. For instance, it has been demonstrated that voluntary environmental management activities are related to reduced environmental "maturity" in both participating and non-participating firms (Iraldo et al., 2009); increased green awareness does not translate into the pro-environmental behaviour expected of companies (Okereke and Russel, 2010; Gadenne et al., 2009) and a negative relationship has been found between eco-innovation and green R&D (Belin et al., 2011; Erakhrumen, 2014). Furthermore, few environmental performance differences are evident in environmentally certified and non-certified companies (Darnall et al., 2005) and firms' green investment capability has not been found to result in improved environmental engagement

(Kanda et al., 2015; Suzer, 2015). Figure 8.4 below shows the increasing influence of environmental consciousness on the sample of 100 JSE listed companies' green investment practices between 2010 and 2014. It shows that the number of companies citing such influence rose from 57 in 2010 to 82 in 2014.

Figure 8.4: JSE Listed Companies Indicating Whether Environmental Consciousness Promoted Firm Green Investment Practices from 2010 to 2014



8.6 Summary of Chapter 8

This chapter presented the data analysis and the findings of the study. The results from the Chi-Square tests demonstrated that environmental legislation, corporate image, profitability and environmental consciousness influenced corporate green investment practices in the sample of 100 JSE listed firms. Similarly, the results from the Phi and Cramer's V tests for strength of relationship disclosed a strong relationship between environmental legislation, corporate image, profitability, environmental consciousness and corporate green investment practices. These findings confirm some previous international research findings. As can be expected in any research, they were also contrary to other previous international research. Overall, the analysis shows that, in the sample of 100 JSE listed companies,

environmental investment may have been influenced by environmental legislation, corporate image, profitability and environmental consciousness.

CHAPTER 9

CONCLUSION

9.1 Introduction

This chapter concludes the study by presenting a summary of the research findings, a proposed framework to understand corporate green investment practices among JSE listed firms, recommendations, the study's limitations and a conclusion.

9.2 Summary of Findings

The findings are briefly summarised sequentially according to the research objectives:

Objective 1: To analyse whether environmental legislation influences green investment practices in JSE listed firms.

Using the Chi-Square tests, the findings from the analysis in Chapter 8 (Table 8.1) showed that environmental legislation influenced corporate green investment practices in the sample of 100 JSE listed firms. The Phi and Cramer's V test of strength of relationship also showed a significant relationship between environmental legislation and green investment practices among JSE listed firms.

Furthermore, an increasing number of companies indicated that environmental legislation spurred their green investment practice between 2010 and 2014 (see Figure 8.1).

Hence, this research finding based on South African data confirms previous research findings from other countries, including amongst others, those of Gabaldón-Estevan et al. (2014); Geerts (2014); Wei et al. (2011); Jones (2010); Shimshack and Ward (2005); Esser, (2011); Johnstone et al. (2007); Sinkin et al. (2008) and Demirel and Kesidou (2011). However, it contradicts those of previous researchers such as Peters and Romi (2013); Delmas (2007); Rehfeld (2007); Bergquist et al. (2013) and López-Gamero et al. (2010) which demonstrated that environmental legislation does not influence corporate green investment practices.

Objective 2: To appraise if corporate image influences green investment practices in JSE listed firms.

By applying Chi-Square tests, the analysis and findings outlined that corporate image influenced corporate green investment initiatives in JSE listed companies (see Table 8.2). Furthermore, the Phi and Cramer's V test of strength of relationship produced a significant relationship between corporate image and green investment practices in JSE listed companies.

The statistical tests findings are consistent with the increased number of JSE listed companies that indicated that corporate reputation motivated their green investment activity between 2010 and 2014 (see Figure 8.2).

Therefore, this research finding based on South African data confirms those of previous studies in other countries, including those by Aerts and Cormier, (2009); Dawkins and Fraas, (2011); Bebbington et al. (2008); Cho and Patten, (2007); Kruger and Saayman, (2013) and Chen (2010). In contrast, it contradicts some previous research such as that conducted by McGinn (2009); Luchs et al. (2010); Wang and Chen (2012); Brammer and Pavelin (2006b); Crittenden et al. (2011); and Sen and Bhattacharya (2001) which found that corporate image does not influence green investment activities.

Objective 3: To determine whether profitability influences green investment practices in JSE listed firms.

The Chi-Square test results in Chapter 8 demonstrate that profitability influenced green investment practices in JSE listed firms (see Table 8.3). Furthermore, Phi and Cramer's V test of relationship underline this assertion by generating a significant relationship between profitability and green investment practices in JSE listed firms.

The statistical findings on profitability concur with the increased number of JSE listed firms that agreed that profitability motivated their green investment practices from 2010 to 2014 (see Figure 8.3).

This research based on South African data concurs with previous research such as that by Lai and Wong (2012); Ramiah et al. (2013); Sambasivan et al. (2013); Plouffe et al. (2011); Clarkson et al. (2011) and Chien and Peng (2012). Conversely, it contradicts the findings of previous studies by Fisher-Vanden and Thorburn (2008); Thorburn and Fisher-Vanden (2011); DiGiuli and Kostovetsk (2014); Ziegler et al. (2009) and Sarkis and Cordeiro (2001) which found that profitability does not influence company green investment initiatives.

Objective 4: To examine if environmental consciousness influences green investment practices in JSE listed firms.

The Chi-Square tests in the analysis and findings illustrate that environmental consciousness influenced corporate green investment practices in JSE listed firms (see Table 8.4). The Phi and Cramer's V test of strength of relationship also demonstrate a significant relationship between environmental consciousness and green investment practices in JSE listed firms.

These statistical results are consistent with the increasing number of JSE listed firms which identified environmental awareness as an important factor which promoted their green activity between 2010 and 2014 (see Figure 8.4).

Therefore, this finding based on South African data agrees with previous research outcomes from other countries, including amongst others, those of Chang (2011); Innes and Sam (2008); Santolaria et al. (2011); Johnstone and Labonne (2009); López-Gamero et al. (2009); Wu et al. (2011); Bohdanowicz, (2005); Min, (2011); Djekic et al. (2014) and Qu et al. (2015). However, it contradicts previous research by Kanda et al. (2015); Suzer (2015); Erakhrumen (2014); Belin et al. (2011); Gadenne et al. (2009); Iraldo et al. (2009) and Darnall et al. (2005) which found that environmental consciousness does not influence firm green investment activities.

Objective 5: the fifth research objective was to propose a framework to understand the determinants of corporate green investment practices and hence contribute to the existing literature. This is presented in the following section.

9.3 Contribution to Knowledge

Although there are diverse views in the literature on the factors that influence corporate green investment practices, there is currently no framework to understand

such influences. The researcher addressed this gap by proposing a framework to understand the determinants of corporate green investment practices.

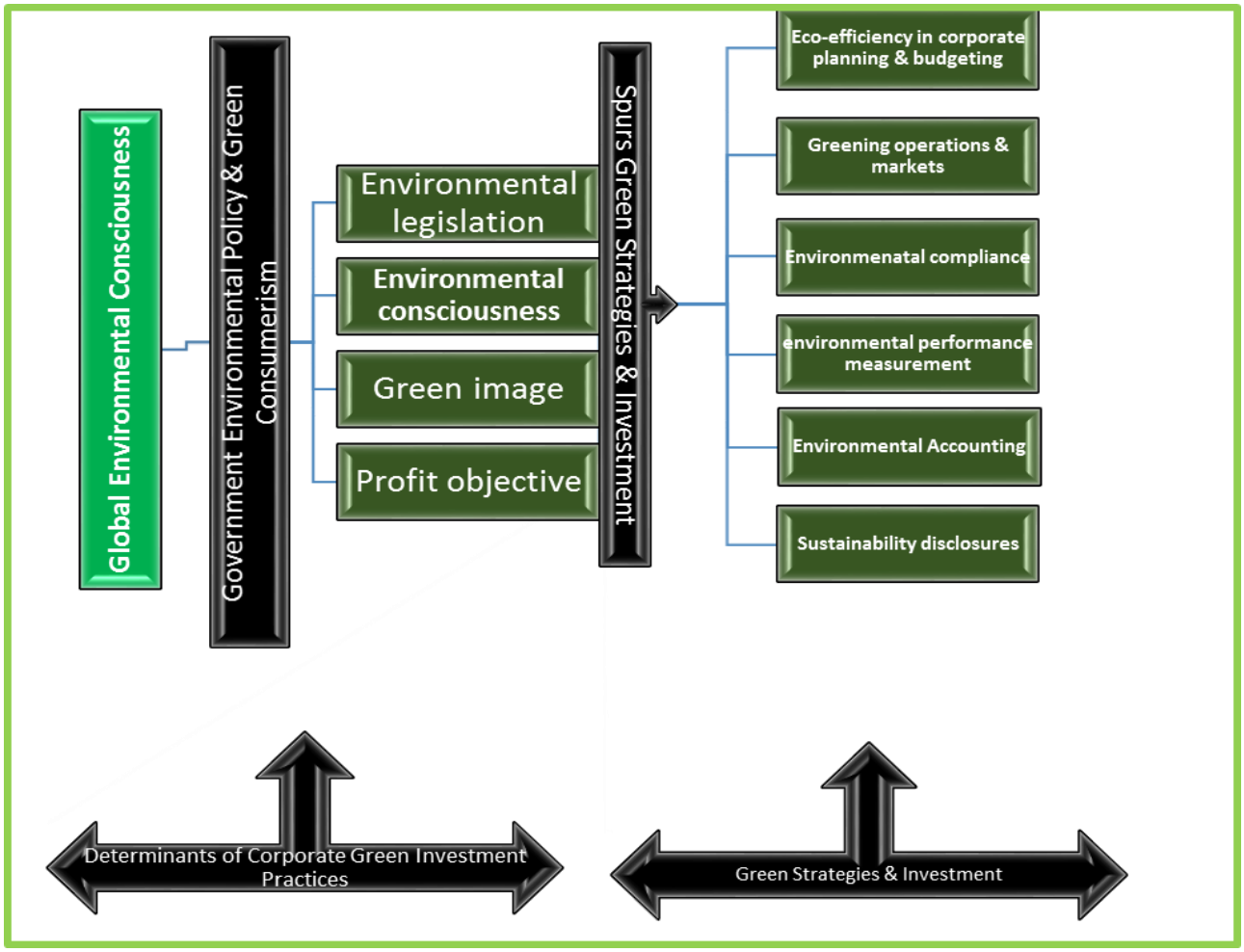
Suggested Framework for the Determinants of Corporate Green Investment Practices

