Waste sector small and medium-sized enterprises and their role in the Extended Producer Responsibility; a case study of environmental responsibility in SMEs in eThekwini, KwaZulu-Natal (South Africa)

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ABSTRACT

Both the waste sector and corporate enterprises, under the banner of corporate social and environmental responsibility (CSER), have a role to play in sustainable development, particularly in the South African context where legislation supports the waste hierarchy in its approach to waste management, and the promotion of employment and small and medium-sized enterprises (SMEs). SMEs, due to their vast number and the significance of their aggregate contribution to the global economy, have been identified as key contributors to sustainable development. Global supply chains rely heavily on SME suppliers and service providers, yet the combined environmental impact of SMEs remains un-quantified and their engagement in CSER is underexplored.

This research explores the role that SMEs play in extended producer and environmental responsibility from a waste management perspective in the eThekwini Municipal area, describes the barriers that SMEs face when implementing environmental measures and provides a critical assessment of environmental responsibility in waste management supply chains. Case studies, where interviews and documentations were used as data collection methods, on waste management supply chains are provided.

It is evident that there is a culture of outsourcing of the waste management function in the eThekwini municipal area and SMEs are an important component of the waste management value chain. However, environmental responsibility amongst the SMEs is poor as the SMEs response to supply chain or legislative pressure is weak. The bureaucracy of legal requirements of the waste sector, an ill-informed public and business sector regarding environmental issues, and the highly competitive nature of the waste sector are common obstacles experienced. In the face of difficulties such as limited resources, some SMEs are responding to legislative pressure and adopting the ISO 14001 certification. Many SMEs are responding to supply chain pressure in terms of the Broad Based Black Economic Empowerment Act and participating in social responsibility activities. Findings from this research support the government's vision of the creation of employment, the promotion of small business within the waste sector and the role that SMEs play in sustainable development in South Africa however; there is a need for strategies to address the environmental problems of small business.

DECLARATION

I hereby declare that the work contained in this dissertation is the original work of the author conducted in the Discipline of Geography and Environmental Science, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal (Pietermaritzburg), under the Supervision of Prof. Trevor Hill and Chris Whyte. Acknowledgement of other authors or organisations has been made within the text and referenced as such.

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This thesis involves commercial confidentiality i.e. information made available by private corporations, and has been produced in terms of an agreement with these corporations. The contents of this thesis are to remain confidential and are not to be circulated for a period of five years.

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LIST OF ABBREVIATIONS

APEIS RISPO	Asia-Pacific Environmental Innovation Strategies. Research on Innovative and Strategic Policy Options
B-BBEE	Broad-Based Black Economic Empowerment
CSER	Corporate social and environmental responsibility
CSR	Corporate environmental responsibility
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DMA	Durban Metropolitan Area
DTI	The Department of Trade and Industry
DWAF	Department of Water Affairs and Forestry
ECA	The Environmental Conservation Act (73 of 1989)
EDDRSA	The Economic Development Department of the Republic of South Africa
EMS	Environmental Management System
EPR	Extended Producer Responsibility
EU	European Union
IPandWM	The White Paper on Integrated Pollution and Waste Management for South Africa, 17 March 2000
ISO	International Organisation for Standardisation
IWM	Integrated Waste Management
IWMP	Industry Waste Industry Management Plan
NEMA	The National Environmental Management Act (107 of 1998)
NSBA	The National Small Business Act
NSBAA	The National Small Business Amendment Act
NWMS	The National Waste Management Strategy
OECD	Organisation for Economic Co-operation and Development
OHSA	The Occupational Health and Safety Act (85 of 1993)
PACSA	The Packaging Council of South Africa
PRASA	Paper Recycling Association Of South Africa
SAWIC	South African Waste Information Centre
SAWIS	South African Waste Information System
SHEQ	Safety, Health, Environment and Quality
SME	Small and Medium sized enterprises
TGRC	The Glass Recycling Company
UNIDO	United Nations Industrial Development Organisation
Waste Act	The National Environmental Management: Waste Act 2008 (Act 59 of 2008)

WBCSD	World Business Council for Sustainable Development

CHAPTER ONE
INTRODUCTION

1.1 Introduction

The unsustainable consumption of the earth's resources may be the most important issue of the 21st century (Toms, 2000) and the immense increase in waste generation is a direct result of this consumption (Falasca-Zamponi, 2011). There is a strong link between waste creation and wealth creation (Strange, 2002) and the problem of waste has emerged as one of the most contentious and dramatic consequences of global market-driven economic development (Falasca-Zamponi, 2011). These growing waste streams need to be managed and removed from human settlements to avoid nuisance, public health and environmental problems. Consequently waste management policy and practice has developed to ensure that while occupational health risks are minimised, environmental resources are protected (Strange, 2002). Since the 1980s one of the driving forces in shaping waste policy has been the overarching goal of sustainable development (Strange, 2002) which takes care of three essential aspects; economic growth, environmental responsibility, and social justice (Banerjee, 2009). Approaches to waste management have embraced the economic, social and environmental dimensions and sustainable waste management has been equated to integrated waste management, the judicious application of a range of options to achieve a broadly optimal system of waste management and resource recovery (Strange, 2002: 1).