As noted earlier in this chapter, the study's research objectives were achieved by means of an evaluation of the literature and an analysis of the research data. The review of previous research in other countries identified the major determinants of corporate environmental practices as environmental legislation, environmental consciousness, corporate image and the corporate desire for profit. These four variables were examined in the South African context and were found to propel corporate green investment practices in the country. Thus, this research adds a new dimension to the literature by being the first to examine these four variables in South Africa. Apart from this research gap, no previous research has proposed a framework to understanding the determinants of corporate green investment practices. Therefore, a further contribution made by the current study is a framework that offers a handy view of the determinants of corporate green investment practices. This framework is graphically presented in Figure 9.1.

In addition to the four variables suggested in the literature and examined in this research; stakeholder theory and goal-framing theory (section 2.4) highlights that the determinants of corporate green investment practices – green consciousness, green image, green legislation and the profit objective – can be said to be rooted in two major factors. The first is the emergence of global environmental consciousness and related campaigns and the second is ensuing government environmental policies (Rowell, 1996; Betsill and Bulkeley, 2004; Carter and Clements, 2015). Therefore, in the proposed framework (Figure 9.1), global environmental consciousness and government policies are included as the foremost factors that underlie the four determinants of corporate green investment practices. A logical understanding of the determinants of corporate green investment practices rests on sequential development. The emergence of global environmental consciousness gave rise to international and national government policies; subsequently, these led to the explicit factors that spur corporate green investment practices. Accordingly, the determinants shown in Figure 9.1 spur various corporate green strategies and investments. Among others, these practices may include: the integration of eco-

efficiency in corporate budgeting (Burritt and Schaltegger, 2001; Burritt and Saka, 2006), greening of industry operations and markets (Green, 2003; Vachon and Klassen, 2006b; Schaltegger and Burritt, 2014; Lee et al. 2015b), environmental compliance (Earnhart et al. 2014; Sánchez-Medina et al. 2015), environmental performance measurement (Bhattacharya et al. 2014; Schaltegger and Burritt, 2014), corporate green accounting (Tu and Huang, 2015), and corporate sustainability disclosure (Sobhani et al. 2011; Bonilla-Priego et al. 2014).

Figure 9.1: Proposed Framework to understand the determinants of Corporate Green Investment Practices in JSE Listed Companies



Source: Author's suggested framework

Recommendations

The following recommendations are made for future research.

Future Research

Given the relatively new nature of corporate environmental awareness and engagement, research on corporate green investment is still evolving. Therefore, much work remains to be done to understand the various idiosyncrasies of corporate green investment behaviour. Whilst the determinants of corporate green investment behaviour identified in this study concur with the findings of studies in other countries, this study went further to examine the four determinants in South Africa. Future research could investigate the combined effect of these determinants of corporate green behaviour. Hence, based on the suggested research framework (Figure 9.1), the following suggestions are made for future research:

i. How does a combination of the four determinants of corporate green investment activities influence corporate eco-efficiency?

ii. How does a combination of the four determinants of firm green investment initiatives influence corporate engagement in green operations and markets?

iii. How does a combination of the four determinants of corporate green investment practices influence corporate environmental compliance?

iv. How does a combination of the four determinants of firm green investment practices influence the integration of environmental performance measures in the corporate performance measurement system?

Future research that provides answers to the above questions would offer further insight into the interconnectedness between external corporate environmental stimuli, corporate environmental behaviour and sustainable economic development.

9.4 Conclusion

This study examined the determinants of corporate green investment practices in JSE listed firms. Data were collected from the annual sustainability reports of 100 CDP firms listed on the JSE from 2010 to 2014 and were subjected to content analysis. Applying the Chi-Square tests, the results from the statistical analysis showed that environmental legislation, corporate image, profitability and environmental consciousness influenced corporate green investment activities, thereby providing answers to the four research questions. Furthermore, using the Phi

and Cramer's V tests, environmental legislation, corporate image, profitability and environmental consciousness, showed a strong relationship with firms' green investment activities.

Based on the literature review and the findings of this study, this research makes a modest contribution to the literature and knowledge on South African companies' green investment behaviour in two ways: firstly, by suggesting a framework to understand and research the determinants of JSE listed companies' green investment practices and secondly, based on the framework, by suggesting further research to investigate how a combination of the four determinants of corporate green investment activities influences the following: corporate eco-efficiency, corporate participation in green operations and markets, firm environmental compliance and the integration of environmental performance measures in the corporate performance measurement system. This research bridged the existing gap in knowledge about corporate green investment practices in the South African context as no previous studies in South Africa investigated the factors affecting corporate green investment practices. It also extended previous international research on corporate green investment practices in Taiwan, Canada, the USA, UK, Brazil, China and Hong Kong (Chang and Chen, 2013; Gray and Shimshack, 2011; Tomasin et al. 2013; and Chan et al. 2014) by examining the variables investigated in these earlier studies in relation to South African companies. However, this study differed from earlier international research in that, while it examined the variables that affect corporate green investment practices on their own, the current study examined all four variables (legislation, image, profitability and environmental consciousness) in South African companies.

9.5 Limitations of the study

The research was limited to the 100 CDP companies listed on the JSE. This might not be sufficiently representative to allow for generalisation; hence, future research could include more companies. Furthermore, the content analysis of the data could be subjective as it relied on companies' pronouncements and the researcher's assumptions and codification. Future research could combine content analysis with interviews. Finally, since this study covered only five years, future research could span a longer period in order to enhance reliability.

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APPENDIX A: Definition of Terms

- Determinants - factors that spur green investment practices in the context of this research.

- Green investment - occurs when companies invest in environmentally sound practices that systematically, comprehensively and successfully lead to resource efficiency, the removal of harmful substances and reduced carbon emissions, thereby optimising environmental benefits through providing green goods and services (Eyraud et al., 2013; Robert Haβler cited in Ecologic, 1998).

- Corporate green investment practices –refer to all diversified environmentally compatible and/or climate resilient activities which companies have adopted and identified as environmentally friendly and therefore designed to protect the natural environment by way of committing finance and/or capital. These green investment practices include various forms of green energy technologies, green research and development initiatives, energy efficient technologies, waste management activities, water security practices, carbon sequestration practices, green financing instruments, insulation and cooling frameworks, smart grid technologies and electric vehicles (Inderst et al., 2012; Eyraud et al., 2013).

- Environmental legislation - also referred to as environmental law, is a collective term which explains the interconnected systems of statutes, regulations, treaties and common law which address the impact of corporate practices on the natural environment (Wei et al., 2011; Popp et al., 2011). It is the foundation for measuring and assigning environmental liability in situations when companies commit environmental crimes as well as corporate failure to adhere to or comply with legislation (Stafford, 2007; Sinkin et al., 2008). The main objective is “compliance”, which embraces co-operation, persuasion, conciliation and negotiation (Geerts, 2014; Wei et al., 2011; Shimshack and Ward, 2005).

- Corporate Image - also referred to as “corporate reputation”, involves how a company is perceived by the public (Melo and Garrido-Morgado, 2011). It is thus a mental picture which appears when the company’s name is mentioned (Cho et al., 2012a). As such, a corporate image is a psychological notion or conviction which transforms in relation to, amongst others, the company’s setting, performance, announcements and media coverage (Kang and Yang, 2010; Cormier and Magnan, 2007; Aerts et al., 2006). Corporate image can also be defined as the net outcome of comprehension, principles, ideas, sentiments, thoughts and judgements about the company (Cho et al., 2012a). It refers to the aggregate product of different issues that reflect and support an interchange of ideas about the identity of the firm (Aerts and Cormier, 2009).

- Profitability – it is the capability of a company to earn positive financial returns. It is the ability of the firm to employ its resources to produce revenues that exceed the expenses over a particular period of time. It occurs when a company reaps financial benefits through integrating diversified business practices (Antonietti and Marzucchi, 2013). It is the capacity to achieve gains through the operating activities of the firm (Wong, 2012; Lai and Wong, 2012). Therefore, profit accrues when the earned income exceeds the cost of all corporate initiatives (Tomasin et al., 2013; Zeng et al., 2010b).