In the South African context, over the last two decades waste has become an increasingly important environmental concern and unsustainable consumption has resulted in a proliferation of the volume and the diversity of waste (Hugo, 2004). The South African Polokwane Declaration on Waste Management of September 2001 has a goal to "reduce waste generation and disposal by 50 and 25%, respectively by 2012 and develop a plan for ZERO WASTE by 2022" (The Polokwane Declaration, 2001:1). South Africa legislation supports the waste hierarchy in its approach to waste management, by promoting cleaner production, waste minimisation, reuse, recycling and waste treatment with disposal seen as a last resort in the management of waste (SAIWC, 2006). The Waste Act establishes Extended Producer Responsibility (EPR) as a regulatory mechanism in South Africa that applies to instances in which the nature of the waste from a product is of sufficient threat to require producers to take responsibility for aspects of a products management beyond the point of sale (DEA, 2010). Regulations and businesses' voluntary actions may result in waste

reduction; a growing number of firms have chosen to go 'above and beyond' legal requirements by engaging in recycling and abatement activities that minimise waste and thus reduce environmental degradation (Chapple *et al*, 2005).

Despite impending legislation and voluntary action, the national waste baseline report conducted during 2011, found that South African waste management is heavily reliant on landfilling as a waste management option (DEA, 2012). South Africa generated approximately 108 million tonnes of waste during 2011 of which 97 million tonnes was disposed of at landfill and only 10% of all waste generated was recycled (DEA, 2012). South Africa has a well-established recycling industry and recycling activities in South Africa are mostly private sector initiatives run by packaging manufacturers (Matete and Trois, 2007; Karani and Jewasikiewitz, 2007). According to the Packaging Council of South Africa (PCSA website) during 2009 South Africans consumed an estimated 2,5 million tons of packaging (paper, plastic, metal and glass) and the average real growth rate for the last ten years in the South African packaging industry has been approximately 2,5%.

In addition to its context in waste management, the concept of sustainable development has been debated as relevant to corporate enterprises; corporate enterprises are the vehicles of economic development of a country. Thus, the corporate sector has a very important role to play in economic development while, at the same time, taking care of the environmental and social issues (Banerjee, 2009). In fact, the public debate regarding business and the environment had been on-going since the 1970s where an adversarial relationship between companies and environmental groups was established (Banerjee, 2009). During the 1980s, this relationship began to change as politicians, economists, executives and environmentalists began developing measures for the integration of economic and environmental objectives (Banerjee, 2009). The environmental revolution that had been three decades in the making, changed forever how companies do business (Hart, 2007); traditionally, industry has been accused of environmental degradation in the pursuit of profit but a remarkable transformation has taken place in the relationship between business and the environment (Gunnigham, 2009). Under the banner of corporate environmental responsibility (CER), a growing number of businesses are claiming to be part of the solution, seeking to improve their environmental performance and to mitigate their environmental harm. Initiatives as diverse as pollution prevention, material and energy efficiency initiatives, waste management, and product stewardship are all taking place under the auspices of CER (Hart, 2007; Gunnigham, 2009).

One powerful group of stakeholders setting environmental requirements for many companies, small and medium-sized enterprises (SMEs), are the main contractors in industrial value chains (Pesonen, 2001); global supply chains are driven by large multinational enterprises, yet they rely significantly on the participation of numerous SMEs as suppliers of products, services and innovation (Talbolt *et al,* 2007). The environmental performance requirements of companies typically move up-stream in the value chain, and down-stream to consider the impact of the product-in-use, and ultimately, its disposal; organizations are being held responsible for the environmental and social performance of their suppliers and partners (Kovács, 2008; Seuring *et al,* 2008). This will eventually lead to a situation where even the smallest companies in the value chain are required to improve their environmental performance (Pesonen, 2001).

SMEs are commonly recognised as the most important sector of a nation's economy and one of the leading groups of economic activity globally (APEIS RISPO, 2006), and have been called the "mainstay of most economies" (Fox 2005: 1) and the "bedrock of developing countries' economies" (EU Green Paper, 2001: 6). SMEs account for over 95% of enterprises and 60% to 70% of employment, they generate a large share of new jobs in Organisation for Economic Co-operation and Development (OECD) economies (OECD, 2000) and on average, account for 50% of Gross Domestic product of all countries (UNIDO, 2006). Similar statistics for Developing Countries are more difficult to come by (Painter-Moreland and Spence, 2009) however it is estimated that in South Africa 2.8 million SMEs contribute between 52% and 57% to the South Africa Gross Domestic Product and 61% of formal employment (Burger, 2010/11). SMEs importance goes beyond their strength in numbers, and a growing body of research (for example Luetkenhorst, 2004; Raynard and Forstater, 2002; Fox, 2005; Hillary, 2002) indicate that SMEs contribute to more than just the economy, they contribute to sustainable development, particularly in Developing Countries:

- It is know that SMEs play an significant role in creating employment, thereby contributing to poverty alleviation (reiterated by Painter-Moreland and Spence, 2009).
- It has been shown that SMEs play a role in making income distribution more equitable (both regionally and functionally).
- SMEs provide livelihood opportunities through simple, value-adding processing activities in agriculturally-based economies.
- SMEs cultivate entrepreneurship and are the foundation for future business.

- SMEs support the building up of systemic productive capacities and the creation of resilient economic systems, through linkages between small and large enterprises.
- SMEs are a source of innovation and create competition.
- SMEs are important for a healthy, dynamic market economy.

The South African White Paper on National Strategy for the Development and Promotion of Small Business in South Africa (RSA, 1995), recognizes that the SME sector plays an important, if not crucial role in the economic and social development of a country and highlight that in a South African context "small, medium and micro-enterprises (SMMEs, also referred to as SMEs, small business or small enterprises) represent an important means to address the challenges of job creation, economic growth and equity in our country" (RSA, 1995: 1). Moreover, the White Paper targets the SME sector as an economic empowerment vehicle for previously disadvantaged people (Daile, 2009). More recently, The South African National Waste Management Strategy (NWMS) and the Green Economy Accord (The Accord) make commitments relating to the creation of employment and the promotion of small business within the waste sector. The NWMS (DEA, 2011) is structured around eight strategic goals, goal three sets 69 000 new jobs in the waste sector and 2 600 additional SMEs and cooperatives participating in waste service delivery and recycling as targets to be achieved by 2016 (DEA, 2011).

Launched at the COP17 during 2011, the South African Green Economy Accord (EDDRSA, 2011) is one of the most comprehensive social pacts on green jobs in the world. Greening the South African economy represents a critical lever for bringing about the structural transformation needed for a more equitable and inclusive economy (DBSA, 2011; EDDRSA, 2011). The minimisation of waste is one of several prioritised programmes that will have a significant impact on mainstreaming green economy approaches to the benefit of the environment, economy and society (DBSA, 2011). The Accord aims to create five million new jobs by 2020, in a diversity of economic activities such as energy generation, recycling, farming activities to provide feedstock for biofuels, soil and environmental management and ecotourism. Notably the Accord highlights that in recycling, there are significant opportunities for the creation of small enterprises aimed at beneficiating waste at landfill sites though activities such as building rubble into bricks, converting plastic into planks and extracting and using landfill gas (EDDRSA, 2011). Waste management further provides a source of opportunity in extracting re-usable resources from industrial waste streams (EDDRSA, 2011).

Though small, it is recognised that SMEs have enormous impacts on social and environmental issues (APEIS RISPO, 2006). Hillary (2000) states that the total environmental impact of SMEs is unknown, and, though a figure of 70% is cited as SMEs' contribution to pollution levels, this figure is unsubstantiated. However, the potential environmental impact of small firms should not be underestimated. It is presumed that smaller firms in their individual capacity may have a lesser impact, but collectively, the sheer number of SMEs may mean that their social and environmental impacts are substantial (Hillary, 2000; Tilley, 1999, Lewis and Cassells, Fox, 2005, Niblock-Siddle and Black, 2008; Iraldo *et al,* 2010). In some instances the SME sector has been identified as problematic in terms of environmental issues (Hallinan, 2003). Hillary (2000) explains that the impact of SMEs on their local ecosystems can be potent and that this is owing to SMEs, especially those in Developing Countries, being characterised by the use of older technologies, the lack of awareness of legislation and of their own environmental impacts and less structured management of such issues.

Despite this potential impact on the environment, extant research on environmental management within SMEs is scarce (Ángel del Brío and Junquera); research concerned with CSER has been widely debated in the context of larger corporations leaving the role of CSER amongst SMEs relatively unexplored (Brammer *et al*, 2011). Only more recently the ways that SMEs engage in environmentally responsible practices have attracted research attention (Cassells and Lewis, 2011) and it has been found that SMEs lag behind their larger counterparts in terms of environmental activeness and performance (Hallinan, 2003; Cassells and Lewis, 2011; Frost, 2011). Indeed, environmental management among small business is in its infancy (Worthington and Patton, 2005) and the scarce development of environmental responsibility in SMEs may be attributed to a number of factors such as a lack of awareness of environmental responsibility, a lack of environmental capacity, a lack of resources, and a lack of relations with stakeholders resulting in SMEs being less susceptible to reputational risks, to mention a few (Brammer *et al,* 2011).

The same is true in the South African context where the SME sector lags behind their international counterparts when it comes to prudent environmental management (Blignaut and Demana, 2002), environmental awareness levels amongst SMEs are low, and there is a general problem of non-compliance with environmental legislation (Coleman, 1997; Blignaut and Demana, 2002). It needs to be established to what extent SMEs in South Africa are

involved in CSER issues (Smith and Perks, 2010) and more research is needed to further the development of CSER in SMEs of South Africa (Ladzani and Seeletse, 2012; Dzansi and Pretorius, 2009a). Dzansi and Pretorius (2009a) contend that questions relating to CSR in Africa remain unanswered due to the absence of a framework and measurement instrument that captures the essence of small business CSR in the African context. In addition to the need for more research, there is a need for a CSR framework that captures the African context (Dzansi and Pretorius, 2009a). The area of social responsibility is a high priority in SME development in South Africa and interventions are imperative to ensure this (Ladzani and Seeletse, 2012).