- Environmental consciousness - is part of a belief framework promoted by certain individuals to foster pro-environmental practices (Zelezny and Schultz, 2000). It refers to diverse forms of corporate pro-environmental conduct that are determined by various factors, including firm senior management perspectives (Triguero et al., 2013), environmental activism (affiliation with environmental interest groups, environmental co-operative networking, environmental protests) (Vachon and Klassen 2006a), individual low-cost conduct (waste management, cleaner production) (Wu et al., 2011) and individual high-cost conduct (green consumerism) (Mostafa, 2009). Hence, environmental consciousness is an environmental engineering philosophy which considers the environmental issues (from the production phase to the disposal stage) of a company’s manufacturing design or the firm’s product life

cycle (Shin et al., 2008). Environmental consciousness can also be referred to as environmental awareness (Min, 2011; Perron et al., 2006).

- Stakeholders - are internal and external people or groups who influence, or are influenced by, the achievement of the firm's objectives (Haigh and Griffiths, 2007). They include the natural environment, employees, consumers, government, competitors, interest groups, suppliers and the media (Fontaine et al., 2006; Haigh and Griffiths, 2007).

- The natural environment - comprises of all non-living and living things through which natural processes occur or are found on the earth's surface (Russo and Minto, 2012). Hogan (2013:1) defines the natural environment as "the set of living and non-living things on Earth which occur in a state substantially not influenced by humans." The natural environment is therefore characterised by comprehensive ecological constituents (such as the atmosphere, flora, fauna, soil, and rocks) and natural phenomena (for example, hurricanes, germination, erosion, earthquakes, fog, and volcanic eruptions) as well as natural resources and physical processes (for instance, air, water, climate, energy, radiation, magnetism and electric charges) (Russo and Minto, 2012; Hogan, 2013; IPPC, 2007). Thus, the natural environment is made up of sophisticated mutual relationships involving living organisms (the biotic component) and meteorological factors, all of which unite or merge to produce natural structures that are rich in species and biodiversity (Hogan, 2013).

- Climate change – is when mean long-run weather patterns of a particular area and/or region are changed for a long period of time, typically decades or even longer as a result of anthropogenic practices (Dawkins and Fraas, 2011; Dienes, 2015; IPPC, 2014). Examples include shifts in wind patterns, shifts in temperatures and shifts in amount of precipitation (IPPC, 2014; 2007). The impact of these shifts include amongst others increasing desertification, rising sea levels and extreme weather conditions in form of hurricanes and floods (Dawkins and Fraas, 2011; Dienes, 2015; IPPC, 2007, 2014).

- CDP – formally Carbon Disclosure Project (CDP) until year end 2012 is a private, voluntary, non-profit based entity established to promote improved transparency among corporations and their investors and to encourage better management of carbon emissions, prevent climate change and support effectual monitoring and control of natural resources (Matisoff, 2013). The CDP (2010) was launched in the year 2000 in the United Kingdom. It provides guidelines for companies to measure and report on greenhouse gas emissions as well as their climate change policies and promotes public awareness of environmental issues.

- Carbon footprint - Is the aggregate quantity of greenhouse gases generated directly and/or indirectly through anthropogenic practices, usually expressed in equivalent tons of carbon dioxide (CDP, 2014, 2010, 2009; IPPC, 2007).

APPENDIX B: Classification Types Adopted by the Researcher in Content Analysis

Important definitions considered in the classifications by the researcher:

(a) Environmental legislation - also referred to as environmental law, is a collective term which explains the interconnected systems of statutes, regulations, treaties and common law which address the impact of corporate practices on the natural environment (Wei et al., 2011; Popp et al., 2011). It is the foundation for measuring and assigning environmental liability in situations when companies commit environmental crimes as well as corporate failure to adhere to or comply with legislation (Stafford, 2007; Sinkin et al., 2008). The main objective is "compliance", which embraces co-operation, persuasion, conciliation and negotiation (Geerts, 2014; Wei et al., 2011; Shimshack and Ward, 2005).

(b) Corporate Image - also referred to as "corporate reputation", involves how a company is perceived by the public (Melo and Garrido-Morgado, 2011). It is thus a mental picture which appears when the company's name is mentioned (Cho et al., 2012a). As such, a corporate image is a psychological notion or conviction which transforms in relation to, amongst others, the company's setting, performance, announcements and media coverage (Kang and Yang, 2010; Cormier and Magnan, 2007; Aerts et al., 2006). Corporate image can also be defined as the net outcome of comprehension, principles, ideas, sentiments, thoughts and judgements about the company (Cho et al., 2012a). It refers to the aggregate product of different issues that reflect and support an interchange of ideas about the identity of the firm (Aerts and Cormier, 2009).

(c) Profitability – it is the capability of a company to earn positive financial returns. It is the ability of the firm to employ its resources to produce revenues that exceed the expenses over a particular period of time. It occurs when a company reaps financial benefits through integrating diversified business practices (Antonietti and Marzucchi, 2013). It is the capacity to achieve gains through the operating activities of the firm

(Wong, 2012; Lai and Wong, 2012). Therefore, profit accrues when the earned income exceeds the cost of all corporate initiatives (Tomasin et al., 2013; Zeng et al., 2010b).

(d) Environmental consciousness - is part of a belief framework promoted by certain individuals to foster pro-environmental practices (Zelezny and Schultz, 2000). It refers to diverse forms of corporate pro-environmental conduct that are determined by various factors, including firm senior management perspectives (Triguero et al., 2013), environmental activism (affiliation with environmental interest groups, environmental co-operative networking, environmental protests) (Vachon and Klassen 2006a), individual low-cost conduct (waste management, cleaner production) (Wu et al., 2011) and individual high-cost conduct (green consumerism) (Mostafa, 2009). Hence, environmental consciousness is an environmental engineering philosophy which considers the environmental issues (from the production phase to the disposal stage) of a company's manufacturing design or the firm's product life cycle (Shin et al., 2008). Environmental consciousness can also be referred to as environmental awareness (Min, 2011; Perron et al., 2006).

The table below presents classification types adopted by the researcher for each studied variable.

Table B1: Classification Types Adopted by the Researcher in Content Analysis for each Examined Variable

	Classification Types: Profitability
1.	Marketability from green investments.
2.	Green business opportunities.
3.	Reductions in costs from green investments
4.	Competitive advantages from green practices.
5.	Productive efficiency realised by greening.
6.	Minimised green business risks.
7.	Financial entity green demands.
8.	Market shares and growth from green practices.

	Classification Types: Corporate Image
1.	Green beliefs, consistency, trust and respect.
2.	Customer view about green commodities.
3.	Company ambitions, vision and mission about green issues.
4.	Forthright in communicating green information.
5.	External engagement of firm about green aspects.
6.	Company policy and legacy concerning green investments.
7.	Green public relations.
8.	Legitimation and social acceptance

	Classification Types: Environmental legislation
1.	Validity of licenses and permits.
2.	Monitoring of compliance.
3.	Inspections undertaken.
4.	Related fines, liabilities and penalties.
5.	Bribery matters.
6.	Government and company relationships.
7.	Applicability of green and/or environmental laws.
8.	Any green and/or environmental legal proceedings.

	Classification Types: Environmental Consciousness
1.	Availability of green departments.
2.	Green initiatives and practices.
3.	Education and Training about green aspects.
4.	Green stakeholder engagement activities.
5.	Environmentally sound technologies.
6.	Research and development in green matters.
7.	Restructuring and upgrades concerning green issues.
8.	Evaluation, follow-up of green strategy.

APPENDIX C: List of the Studied South African 100 CDP Companies

Company name	Sector	Sub-sector	Sustainability Reports studied by year.
ABSA Group	Financials	Commercial Banks	2010 to 2014.
Acucap	Financials	Real Estate Management & Development	2010 to 2014.
Adcock Ingram	Health Care	Pharmaceuticals	2010 to 2014.
AECI Ltd Ord	Energy & Materials	Chemicals	2010 to 2014.
African Bank Investments Ltd	Financials	Diversified Financial Services	2010 to 2014.
African Oxygen Ltd Ord	Industrials	Industrial Conglomerates	2010 to 2014.
African Rainbow Minerals	Energy & Materials	Metals & Mining	2010 to 2014.
Allied Electronics Corporation Ltd (Altron)	Industrials	Industrial Conglomerates	2010 to 2014.
Anglo American	Energy & Materials	Metals & Mining	2010 to 2014.
Anglo American Platinum Ltd	Energy & Materials	Metals & Mining	2010 to 2014.
AngloGold Ashanti	Energy & Materials	Metals & Mining	2010 to 2014.
Arcelor Mittal South Africa Ltd	Energy & Materials	Metals & Mining	2010 to 2014.
Aspen Pharmacare Holdings	Health Care	Pharmaceuticals	2010 to 2014.
Assore Ltd	Energy &	Metals & Mining	2010 to 2014.