1.2 Problem statement

Environmental issues are pertinent in international business yet studies explicitly dealing with the environmental aspect of corporate responsibility and its current state of research are rare (Holtbrügge and Dögl, 2012). This is particularly evident in the African context where corporate responsibility studies are few and studies with relevance to small business are scarce (Dzansi, 2008, Dzansi and Pretorius, 2009, Dzansi, 2011). In the South African context, SMEs need particular scrutiny due to their economic significance and potential role in sustainable development (Fig, 2005) yet there is a lack of in-depth research on environmental management in the South African SME sector (Viviers, 2009). Given the significance and potential environmental footprint more research on environmental management in the local SME sector should be conducted (Coleman, 1997; Viviers, 2009). As a consequence of the South African government's cognisance of the role that SMEs play in the economy and sustainable development, and that government is actively promoting SMEs, moreover in the waste sector, it is pertinent that the potential environmental consequences of the SME sector be identified (Coleman 1997; Daile, 2009; EDDRSA, 2011).

There is, therefore, a need to investigate how environmental responsibility is practised among South African SMEs and the role that SMEs play in waste management and recycling, particularly in the value chain environmental responsibility of larger corporations. An exploration of this could lead to greater understanding of the role that SMEs play in the environmental responsibility of the waste sector and waste sector value chains.

1.3 Research aim and objectives

The study's aim is to investigate the role that SMEs play in extended producer responsibility from an environmental responsibility perspective in waste management and recycling. To achieve this purpose, the specific objectives of the study are to:

- review the environmental and extended producer responsibility of business, from a waste management and recycling perspective;
- investigate the outsourcing of waste management and recycling to SMEs;
- examine how and why SMEs are engaging in environmental responsibility;
- determine the methods that SME's use to monitor their environmental responsibility efforts; and
- critically assess environmental responsibility in the supply chain.

To achieve the aim and objectives of this study, qualitative methods taking an exploratory, descriptive approach to a multiple case study methodology were employed.

1.4 Structure of the dissertation

In addressing the research aim and objectives, the thesis is divided into eight chapters. The rationale for the study, and the resulting aim and objectives are described in chapter one. The theoretical foundation is described the second chapter, a comprehensive review of the literature as it pertains to the topic of small business and corporate social and corporate environmental responsibility, and the challenges and opportunities that small businesses encounter in environmental responsibility. In the third chapter the environmental importance of waste management and recycling considered, the South African waste and recycling sector is surveyed, as is supporting policy and legislation. Chapter four describes the methodological foundations, considerations, and choices of the study; the chapter discusses and identifies the strengths and limitations, and justifies methods and techniques used; qualitative methods taking an exploratory, descriptive approach to a multiple case study methodology were employed using semi-structured interviews, whilst observation and document analysis were the primary data collection techniques. In chapter five the case studies are presented as a detailed description of each organisation interviewed and chapter six is a summary of the results collected from the case study descriptions. Chapter seven provides a discussion of the research findings in the context of the literature review, the aim and objectives of the thesis. Finally, chapter eight provides the conclusions of the thesis and

implication of the findings for SMMEs and the waste sector. The Appendices include copies of the survey instruments and other information deemed appropriate to the thesis.

CHAPTER TWO
LITERATURE REVIEW: SMEs AND ENVIRONMENTAL RESPONSIBILITY

2.1 Introduction

Business has come under increasing pressure to demonstrate engagement in corporate social responsibility (CSR) (Jenkins, 2006), the voluntary commitment of an enterprise to contribute to social and environmental goals (EU, 2001). Under this banner business are seeking to improve their environmental performance and to mitigate their environmental harm (Gunnigham, 2009). Increased globalisation and a trend of continued outsourcing have caused organizations to function on a supply chain level (Kovács, 2008; Seuring *et al,* 2008) that are driven by large enterprises, yet rely significantly on the participation of numerous SMEs as suppliers (Talbolt *et al,* 2007) and organizations are being held responsible for the environmental and social performance of their suppliers and partners (Kovács, 2008; Seuring *et al,* 2008). SME's can help improve or harm environmental performance within this supply chain (Talbolt *et al,* 2007).

CSR has traditionally been associated with large companies, however there is growing recognition of the significance of the SME sector (Fox, 2005; Jenkins, 2006; Ciliberti *et al,* 2008). SMEs are a significant sector in terms of their economic, environmental and social impact (Jarvis, 2004; Kechiche and Soparnot, 2012) and play an important, if not critical, role in the economic and social development of a country (OECD, 2007; DTI 2008; STATSSA 2010; Arbor and Quartey 2010), globally and in South Africa where they are the means to address the challenges of job creation, economic growth and equity (RSA, 1995). SMEs are not merely small versions of big businesses but differ from large corporations in a variety of ways (Jarvis, 2004; Jenkins, 2004; Vives, 2006; Kechiche and Soparnot. 2012; Coppaa and Sriramesh, 2013) including the different ways in which CSR is perceived and practiced (Coppaa and Sriramesh, 2013).