	Materials		
Aveng Ltd	Industrials	Construction & Engineering	2010 to 2014.
Avi Ltd	Consumer Staples	Food Products	2010 to 2014.
Barloword	Industrials	Trading Companies & Distributors	2010 to 2014.
BHP Billiton	Energy & Materials	Metals & Mining	2010 to 2014.
Bidvest Group Ltd	Industrials	Industrial Conglomerates	2010 to 2014.
Brait SE	Financials	Diversified Financial Services	2010 to 2014.
British American Tobacco	Consumer Staples	Tobacco	2010 to 2014.
Capital & Counties Properties	Financials	Real Estate Investment Trusts	2010 to 2014.
Capital Property Fund	Financials	Real Estate Investment Trusts	2010 to 2014.
Capitec Bank Holdings Ltd	Financials	Commercial Banks	2010 to 2014.
Clicks Group Ltd	Consumer Directory	Multiline Retail	2010 to 2014.
Compagnie Financière Richemont SA	Consumer Discretionary	Textiles, Apparel & Luxury Goods	2010 to 2014.
Coronation Fund Managers Ltd	Financials	Diversified Financial Services	2010 to 2014.
Datatec	IT & Telecoms	Software & Services	2010 to 2014.
Discovery Holdings Ltd	Financials	Insurance	2010 to 2014.
Emira Property Fund Ltd	Financials	Real Estate Investment Trusts	2010 to 2014.

Exxaro Resources Ltd	Energy & Materials	Metals & Mining	2010 to 2014.
Famous Brands Ltd	Consumer Discretionary	Consumer Services	2010 to 2014.
FirstRand Ltd	Financials	Diversified Financial Services	2010 to 2014.
Foschini Group Ltd	Consumer Discretionary	Specialty Retail	2010 to 2014.
Fountainhead Property Trust	Financials	Real Estate Investment Trusts	2010 to 2014.
Gold Fields Ltd	Energy & Materials	Metals & Mining	2010 to 2014.
Grindrod Ltd	Industrials	Marine	2010 to 2014.
Growthpoint Properties	Financials	Real Estate Management & Development	2010 to 2014.
Harmony Gold Mining Co Ltd	Energy & Materials	Metals & Mining	2010 to 2014.
Hosken Consolidated Investments	Financials	Diversified Financial Services	2010 to 2014.
Hyprop Investments Ltd	Financials	Real Estate Management & Development	2010 to 2014.
IIlovo Sugar Ltd	Consumer Staples	Food Products	2010 to 2014.
Impala Platinum Holdings	Energy & Materials	Metals & Mining	2010 to 2014.
Imperial Holdings	Consumer Discretionary	Distributors	2010 to 2014.
Intu Properties Plc	Financials	Real Estate Investment Trusts	2010 to 2014.
Investec Ltd	Financials	Capital Markets	2010 to 2014.
Investec Plc-see	Financials	Capital Markets	2010 to 2014.

Investec Ltd			
JD Group Ltd	Consumer Discretionary	Specialty Retail	2010 to 2014.
KAP Industrial Holdings	Industrials	Industrial Conglomerates	2010 to 2014.
Kumba Iron Ore	Energy & Materials	Metals & Mining	2010 to 2014.
Liberty Holdings Ltd (Inc Liberty Life Group Ltd)	Financials	Insurance	2010 to 2014.
Life Healthcare Group Holdings Ltd	Health Care	Health Care Providers & Services	2010 to 2014.
Lonmin	Energy & Materials	Metals & Mining	2010 to 2014.
Massmart Holdings Ltd	Consumer Staples	Food & Staples Retailing	2010 to 2014.
Mediclinic International	Health Care	Health Care Providers & Services	2010 to 2014.
MMI Holdings Ltd	Financials	Insurance	2010 to 2014.
Mondi Ltd-see Mondi Plc	Energy & Materials	Paper & Forest Products	2010 to 2014.
Mondi Plc	Energy & Materials	Paper & Forest Products	2010 to 2014.
Mr Price Group Ltd	Consumer Discretionary	Specialty Retail	2010 to 2014.
MTN Group	IT & Telecoms	Wireless Telecommunication Services	2010 to 2014.
Murray & Roberts Holdings Ltd	Industrials	Construction & Engineering	2010 to 2014.
Nampak Ltd	Energy & Materials	Containers & Packaging	2010 to 2014.
Naspers	Consumer	Media	2010 to 2014.

	Discretionary		
Nedbank Ltd	Financials	Commercial Banks	2010 to 2014.
Netcare Ltd	Health Care	Health Care Providers & Services	2010 to 2014.
Northam Platinum Ltd	Energy & Materials	Metals & Mining	2010 to 2014.
Oceana	Consumer Staples	Food Products	2010 to 2014.
Old Mutual Plc	Financials	Insurance	2010 to 2014.
Omnia Holdings Ltd	Energy & Materials	Chemicals	2010 to 2014.
Pick n Pay Holdings Ltd	Consumer Staples	Food & Staples Retailing	2010 to 2014.
Pioneer Foods	Consumer Staples	Food Products	2010 to 2014.
Pretoria Portland Cement Co Ltd	Energy & Materials	Construction Materials	2010 to 2014.
Redefine Properties Ltd	Financials	Real Estate Management & Development	2010 to 2014.
Reinet Investments	Financials	Diversified Financial Services	2010 to 2014.
Remgro	Financials	Diversified Financial Services	2010 to 2014.
Resilient Prop Inc	Financials	Real Estate Management & Development	2010 to 2014.
Reunert	Industrials	Industrial Conglomerates	2010 to 2014.
Rmb Holdings Ltd-see FirstRand	Financials	Diversified Financial Services	2010 to 2014.
RMI Holdings	Financials	Insurance	2010 to 2014.
Royal Bafokeng	Energy &	Metals & Mining	2010 to 2014.

Platinum Ltd	Materials		
SA Corporate Real Estate Fund	Financials	Real Estate Investment Trusts	2010 to 2014.
SABMiller	Consumer Staples	Beverages	2010 to 2014.
Sanlam	Financials	Insurance	2010 to 2014.
Santam Ltd	Financials	Insurance	2010 to 2014.
Sappi	Energy & Materials	Paper & Forest Products	2010 to 2014.
Sasol Ltd	Energy & Materials	Oil, Gas & Consumable Fuels	2010 to 2014.
Shoprite Holdings Ltd	Consumer Staples	Food & Staples Retailing	2010 to 2014.
Standard Bank Group	Financials	Commercial Banks	2010 to 2014.
Steinhoff International Holdings	Consumer Discretionary	Household Durables	2010 to 2014.
Sun International Ltd	Consumer Discretionary	Hotels, Restaurants & Leisure	2010 to 2014.
Telkom SA Ltd	IT & Telecoms	Diversified Telecommunication Services	2010 to 2014.
The Spar Group Ltd	Consumer Staples	Food & Staples Retailing	2010 to 2014.
Tiger Brands	Consumer Staples	Food & Staples Retailing	2010 to 2014.
Tongaat Hulett Ltd	Consumer Staples	Food Products	2010 to 2014.
Trencor	Industrials	Marine	2010 to 2014.
Truworths International	Consumer Discretionary	Specialty Retail	2010 to 2014.
Vodacom Group	IT & Telecoms	Wireless Telecommunication Services	2010 to 2014.

Vukile Property Fund	Financials	Real Estate Investment Trusts	2010 to 2014.
Wilson Bayly Holmes-Ovcon Ltd	Industrials	Construction & Engineering	2010 to 2014.
Woolworths Holdings Ltd	Consumer Discretionary	Multiline Retail	2010 to 2014.

APPENDIX D: Green Investment Practices in Studied Companies

Green investment practices motivated by environmental legislation in companies studied
Compliance with JSE listing requirements.
Adherence to King III Report demands.
Compliance with South African Environmental Legislation interests.
Adherence to internationally approved environmental certifications.
Integrating (GRI) G3 and GRI'S G4 standards.
Compliance with other global and local industrially related green-oriented regulations.
Green investment practices motivated by corporate image in companies studied
Green international and industrial ratings.
Carbon emissions disclosure activities.
Green stakeholder participation.
Affiliation with "green" interested organisations and/or groups.
Media involvement and information dissemination about green issues.
Green reputational risks management initiatives.
Green investment practices motivated by profitability in companies studied
Green market development.
Available green financial instruments.
Green business risk management activities.
Energy efficiency initiatives.
Green productive and operational efficiency.
Adoption of cost-effective green technologies.
Green investment practices motivated by environmental consciousness in companies studied
Environmental education and training.
Environmental campaigns and company green policy.
Green research and development.
Green technology and innovation adoption.
Product life cycle analysis.
Environmental benchmarking and offset activities.
Green networks (logistics, supply chain, distribution and transport).