This chapter explores the significance of SMEs, their impact on the environment and their adoption of, and attitudes towards, corporate social and environmental responsibility. The relevant literature on corporate social and environmental responsibility is considered, as is the role of small business in sustainable development.

2.2 Small to medium-sized enterprises (SMEs)

There is no uniformly acceptable definition of a small firm with considerable variation in their definition (Storey, 1994; OECD, 2000; IFC 2010; Mahembe, 2011), due to the fact that a small firm in one industry is likely to have different levels of capitalism, sales and employment than a firm in another industry (Storey, 1994; Mahembe, 2011). Definitions, therefore, relate to 'objective' measures of size such as sales, turnover, profitability and net worth (Storey, 1994; Mahembe, 2011). SMEs can broadly be defined as non-subsidiary, independent firms which employ less than a given number of employees with financial assets and a turnover not exceeding specified amounts (OECD, 2000). SME definitions can be broadly categorised into 'economic' and 'statistical' definitions (Storey, 1994; Mahembe, 2011). A firm is regarded as small if it meets the criteria for the definition as described in Table 2.1.

Table 2.1 Criteria for the economic and statistical definitions of an SME (Storey, 1994; Mahembe, 2011)

Definition	**Criteria**
Economic definition	1. The firm has a relatively small share of their market place; 2. the firm is managed by owners, or part owners, in a personalised way and not through the medium of a formalised management structure; and 3. the firm is independent in that it is not part of a larger enterprise.
Statistical definition	1. Quantifying the size of the small firm sector and its contribution to GDP, employment and exports; 2. comparing the extent to which the small firm sector's economic contribution has changed over time; and 3. in a cross country comparison of the small firms' economic contribution.

Like many other countries, the issue of what constitutes a small or medium enterprise (SME), commonly referred to as small medium and micro enterprises (SMMEs) in South Africa, is a major concern in South Africa (Mahembe, 2011). For the purpose of this research the term SME will be used to denote either, as will the terms 'small business', 'small enterprise' and 'small firm'. The National Small Business Act of 1996 (NSBA), defined the term 'small business' which was later revised by The National Small Business Amendment Act of 2003 (NSBAA) as follows:

> "a separate and distinct business entity, together with its branches or subsidiaries, if any, including co-operative enterprises [and non-governmental organisations], managed by one owner or more [which, including its branches

or subsidiaries, if any], is predominantly carried on in any sector or subsector of the economy mentioned in column 1 of the Schedule and [which can be] classified as a micro-, a very small, a small or a medium enterprise by satisfying the criteria mentioned in columns 3, 4 and 5 of the Schedule"

The NSBA (RSA, 1996) classifies small businesses into micro, very small, small or medium enterprises (Table 2.2). The National Small Business Act, as revised by the National Small Business Amendment Act of 2003 (NSBAA) links these categories to sectors of the economy and benchmarks are set for each category in terms of number of employees, annual turnover and asset value (DTI, 2008; Arbor and Quartey 2010). SMEs are not restricted to formally registered enterprises, for example close corporations or private companies, but include informal and non-Value Added Tax registered enterprises, such as survivalist street trading enterprises, informal manufacturing and services, and occasional home-based evening jobs (DTI, 2008). Formal SMEs are those that are registered and have access to bank account and capital markets whereas informal SMEs are excluded from the formal financial market (Mahembe, 2011).

Table 2.2 Threshold per sector as per Schedule I of the NSBAA (RSA, 2003)

Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Sector or sub-sectors in accordance with the Standard Industrial Classification	**Size of class**	**Total full-time equivalent of paid employees**	**Total turnover**[1]	**Total gross asset value (fixed property excluded)**[1]
Agriculture	Medium Small Very small Micro	100 50 10 5	R5m R3m R0.5m R0.2m	R5m R3m R0.5m R0.1m
Mining and Quarrying	Medium Small Very small Micro	100 50 20 5	R39m R10m R4m R0.2m	R23m R6m R2m R0.1m
Manufacturing	Medium Small Very small Micro	100 50 20 5	R51m R13m R5m R0.2m	R19m R5m R2m R0.1m
Electricity, Gas and Water	Medium Small Very small	100 50 20	R51m R13m R5.1m	R19m R5m R1.9m

[1] Note: One ZAR = 0.09962 USD (3 June 2013)

Column 1	Column 2	Column 3	Column 4	Column 5
	Micro	5	R0.2m	R0.1m
Construction	Medium Small Very small Micro	100 50 20 5	R26m R6m R3m R0.2m	R5m R1m R0.5m R0.1m
Retail and Motor Trade and Repair Services	Medium Small Very small Micro	200 50 20 5	R39m R19m R4m R0.2m	R6m R3m R0.6m R0.1m
Wholesale Trade, Commercial Agents and Allied Services	Medium Small Very small Micro	200 50 20 5	R64m R32m R6m R0.2m	R10m R5m R0.6m R0.1m
Catering, Accommodation and other Trade	Medium Small Very small Micro	200 50 20 5	R13m R6m R5.1m R0.2m	R3m R1m R1.9m R0.1m
Transport, Storage and Communications	Medium Small Very small Micro	200 50 20 5	R26m R13m R3m R0.2m	R6m R3m R0.6m R0.1m
Finance and Business Services	Medium Small Very small Micro	200 50 20 5	R26m R13m R3m R0.2m	R5m R3m R0.5m R0.1m
Community, Social and Personal Services	Medium Small Very small Micro	200 50 20 5	R13m R6m R1m R0.2m	R6m R3m R0.6m R0.1m