APPENDIX E: Indicators of the Studied Variables as Factors which Support Corporate Green Investment Practices in JSE Listed Firms

Table E1: Indicators of Environmental Legislation as a Factor which Spur Corporate Green Investment Practices in JSE Listed Firms

Summarised indicators of environmental legislation	**Number of companies which supported the indicator**				
Year	**2010**	**2011**	**2012**	**2013**	**2014**
Total	62	65	67	73	84
Adhere to Johannesburg Stock Exchange (JSE) Socially Responsible Index listing requirements.	9	10	11	13	16
Comply with integrated King III Report demands (South Africa).	6	5	5	4	5
Abide with Kyoto Protocol requirements where they are registered.	4	3	3	4	3
Adhere to United Nations Framework on Climate Change (UNFCCC) demands where they are registered.	2	3	3	4	3
Law required air emission licences to operate.	3	2	4	3	3
Internal control methods uphold regional green law demands.	2	2	1	2	3
The firm is committed to green and environmental legal compliance mandate of the country.	13	14	16	18	21
The company adheres to environmental certifications which include ISO14001.	3	7	1	5	8
Abide with SANS 204 Energy Efficiency in Buildings requirements.	4	3	6	4	4
Comply with Global Reporting Initiative (GRI) G3 and GRI's G4 guidelines.	4	3	4	4	4

Adhere to AccountAbility's AA1000 principles and requirements.	2	3	3	3	2
The company aim to meet or even exceed applicable environmental legislation interests.	3	2	2	2	3
Consider Climate Markets and Investment Association (CMIA) business operating green requirements.	2	2	1	1	2
Take into account of International Emissions Trading Association (IETA) green requirements.	3	3	4	3	4
Adopt Equator Principles sustainability model in implementing project finance decisions.	2	3	3	3	3

Table E2: Indicators of Corporate Image as a Factor which Spur Corporate Green Investment Practices in JSE Listed Firms

Summarised indicators of corporate image	**Number of companies which supported the indicator**				
Year	**2010**	**2011**	**2012**	**2013**	**2014**
Total	59	63	69	75	80
Green technology integration promotes mutual partnership with key stakeholders.	1	2	2	3	4
The firm is determined to attain a positive environmental legacy.	1	2	2	3	4
The entity wants to be identified and recognised as green champions.	2	1	1	2	3
The firms funding assets have impact in areas where environmental groups operate thereby attaining legitimacy.	3	2	2	1	3
Voluntarily disclose carbon footprint with CDP South Africa which has improved trust, credibility and firm belief systems.	2	1	2	3	5

Maintain close association with key stakeholders on carbon emission reduction matters.	2	2	2	3	2
Reputational risks are avoided by sound greening activities.	3	3	4	5	6
Build sustainability image of the firm's vision.	2	2	1	1	2
Participating in the carbon emission reduction annually is part of the firm's green vision.	2	1	2	2	1
Public disclosure of carbon footprint enhances harmonisation of relationships with stakeholders.	4	3	5	2	3
Signatory of the Energy Efficiency Accord with South African government which improves relationship with the government.	-	1	2	3	2
Public disclosure of carbon through the CDP is now part of firm long-term policy and green image building.	2	1	3	2	3
Actively involved with green projects and campaigns with major stakeholders which fosters carbon reduction initiative and general society approval.	2	2	4	4	3
Carbon footprint is verified by recognised worldwide sustainability supporting agencies such as the Global Carbon Exchange (GCE).	-	2	1	1	2
Is a member of the Carbon Protocol, South Africa.	2	2	1	1	1
Assist clients to be more efficient by greening IT systems.	2	2	1	1	-
External stakeholder views are incorporated in sustainability policy development.	3	2	2	2	3

Regularly carry out energy saving initiatives in Shopping Malls on customer's behalf.	-	1	1	1	1
Energy and carbon management are pillars of corporate policy.	2	2	1	2	1
Take part in CDP South Africa and Nedbank BettaBeta Green exchange trade fund.	2	2	1	-	1
Is a member of the Green Building Council of South Africa ("GBCSA").	2	2	2	2	1
Taking part in carbon disclosure indicates better green brand quality.	1	2	1	1	1
Undertake and hosted climate change projects such as COP17 public debate on climate change and the 2011 Global Investor Statement on Climate Change.	-	1	1	2	1
Seek to maintain a viable green business model from a stakeholder's perspective.	1	2	1	2	3
Produce green certified products approved by stakeholders.	1	1	1	2	1
Integrate a strong and empowered green vision.	1	1	1	1	1
Green demands of stakeholders have formalised & established channels within the firm.	2	1	1	1	1
Offer Greening Your Business Course to companies.	-	1	1	1	1
Have improved availability of green merchandise range.	-	1	1	1	2
Use magazines, newsletters and e-media to communicate green matters.	2	1	3	2	1
Assume industrial leadership on green investment issues.	-	1	1	2	1
Taking part in Carbon emissions disclosure practices improves firm attractiveness.	2	1	1	1	2
View carbon emission reduction matters	1	1	2	1	1

as part of firm culture.					
Taking part in Carbon related issues continually improve public relations.	3	2	2	1	1
Consider carbon emission reduction aspects as ethical.	1	2	1	1	1
Promote transparency by disclosing carbon footprint.	1	1	1	1	2
Have an ethical and credible climate change policy.	-	1	1	1	1
Involvement with carbon disclosure is designed to meet expectations of stakeholders.	1	1	1	2	1
Is forthright in communicating carbon and environmental matters.	-	1	2	2	1
Company visibility is improved through assuming carbon reporting practices.	1	1	2	2	1
Promote public awareness concerning green issues.	2	1	1	3	3
Believe high business standards are maintained by taking part in Carbon related matters and reporting.	-	1	1	1	2

Table E3: Indicators of Profitability as a Factor which Support Corporate Green Investment Activities in JSE Listed Firms

Summarised indicators of profitability	**Number of companies which supported the indicator**				
Year	**2010**	**2011**	**2012**	**2013**	**2014**
Total	56	57	59	68	79
Zero carbon schemes generate financial gains.	2	2	3	4	6
Sustainable green business opportunities are created.	4	3	3	3	5
Carbon management investments encourage firm growth when the economic environment gives way.	2	2	1	3	2
Green investments manage climate related risks in core business operations.	1	1	1	2	3
Environmental investments make use of natural environment elements to	2	2	1	2	2

improve green building performance which lowers energy related costs.					
Energy management practices lessen costs.	2	2	1	1	3
Co-generation projects of energy minimise costs.	1	2	1	1	2
Efficient use of energy reduces overhead costs.	2	1	4	2	1
Green investments improve firm overall productivity.	1	2	1	1	1
Carbon emissions control investments, enhance firm competitive advantages.	2	3	3	3	4
Manufacturing machinery and procedures which are environmentally friendly maximise energy savings.	1	1	1	2	2
Green investment and divestment decisions promote efficient allocation of financial and other important resources.	2	1	3	2	2
Smart metering schemes save energy and ultimately lessen costs.	2	2	2	2	3
Energy efficiency interventions maximise returns.	1	1	1	2	3
Continual employment of green technologies supports efficient production.	1	2	1	1	2
The firm considers that its share price is also determined by green metrics available.	1	1	2	2	2
Security in energy provision is enhanced by green energy integration.	2	2	1	1	2

Sustainability operations generate environmental benefits.	1	1	1	2	1
Energy and environmental risks are assessed and controlled.	2	2	3	2	2
Promoted company marketability results from adopted green designs and green policies.	2	1	1	3	3
By-products from processing sugar cane generate green energy which promotes business prospects and lessens energy associated costs.	1	1	1	1	2
Environmental tax and connected fines for green non-compliance are regularly monitored in the business risk register.	1	1	1	2	1
Green investment indicates responsible lending and investing approaches which avoid crime and possible high costs associated with litigation.	1	1	1	2	1
Operational efficiency on carbon issues are undertaken to minimise operational costs.	2	1	1	1	1
Investing in properties by focusing on energy efficiency and green star ratings to improve marketability and financial gains.	1	1	1	2	2
Have green product life cycle procedures which reuse waste that lowers buying costs.	1	1	2	1	1
Products attributes and manufacturing processes are designed to reduce energy costs.	2	1	1	1	1
Recycle used products which increases profits as it is cheaper than employing virgin materials.	1	2	1	2	1

Offer green bonds and carbon financing mechanisms which develop green markets and favourable long-lasting sustained performance of the firm.	2	2	2	3	2
Environmental Key Performance Indicators (KPIs) have been designed and adopted to assists monitoring energy use which improves finance gains.	1	1	2	1	1
Environmental practices protect the firm's brand and avoids green fines and penalties.	2	1	1	2	1
Incorporated sustainability data and ratings into the electronic tools used daily by listed equity analyst portfolio managers reduce business risks.	1	2	1	1	2
Green product range increases sales and therefore, revenue.	1	2	1	1	2
Inflationary pressures cause the firm to integrate energy saving technologies thereby lowering energy costs.	1	1	1	2	2
Environmental impacts are connected with the portfolio of investment properties hence possible green risks are mitigated.	1	1	1	1	3
Climate change is viewed as systemic risk so green goals are monitored regularly.	1	2	2	1	2
Responsible control of the environmental footprint generates sound business sense and high firm competence.	1	1	1	2	1
Promoted green supply chain innovation lowers carbon related	1	1	3	1	3

costs.					

Table E4: Indicators of Environmental Consciousness as a Factor which Promotes Corporate Green Investment Practices in JSE Listed Companies

Summarised indicators of environmental consciousness	**Number of companies which supported the indicator**				
Year	**2010**	**2011**	**2012**	**2013**	**2014**
Total	57	59	63	72	82
Carbon management adaptation approaches are incorporated in firm policy and operations.	2	2	1	2	2
Companies have developed a climate change strategy for the long-term.	2	2	3	4	4
Support environmental transformation which results in overall green lifestyle and green behaviour in the firm.	1	1	1	1	2
Works with government, media and academia in promoting climate change awareness programmes.	1	1	2	3	4
Integrates latest energy efficiency technologies.	1	3	4	3	4
Risks linked with climate change are reduced by sound environmental control measures adopted.	2	1	1	1	2
Low-carbon investment issues build meaning, interaction and exchange of knowledge with external partners.	1	1	1	2	1
Utilise the Greenhouse Gas Accounting Protocol and the ISO14064 International Standard for GHG Emissions Inventories and Verification.	2	1	1	1	1
Participate with other industrial associations on carbon matters which generates new green ideas and strategies.	1	1	1	2	1
Undertake research & development on carbon emissions related issues.	2	2	3	3	5
Carbon emissions are lessened in	1	2	2	2	3

accordance to identified and prescribed environmental baselines.					
Continually refurbish environmental assets so as to conserve energy usage.	1	1	1	2	1
Have incorporated environmental and carbon footprint accounting models.	1	2	1	1	2
Monitor carbon emissions of its upstream and downstream partners.	1	1	1	1	1
Installed green appliances regularly check energy usage and environmental impacts.	2	2	3	3	4
Engage environmental and climate change experts and specialists in firm operational environmental management policies and practices.	2	1	2	2	3
Are improving the capacity of environmentally sound technologies.	1	1	1	1	1
Stimulated towards improving the firm's carbon emissions reduction data targets.	2	1	1	2	1
Continually update and revise environmental policies.	2	2	1	1	2
Invest in renewable or green energy projects.	1	2	3	2	4
Undertake energy audits so as to standardise and improve energy consumption.	1	2	2	2	2
Incorporate co-generation of green energy schemes which eventually will fully substitute fossil fuel use in the future.	1	1	1	1	1
Differentiation of green products attracts various outside participants.	1	1	1	1	2
Environmental managers are expected to train and educate internal and external partners on green matters.	2	2	4	3	4
Buildings are regularly upgraded and refurbished using green attributes.	1	1	1	2	1
Adopting best practice green technology.	1	1	1	1	1
Infrastructure sharing minimise climate change related challenges.	2	2	1	1	1
Corporate procurement team influences	2	2	3	3	3

suppliers to adopt green policies.					
Climate change policy is expanded in the supply chain.	1	1	1	1	1
Expanded use of green energy and green technologies.	2	2	1	1	1
Green facilities are upgraded and refurbished to accurately measure green metrics.	2	1	1	1	2
Support public involvement in environmental issues.	1	2	2	4	3
Integrate green energy and low carbon packaging processes and methods.	2	1	1	1	1
Energy efficiency measures are promoted.	1	1	1	2	2
Regular employment of environmental offsets.	1	1	1	2	1
Screen suppliers using green benchmarks.	1	2	1	1	1
Committed towards minimising environmental footprint.	2	2	1	1	1
Utilise an efficient environmental policy and energy mix.	1	1	1	1	2
Support effective environmental management of value chain practices and efficiencies.	1	1	1	2	1
Promote virtual data centre establishment which reduces carbon footprint.	1	1	2	1	1
Textile products are designed in mechanisms that save energy.	1	1	1	1	2

APPENDIX F: List of Tables Indicating Whether a Studied Variable Motivates Corporate Green Investment Activities from 2010 to 2014

Table F1: JSE Listed Companies Indicating the Extent to which Environmental Legislation as a Factor Promotes Firm Green Investment Practice from 2010 to 2014.

Year	2010	2011	2012	2013	2014	Total
Number of companies indicating	62	65	67	73	84	351
Number of companies not indicating	38	35	33	27	16	149
Total	100	100	100	100	100	500

Source: Author's research data retrieved through content analysis (see appendix D).

Table F2: JSE Listed Companies Indicating Whether Corporate Image as a Factor Motivates Corporate Green Investment Practices from 2010 to 2014.

Year	2010	2011	2012	2013	2014	Total
Number of companies indicating	59	63	69	75	80	346
Number of companies not indicating	41	37	31	25	20	154
Total	100	100	100	100	100	500

Source: Author's research data retrieved through content analysis (see appendix D).

Table F3: JSE Listed Firms Indicating the Extent that Profitability as a Factor Spurs Firm Green Investment Activities from 2010 to 2014.

Year	2010	2011	2012	2013	2014	Total
Number of companies indicating	56	57	59	68	79	319
Number of companies not indicating	44	43	41	32	21	181
Total	100	100	100	100	100	500

Source: Author's research data retrieved through content analysis (see appendix D).

Table F4: JSE Listed Firms Indicating Whether Environmental Consciousness as a Factor Promotes Firm Green Investment Practice from 2010 to 2014.

Year	2010	2011	2012	2013	2014	Total
Number of companies indicating	57	59	63	72	82	333
Number of companies not indicating	43	41	37	28	18	167
Total	100	100	100	100	100	500

Source: Author's research data retrieved through content analysis (see appendix D).

APPENDIX G: Research Data on Variables "External Pressure" and "Corporate Green Investment Practices"

Table G1: Research Data on Environmental Legislation and Corporate Green Investment Practices

ENVLEG	GINV	JSE LISTED COMPANY	GINV (R MILLIONS)
IND	STRG	COMPANY 1	2.62
NOTIND	WEK	COMPANY 2	6.6
IND	WEK	COMPANY 3	12.3
NOTIND	STRG	COMPANY 4	8.4
IND	STRG	COMPANY 5	11.01
NOTIND	WEK	COMPANY 6	3.6
IND	STRG	COMPANY 7	9.3
NOTIND	WEK	COMPANY 8	7.68
IND	STRG	COMPANY 9	5.68
NOTIND	STRG	COMPANY 10	4.62
IND	WEK	COMPANY 11	9.05
NOTIND	STRG	COMPANY 12	6.7
IND	STRG	COMPANY 13	15.2
NOTIND	WEK	COMPANY 14	8.76
IND	STRG	COMPANY 15	4.56
NOTIND	WEK	COMPANY 16	10.32
IND	STRG	COMPANY 17	7.45
NOTIND	WEK	COMPANY 18	8.01
IND	STRG	COMPANY 19	5.73
NOTIND	STRG	COMPANY 20	7.87
IND	WEK	COMPANY 21	4.01
NOTIND	STRG	COMPANY 22	6.01
IND	STRG	COMPANY 23	7.38
NOTIND	WEK	COMPANY 24	6.39
IND	STRG	COMPANY 25	12.6
NOTIND	WEK	COMPANY 26	3.68
IND	WEK	COMPANY 27	18.36
NOTIND	WEK	COMPANY 28	6.5
IND	STRG	COMPANY 29	9.55
NOTIND	WEK	COMPANY 30	7.21
IND	STRG	COMPANY 31	13.35
NOTIND	WEK	COMPANY 32	3.93
IND	STRG	COMPANY 33	10.43
NOTIND	WEK	COMPANY 34	8.61
IND	STRG	COMPANY 35	7.29

NOTIND	WEK	COMPANY 36	3.27
IND	STRG	COMPANY 37	6.34
NOTIND	WEK	COMPANY 38	8.9
IND	STRG	COMPANY 39	6.48
NOTIND	WEK	COMPANY 40	5.74
IND	STRG	COMPANY 41	4.6
NOTIND	WEK	COMPANY 42	8.5
IND	STRG	COMPANY 43	6.3
NOTIND	WEK	COMPANY 44	7.6
IND	STRG	COMPANY 45	3.02
NOTIND	WEK	COMPANY 46	6.67
IND	STRG	COMPANY 47	7.64
NOTIND	WEK	COMPANY 48	4.29
IND	STRG	COMPANY 49	11.04
NOTIND	WEK	COMPANY 50	3.8
IND	STRG	COMPANY 51	10.75
NOTIND	WEK	COMPANY 52	7.25
IND	STRG	COMPANY 53	6.44
NOTIND	WEK	COMPANY 54	8.05
IND	WEK	COMPANY 55	7.69
NOTIND	WEK	COMPANY 56	14.8
IND	STRG	COMPANY 57	3.21
NOTIND	WEK	COMPANY 58	12.77
IND	STRG	COMPANY 59	6.29
NOTIND	WEK	COMPANY 60	4.33
IND	WEK	COMPANY 61	8.57
NOTIND	STRG	COMPANY 62	7.03
IND	STRG	COMPANY 63	2.87
NOTIND	WEK	COMPANY 64	6.83
IND	STRG	COMPANY 65	9.52
NOTIND	WEK	COMPANY 66	8.4
IND	STRG	COMPANY 67	10.09
NOTIND	WEK	COMPANY 68	8.82
IND	STRG	COMPANY 69	2.39
NOTIND	WEK	COMPANY 70	7.62
IND	STRG	COMPANY 71	9.73
NOTIND	WEK	COMPANY 72	8.55
IND	STRG	COMPANY 73	4.59
NOTIND	WEK	COMPANY 74	13.78
IND	STRG	COMPANY 75	11.42
NOTIND	STRG	COMPANY 76	4.67
IND	STRG	COMPANY 77	10.23
NOTIND	WEK	COMPANY 78	12.85
IND	STRG	COMPANY 79	5.94
NOTIND	WEK	COMPANY 80	7.37
IND	STRG	COMPANY 81	8.81