The White Paper on National Strategy for The Development and Promotion of Small Business in South Africa (1995) defines three main subgroups in the small business sector; micro enterprises, small enterprises and medium-sized enterprises (Table 2.3). These categories were later refined by the NSBA, the NSBAA, and the DTI (DTI, 2003; DTI 3004; Arbor and Quartey 2010) and included a fourth category, survivalist enterprises.

Table 2.3 Characteristics of SME categories (adapted from the NSBA, NSBAA, DTI, 1995; DTI, 2003 and DTI, 2004)

'Survivalist enterprises'	• Those unable to find employment • Self-employed (no employees) • Income generated is less than the minimum income standard or poverty line • Economic activity directed at providing minimal means for survival • Little capital investment, negligible asset value • Virtually no skills or training • Limited opportunity for growth into a viable business • Characterised by largely by women and black persons • Examples include hawkers, vendors, subsistence farmers
Micro enterprises • Fewer than 5 employees • Turnover less than R200,000	• Often owner, some family member/s and one or two paid employees (total of up to 5 employees) • Lack formality in terms of business licences • Do not usually qualify for VAT registration (turnover under VAT registration level) • Informal accounting, operating procedures, operating permits and premises • Limited capital base • Rudimentary technical and business skills • Weak compliance with labour legislation • Many develop into viable small businesses • Examples include spaza shops, home based businesses, mini-bus taxis, artisans, small scale construction businesses
Very small • Fewer than 10 employees • Turnover less than R500,000 (agriculture sector), or less than R6million (wholesale trade sector)	• Self-employed and or enterprise employing a limited number of persons (less than 10 paid employees) • Operate in the formal economy • Have access to formal technology • Examples include artisans such as plumbers and electricians and professionals
Small enterprises • Fewer than 50 employees • Turnover less than R1 million (community, social and personal sector)R6 million (construction sector)	• Constitute the bulk of established businesses • 5 to 50 paid workers • More established than micro and very small enterprises • Business practices more complex • Owner managed • Outgrown direct supervision by the entrepreneur and has developed secondary coordinating mechanisms • Operate from business or industrial premises • Tax registered • Meet formal business registration requirements
Medium enterprises • Fewer than 200 employees • Turnover less than R19 million (retail and motor trade and	• Owner – manager controlled • Ownership and management structure more complex • Decentralisation of power to additional management layer, division of labour, and functional differentiation • Up to 200 paid employees • Capital assets of a value of up to about R5 million

repair services sector), and less than R5 million (agriculture sector)	

For the purpose of this research, the researcher will adopt the definition provided by the NSBAA, yet only total full-time equivalent of paid employees and total turnover will be considered, due the assumed ease of collection of this information. The OECD (2004b) state that the most commonly used measure in defining a SME is that of employment, due to its simplicity and the ease of collection of data. Hence, where total turnover is not disclosed, only total full-time equivalent of paid employees will be used to determine whether the enterprise is an SME. The IFC (2010) state that a common definition of SMEs includes registered businesses with less than 250 employees, hence organisations that participate in the research that employ less than 250 staff will be considered a SME for the purpose of this research. Waste management companies and waste traders will be considered a SME if they fall within the 'Transport, Storage and Communications' delineations and recyclers and refurbishers if they fall within the 'Manufacturing' delineations (Table 2.2). The rational for selecting this particular grouping is that waste management companies and waste traders essentially transport and store waste until volumes warrant sale to a recycler and/or refurbisher. Recycling and refurbishing in not strictly speaking manufacturing but materials are re-processed as they would have been processed from virgin materials.

Globally, it has been recognised that the small businesses sector plays an important, if not critical, role in the economic and social development of a country (OECD, 2007; DTI 2008; STATSSA 2010; Arbor and Quartey 2010). SMEs are often described as efficient and prolific job creators, the seeds of big businesses and the fuel of national economic engines (Arbor and Quartey 2010; IFC 2010). Encouraging entrepreneurship and facilitating the growth of SMEs is an effective means of creating jobs, reducing poverty, and stimulating local and regional development, and as such, SMEs play an important role in promoting sustainable development (Table 2.4) (OECD, 2007).

SMEs typically contribute approximately 50% of GDP, and 60% of employment in national or local economies (OECD, 2004c). More than 95% of enterprises in Organisation for Economic Cooperation and Development (OECD) countries are SMEs, which account for 60-70% of employment in most of these countries (OECD 2007). The Business Population Estimates (BIS, 2012) provides information on the total number of private sector enterprises in the

United Kingdom at the start of 2012, there were an estimated 4.8 million UK private sector enterprises employing an estimated 23.9 million people with an estimated combined annual turnover of £3 100 billion. SMEs together accounted for approximately 59.1% of employment and 48.8% of turnover in the UK private sector (Painter-Moreland and Spence, 2009). Developing country statistics are more difficult to source due to problems associated with collecting such data on an ill-defined unit of an SME and the commonly large degree of activity in the informal economy (Painter-Moreland and Spence, 2009).