NOTIND	WEK	COMPANY	82	4.88
IND	STRG	COMPANY	83	7.69
NOTIND	WEK	COMPANY	84	6.41
IND	WEK	COMPANY	85	3.09
NOTIND	STRG	COMPANY	86	7.56
IND	WEK	COMPANY	87	11.47
NOTIND	WEK	COMPANY	88	4.2
IND	STRG	COMPANY	89	8.26
NOTIND	WEK	COMPANY	90	6.39
IND	STRG	COMPANY	91	7.01
NOTIND	WEK	COMPANY	92	3.27
IND	STRG	COMPANY	93	16.7
NOTIND	WEK	COMPANY	94	9.72
IND	STRG	COMPANY	95	4.88
NOTIND	STRG	COMPANY	96	11.48
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Table G2: Research Data on Corporate Image and Corporate Green Investment Practices

IMG	GINV	JSE LISTED COMPANY	GINV (R MILLIONS)
IND	WEK	COMPANY 1	2.62
NOTIND	STRG	COMPANY 2	6.6
IND	WEK	COMPANY 3	12.3
NOTIND	WEK	COMPANY 4	8.4
IND	STRG	COMPANY 5	11.01
NOTIND	WEK	COMPANY 6	3.6
IND	STRG	COMPANY 7	9.3
NOTIND	WEK	COMPANY 8	4.82
IND	STRG	COMPANY 9	5.68
NOTIND	WEK	COMPANY 10	4.62
IND	STRG	COMPANY 11	9.05
NOTIND	WEK	COMPANY 12	6.7
IND	STRG	COMPANY 13	15.2
NOTIND	WEK	COMPANY 14	8.76
IND	STRG	COMPANY 15	4.56
NOTIND	WEK	COMPANY 16	10.32
IND	STRG	COMPANY 17	7.45
NOTIND	WEK	COMPANY 18	8.01
IND	STRG	COMPANY 19	4.35
NOTIND	WEK	COMPANY 20	7.87
IND	STRG	COMPANY 21	4.01
NOTIND	WEK	COMPANY 22	6.01
IND	STRG	COMPANY 23	7.38
NOTIND	WEK	COMPANY 24	6.39
IND	STRG	COMPANY 25	12.6
NOTIND	WEK	COMPANY 26	3.68
IND	STRG	COMPANY 27	18.36
NOTIND	WEK	COMPANY 28	3.75
IND	STRG	COMPANY 29	9.55
NOTIND	WEK	COMPANY 30	7.21
IND	STRG	COMPANY 31	13.35
NOTIND	WEK	COMPANY 32	3.93
IND	STRG	COMPANY 33	10.43
NOTIND	WEK	COMPANY 34	8.61
IND	STRG	COMPANY 35	7.29
NOTIND	STRG	COMPANY 36	3.27
IND	STRG	COMPANY 37	6.34
NOTIND	WEK	COMPANY 38	8.9

IND	STRG	COMPANY 39	6.48
NOTIND	WEK	COMPANY 40	5.74
IND	STRG	COMPANY 41	4.6
NOTIND	WEK	COMPANY 42	8.5
IND	STRG	COMPANY 43	3.81
NOTIND	WEK	COMPANY 44	7.6
IND	STRG	COMPANY 45	3.02
NOTIND	WEK	COMPANY 46	6.67
IND	WEK	COMPANY 47	7.64
NOTIND	WEK	COMPANY 48	4.29
IND	STRG	COMPANY 49	11.04
NOTIND	WEK	COMPANY 50	3.8
IND	STRG	COMPANY 51	10.75
NOTIND	WEK	COMPANY 52	7.25
IND	STRG	COMPANY 53	6.44
NOTIND	WEK	COMPANY 54	8.05
IND	WEK	COMPANY 55	7.69
NOTIND	STRG	COMPANY 56	14.8
IND	STRG	COMPANY 57	3.21
NOTIND	STRG	COMPANY 58	12.77
IND	STRG	COMPANY 59	6.29
NOTIND	WEK	COMPANY 60	4.33
IND	STRG	COMPANY 61	8.57
NOTIND	WEK	COMPANY 62	7.03
IND	WEK	COMPANY 63	2.87
NOTIND	WEK	COMPANY 64	6.83
IND	STRG	COMPANY 65	9.52
NOTIND	WEK	COMPANY 66	4.49
IND	WEK	COMPANY 67	10.09
NOTIND	STRG	COMPANY 68	8.82
IND	STRG	COMPANY 69	2.39
NOTIND	WEK	COMPANY 70	7.62
IND	STRG	COMPANY 71	9.73
NOTIND	STRG	COMPANY 72	8.55
IND	WEK	COMPANY 73	4.59
NOTIND	STRG	COMPANY 74	13.78
IND	STRG	COMPANY 75	11.42
NOTIND	WEK	COMPANY 76	4.67
IND	WEK	COMPANY 77	10.23
NOTIND	STRG	COMPANY 78	4.67
IND	WEK	COMPANY 79	5.94
NOTIND	STRG	COMPANY 80	7.37
IND	STRG	COMPANY 81	8.81
NOTIND	WEK	COMPANY 82	4.88
IND	STRG	COMPANY 83	7.69
NOTIND	WEK	COMPANY 84	6.41

IND	STRG	COMPANY	85	3.09
NOTIND	STRG	COMPANY	86	7.56
IND	WEK	COMPANY	87	4.66
NOTIND	STRG	COMPANY	88	4.2
IND	STRG	COMPANY	89	8.26
NOTIND	WEK	COMPANY	90	6.39
IND	STRG	COMPANY	91	7.01
NOTIND	WEK	COMPANY	92	3.27
IND	WEK	COMPANY	93	16.7
NOTIND	WEK	COMPANY	94	9.72
IND	STRG	COMPANY	95	4.88
NOTIND	STRG	COMPANY	96	11.48
IND	STRG	COMPANY	97	15.77
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Table G3: Research Data on Profitability and Corporate Green Investment Practices

PRFT	GINV	JSE LISTED COMPANY	GINV (R MILLIONS)
IND	STRG	COMPANY 1	2.62
NOTIND	WEK	COMPANY 2	6.6
IND	STRG	COMPANY 3	12.3
NOTIND	WEK	COMPANY 4	8.4
IND	STRG	COMPANY 5	11.01
NOTIND	WEK	COMPANY 6	3.6
IND	STRG	COMPANY 7	9.3
NOTIND	WEK	COMPANY 8	4.82
IND	STRG	COMPANY 9	5.68
NOTIND	WEK	COMPANY 10	4.62
IND	STRG	COMPANY 11	9.05
NOTIND	WEK	COMPANY 12	6.7
IND	STRG	COMPANY 13	15.2
NOTIND	WEK	COMPANY 14	8.76
IND	STRG	COMPANY 15	5.86
NOTIND	WEK	COMPANY 16	10.32
IND	STRG	COMPANY 17	7.45
NOTIND	STRG	COMPANY 18	8.01
IND	STRG	COMPANY 19	4.35
NOTIND	STRG	COMPANY 20	7.87
IND	WEK	COMPANY 21	4.01
NOTIND	STRG	COMPANY 22	6.01
IND	WEK	COMPANY 23	7.38
NOTIND	WEK	COMPANY 24	6.39
IND	STRG	COMPANY 25	12.6
NOTIND	WEK	COMPANY 26	3.68
IND	STRG	COMPANY 27	18.36
NOTIND	WEK	COMPANY 28	3.75
IND	STRG	COMPANY 29	9.55
NOTIND	WEK	COMPANY 30	7.21
IND	STRG	COMPANY 31	13.35
NOTIND	WEK	COMPANY 32	3.93
IND	STRG	COMPANY 33	10.43
NOTIND	WEK	COMPANY 34	8.61
IND	STRG	COMPANY 35	7.29
NOTIND	WEK	COMPANY 36	3.27
IND	STRG	COMPANY 37	6.34
NOTIND	WEK	COMPANY 38	8.9

IND	STRG	COMPANY 39	6.48
NOTIND	WEK	COMPANY 40	5.74
IND	STRG	COMPANY 41	6.66
NOTIND	WEK	COMPANY 42	8.5
IND	STRG	COMPANY 43	3.81
NOTIND	WEK	COMPANY 44	7.6
IND	STRG	COMPANY 45	3.02
NOTIND	WEK	COMPANY 46	6.67
IND	STRG	COMPANY 47	7.64
NOTIND	WEK	COMPANY 48	4.29
IND	STRG	COMPANY 49	11.04
NOTIND	WEK	COMPANY 50	3.8
IND	WEK	COMPANY 51	10.75
NOTIND	STRG	COMPANY 52	7.25
IND	STRG	COMPANY 53	6.44
NOTIND	WEK	COMPANY 54	8.05
IND	STRG	COMPANY 55	7.69
NOTIND	WEK	COMPANY 56	14.8
IND	STRG	COMPANY 57	3.21
NOTIND	WEK	COMPANY 58	12.77
IND	STRG	COMPANY 59	6.29
NOTIND	WEK	COMPANY 60	7.21
IND	STRG	COMPANY 61	8.57
NOTIND	WEK	COMPANY 62	7.03
IND	STRG	COMPANY 63	2.87
NOTIND	WEK	COMPANY 64	6.83
IND	STRG	COMPANY 65	9.52
NOTIND	WEK	COMPANY 66	4.49
IND	STRG	COMPANY 67	10.09
NOTIND	STRG	COMPANY 68	8.82
IND	WEK	COMPANY 69	2.39
NOTIND	WEK	COMPANY 70	7.62
IND	STRG	COMPANY 71	9.73
NOTIND	WEK	COMPANY 72	8.55
IND	STRG	COMPANY 73	4.59
NOTIND	WEK	COMPANY 74	13.78
IND	STRG	COMPANY 75	11.42
NOTIND	WEK	COMPANY 76	4.67
IND	STRG	COMPANY 77	10.23
NOTIND	WEK	COMPANY 78	4.67
IND	STRG	COMPANY 79	5.94
NOTIND	WEK	COMPANY 80	7.37
IND	WEK	COMPANY 81	8.81
NOTIND	WEK	COMPANY 82	4.88
IND	WEK	COMPANY 83	7.69
NOTIND	STRG	COMPANY 84	6.41

IND	STRG	COMPANY	85	3.09
NOTIND	WEK	COMPANY	86	7.56
IND	STRG	COMPANY	87	4.66
NOTIND	WEK	COMPANY	88	4.2
IND	STRG	COMPANY	89	8.26
NOTIND	WEK	COMPANY	90	6.39
IND	STRG	COMPANY	91	7.01
NOTIND	WEK	COMPANY	92	3.27
IND	STRG	COMPANY	93	16.7
NOTIND	WEK	COMPANY	94	9.72
IND	STRG	COMPANY	95	4.88
NOTIND	WEK	COMPANY	96	11.48
IND	WEK	COMPANY	97	15.77
NOTIND	WEK	COMPANY	98	13.79
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Table G4: Research Data on Environmental Consciousness and Corporate Green Investment Practices

ENVCN	GINV	JSE LISTED COMPANY	GINV (R MILLIONS)
IND	WEK	COMPANY 1	2.62
NOTIND	STRG	COMPANY 2	6.6
IND	STRG	COMPANY 3	12.3
NOTIND	WEK	COMPANY 4	8.4
IND	STRG	COMPANY 5	11.01
NOTIND	WEK	COMPANY 6	3.6
IND	STRG	COMPANY 7	9.3
NOTIND	WEK	COMPANY 8	4.82
IND	STRG	COMPANY 9	5.68
NOTIND	WEK	COMPANY 10	4.62
IND	STRG	COMPANY 11	9.05
NOTIND	WEK	COMPANY 12	6.7
IND	STRG	COMPANY 13	15.2
NOTIND	WEK	COMPANY 14	8.76
IND	STRG	COMPANY 15	5.86
NOTIND	WEK	COMPANY 16	10.32
IND	STRG	COMPANY 17	7.45
NOTIND	WEK	COMPANY 18	8.01
IND	STRG	COMPANY 19	6.73
NOTIND	WEK	COMPANY 20	7.87
IND	STRG	COMPANY 21	4.01
NOTIND	WEK	COMPANY 22	6.01
IND	STRG	COMPANY 23	7.38
NOTIND	WEK	COMPANY 24	6.39
IND	STRG	COMPANY 25	12.6
NOTIND	WEK	COMPANY 26	3.68
IND	STRG	COMPANY 27	18.36
NOTIND	WEK	COMPANY 28	3.75
IND	STRG	COMPANY 29	9.55
NOTIND	WEK	COMPANY 30	7.21
IND	STRG	COMPANY 31	13.35
NOTIND	WEK	COMPANY 32	3.93
IND	STRG	COMPANY 33	10.43
NOTIND	WEK	COMPANY 34	8.61
IND	WEK	COMPANY 35	7.29
NOTIND	WEK	COMPANY 36	3.27
IND	STRG	COMPANY 37	6.34
NOTIND	WEK	COMPANY 38	8.9

IND	STRG	COMPANY 39	6.48
NOTIND	WEK	COMPANY 40	5.74
IND	STRG	COMPANY 41	6.66
NOTIND	WEK	COMPANY 42	8.5
IND	STRG	COMPANY 43	3.81
NOTIND	WEK	COMPANY 44	7.6
IND	STRG	COMPANY 45	3.02
NOTIND	WEK	COMPANY 46	6.67
IND	STRG	COMPANY 47	7.64
NOTIND	STRG	COMPANY 48	6.37
IND	STRG	COMPANY 49	11.04
NOTIND	WEK	COMPANY 50	3.8
IND	STRG	COMPANY 51	10.75
NOTIND	WEK	COMPANY 52	7.25
IND	STRG	COMPANY 53	6.44
NOTIND	WEK	COMPANY 54	8.05
IND	STRG	COMPANY 55	7.69
NOTIND	WEK	COMPANY 56	14.8
IND	WEK	COMPANY 57	3.21
NOTIND	STRG	COMPANY 58	12.77
IND	WEK	COMPANY 59	6.29
NOTIND	STRG	COMPANY 60	7.21
IND	WEK	COMPANY 61	8.57
NOTIND	WEK	COMPANY 62	7.03
IND	STRG	COMPANY 63	2.87
NOTIND	WEK	COMPANY 64	6.83
IND	STRG	COMPANY 65	9.52
NOTIND	WEK	COMPANY 66	4.49
IND	STRG	COMPANY 67	10.09
NOTIND	WEK	COMPANY 68	8.82
IND	STRG	COMPANY 69	2.39
NOTIND	WEK	COMPANY 70	7.62
IND	STRG	COMPANY 71	9.73
NOTIND	WEK	COMPANY 72	8.55
IND	STRG	COMPANY 73	7.59
NOTIND	WEK	COMPANY 74	13.78
IND	STRG	COMPANY 75	11.42
NOTIND	WEK	COMPANY 76	4.67
IND	STRG	COMPANY 77	10.23
NOTIND	WEK	COMPANY 78	6.01
IND	WEK	COMPANY 79	5.94
NOTIND	STRG	COMPANY 80	7.37
IND	STRG	COMPANY 81	8.81
NOTIND	WEK	COMPANY 82	4.88
IND	STRG	COMPANY 83	7.69
NOTIND	STRG	COMPANY 84	6.41

IND	WEK	COMPANY	85	3.09
NOTIND	STRG	COMPANY	86	7.56
IND	STRG	COMPANY	87	4.66
NOTIND	WEK	COMPANY	88	4.2
IND	WEK	COMPANY	89	8.26
NOTIND	STRG	COMPANY	90	6.39
IND	WEK	COMPANY	91	7.01
NOTIND	STRG	COMPANY	92	3.27
IND	WEK	COMPANY	93	16.7
NOTIND	STRG	COMPANY	94	9.72
IND	STRG	COMPANY	95	6.38
NOTIND	WEK	COMPANY	96	11.48
IND	STRG	COMPANY	97	15.77
NOTIND	WEK	COMPANY	98	13.79
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APPENDIX H: List of Publications from this Thesis

1. Ganda, F., Ngwakwe, C.C. & Ambe, C. 2015. Investigating whether environmental legislation promotes green investment practices in Johannesburg Stock Exchange (JSE) listed companies. *Environmental Economics* 6(1): 45-54.

2. Ganda, F., Ngwakwe, C.C. & Ambe, C. 2015. Profitability as a factor which spur corporate green investment practices in Johannesburg Stock Exchange (JSE) listed firms. *Managing Global Transitions Journal* 13 (3): 115–136.

3. Ganda, F., Ngwakwe, C.C. & Ambe, C. 2016. Corporate image as a factor that supports corporate green investment practices in Johannesburg Stock Exchange (JSE) listed companies. *International Journal of Sustainable Economy,* 8(1): 57-75.

4. Ganda, F., Ngwakwe, C.C. & Ambe, C. 2015. Environmental consciousness as a factor which promotes firm green investment practices in Johannesburg Stock Exchange (JSE) listed firms. *Journal of Corporate Ownership and Control* 12(4): 440-450.

5. Ganda, F., Ngwakwe, C.C. & Ambe C. 2015. The role of corporate green investment practices on sustainable development. *Environmental Economics* 6(1): 33-44.

6. Ganda Fortune. 2013. Energy and Carbon Reduction practices in South African Mobile Telecommunication companies. *Environmental Economics* 4(4): 33-45.

7. Ganda Fortune & Collins C. Ngwakwe. 2013. Environmental, Social and Governance Disclosure: Transition towards a Sustainable Economy. *Korean Social Science Journal* 40(1): 21-37.

8. Ganda Fortune & Collins C. Ngwakwe. 2014. Water efficiency practices in South African banks. *Environmental Economics* 5(2): 42-52.

9. Ganda Fortune & Collins C. Ngwakwe. 2014. Energy and Carbon reduction practices in South African Banks. *Environmental Economics Journal* 5(4): 6-14.

APPENDIX I: Professional English Editor Confirmation Letter

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Tel: 072 442 7896

Email: deanne.collins30@gmail.com

Income tax number: 0526066204

6 January 2016

This is to confirm that I have edited the thesis, “DETERMINANTS OF CORPORATE GREEN INVESTMENT PRACTICES IN THE JOHANNESBURG STOCK EXCHANGE (JSE) LISTED FIRMS”, by GANDA FORTUNE, student number 201404612, excluding the appendices.

Yours sincerely,

(Ms) Deanne Collins (MA)

Professional Editor