Table 2.4 The contribution of SMEs (Raynard and Forstater, 2002; Luetkenhorst, W. 2004; Vives, 2006; Morsing and Perrinin, 2009)

Contribution	**Description**
SMEs contribute to the provision of employment opportunities.	SMEs tend to employ more labour-intensive production processes than large enterprises. As such SMEs contribute to the provision of productive employment opportunities, the generation of income and ultimately, the reduction of poverty.
SMEs contribute to making income distribution more equitable.	Empirical evidence shows that countries with a high share of small industrial enterprises have succeeded in making income distribution more equitable. This in turn contributions to ensuring long-term social stability by alleviating ex-post re-distributional pressure and by reducing economic disparities between urban and rural areas.
SMEs are key to the transition from agriculture-led to industrial economies.	SMEs are key to the transition from agriculture-led to industrial economies as they provide simple opportunities for value-adding processing activities which can generate sustainable livelihoods. In this context, the predominant role of women is of particular importance.
SMEs are a seedbed for entrepreneurship development.	SMEs are a seedbed for entrepreneurship development, innovation and risk taking behaviour and provide the foundation for long-term growth dynamics and the transition towards larger enterprises.
SMEs support the building up of systemic productive capacities.	SMEs support the building up of systemic productive capacities. They help to absorb productive resources at all levels of the economy and contribute to the creation of resilient economic systems in which small and large firms are interlinked.
SMEs attract foreign investment.	Small and large firms are interlinkages are important for the attraction of foreign investment. Investing transnational companies seek reliable domestic suppliers for their supply chains. There is thus a premium on the existence of domestic supporting industries in the competition for foreign investors.
SMEs are a source of innovation.	SMEs are a significant source of innovation, often producing goods in niche markets in a highly flexible and customized manner.

There is consensus among policy makers, economists, and business experts that SMEs are drivers of economic growth (Dababneh and Tukan, 2007; Arbor and Quartey 2010; Mahembe, 2011). A healthy SME sector contributes significantly to the economy through

creating employment opportunities, generating production volumes, increasing exports and introducing innovation and entrepreneurship skills (Dababneh and Tukan, 2007; Mahembe, 2011). SMEs stimulate initiative and inventiveness, and are characteristically more flexible than large companies, rendering them highly adaptable to changes in the economic environment (Stefanovi and Milosevic, 2011). SMEs support the "building up of systemic productive capacities" in that they help to "absorb productive resources at all levels of the economy and contribute to the creation of resilient economic systems in which small and large firms are interlinked". Such linkages are of increasing importance for the attraction of foreign investment (Luetkenhorst, 2004; 159). The fact that the role of SMEs in an economy appears to increase with country income level might indicate that SMEs are themselves a driver of economic growth (IFC, 2010).

SMEs contribute to a country's national product by either manufacturing goods of value, or through the provision of services to both consumers and/or other enterprises (Berry *et al,* 2002; Arbor and Quartey, 2010). From an economic perspective, SMEs are not just suppliers, but also consumers. This is important where SMEs accrue purchasing power increasing their demand for industrial or consumer goods that will in turn stimulate the activity of their suppliers, just as their own activity is stimulated by the demands of their clients. Demand in the form of investment plays a dual role, both from a demand-side (with regard to the suppliers of industrial goods) and on the supply side (through the potential for new production arising from upgraded equipment) (Berry *et al,* 2002; Arbor and Quartey, 2010).

The contribution that small business makes in generating employment is near universally recognised (SBP, 2013). In many countries, the majority of jobs are provided by SMEs, and a large share of new jobs are created by SMEs (OECD, 2007; IFC, 2010), therefore, SMEs contribute significantly to the total employment rate (Stefanovi and Milosevic, 2011). SMEs tend to employ more labour-intensive production processes than large enterprises thus they contribute significantly to the provision of productive employment opportunities, the generation of income and ultimately, the reduction of poverty (Luetkenhorst, 2004). Essentially, it is though the promotion of SMEs that individual countries can progress towards creating employment and alleviating poverty (Luetkenhorst, 2004).

It is estimated that 2,8 million SMEs, approximately 91% of the formal business entities in South Africa, contribute between 52% and 57% to the GDP and contribute nearly 61% of

employment (Arbor and Quartey 2010; Burger 2010/2011). Small businesses have been identified as key to driving South Africa's economic growth and focus on developing SMEs has attracted increasing attention in South Africa as SMEs are perceived as an engine for general economic growth, for employment creation and equity acceleration (FinScope, 2010; SBP 2011; Urban and Naidoo, 2012). The South African White Paper on National Strategy for the Development and Promotion of Small Business in South Africa, recognizes that the SME sector plays an important, if not crucial role in the economic and social development of a country and highlight that in a South African context "Small, medium and micro-enterprises (SMEs) represent an important vehicle to address the challenges of job creation, economic growth and equity in our country" (DTI, 1995:3). Broadly, the South African government's strategy is to "curb unemployment through job creation, alleviate poverty, and redistribute wealth" (FinScope, 2010; 1). In particular waste sector policy is geared towards the promotion of SMEs; the NWMS (DEA, 2011) aims to create 69 000 new jobs in the waste sector and stimulate 2 600 additional SMEs and cooperatives to participate in waste service delivery and recycling by 2016.

2.3 Corporate social responsibility (CSR) and corporate environmental responsibility (CER)

There are numerous definitions for the term 'corporate social responsibility' and several other terms under the business ethics banner that are accepted as synonymous, these are; 'business social responsibility' (BSR), 'corporate sustainability (CS), 'corporate citizenship' (CC), 'socially responsible behaviour' (SRB) and 'corporate social environmental responsibility' (CSER) (Luetkenhorst, 2004; Perrini, 2006; Fig, 2007; Suprawan *et al,* 2009; Dzansi, 2011). There is uncertainty amongst academia and the corporate world as to how CSR should be defined; the problem is that there is an abundance of definitions (Dahlsrud, 2008). Studies in the corporate arena (Mazurkiewicz,2003; Blowfield and Frynas, 2005; Fig, 2007; Terry, 2009; Lee, 2011) commonly cite definitions for the term 'corporate social responsibility' proposed by the World Business Council for Sustainable Development (WBCSD) and the Commission of the European Communities (EU). The WBCSB define CSR as "the commitment of business to contribute to sustainable economic development, working with employees, their families and the local communities and society at large to improve their quality of life" (WBCSD, 2001:6). The WBCSB point out that environmental concerns are part of a company's CSR. The European Union define CSR as "a concept whereby companies integrate social and environmental concerns into their business

operations and their interaction with their stakeholders on a voluntary basis" (EU, 2001:6). Dzansi (2008) argues that the term 'business social responsibility' (BSR) is preferable when referring to SMEs as the term 'corporate social responsibility' implies that the social responsibility is only relevant to larger corporations. CSR can be applied to a range of businesses, regardless of their size or sector (Dzansi, 2008).

Dahlsrud's (2008) investigation into the available definitions of CSR showed that definitions consistently refer to five dimensions; the environmental, social, economic, stakeholder, and the voluntarism dimension, whereas the WBCSB (2000) describe five key issues of CSR; human rights, employee rights, environmental protection, community involvement and supplier relations. In both instances, the environmental dimension is a constant and protecting the environment from the impact of operations is a core responsibility of the organisation (WBCSB, 1999; Terry, 2009). According to Dahlsrud (2008) phrases used to describe the environmental dimension include 'a cleaner environment', 'environmental stewardship' and 'environmental concerns in business operations'.

Some authors, for example Gunningham (2009) and Lee (2011) state that Corporate Environmental Responsibility (CER) is a sub-category of the broader concept of Corporate Social Responsibility (CSR). Rahman and Post (2012) however, consider environmental corporate social responsibility (ECSR) to be an important and distinct part of the overarching concept of corporate social responsibility (CSR). A number of definitions of CER exist in the literature (Table 2.5), broadly, CER focuses on firm-specific activities, both compliant and preventative, that limit the adverse environmental impact of organisations (Rahman and Post, 2012). The baseline for corporate environmental responsibility is compliance with environmental legislation (Visser *et al*, 2007) however, CER is complex, multidimensional and encompasses the diversity of organisations environmental impacts and their efforts to ameliorate them (Vogel, 2005). Environmental protection activities undertaken by corporations include; issues of the responsible conservation of scarce resources, such as energy and water; controls of emissions and effluent; responsibility for disposal of waste and packaging relating to the product it sells; and managing risks of contamination, and environmental rehabilitation (Vogel, 2005; Visser *et al,* 2007; Terry, 2009). Moreover, organisations are seen to have a broad responsibility to protect the physical environment throughout their supply chains (WBCSB, 1999).

Table 2.5 Definitions of Corporate Environmental Responsibility

Definition	Source
"the duty to cover the environmental implications of the company's operations, products and facilities; eliminate waste and emissions; maximize the efficiency and productivity of its resources; and minimize practices that might adversely affect the enjoyment of the country's resources by future generations".	Mazurkiewicz (2004:2)
"environmentally friendly actions not required by law, also referred to as going beyond compliance, the private provision of public goods, or voluntarily internalizing externalities"	Lyon and Maxwell (2000:240)
"practices that benefit the environment (or mitigate the adverse impact of business on the environment) that go beyond those that companies are legally obliged to carry out"	Gunnigham (2009:215)

In a South African context, Fig (2007) states that South African firms prefer the term corporate social investment to that of corporate social environmental responsibility. This preference reflects the South African businesses ethos; social and environmental interventions by the organisations are seen as investments with the likelihood of some return in the form of reputation, enhanced markets or brand recognition.

2.3.1 Corporate social responsibility (CSR) and SMEs

Much of the scholarly discussion on CSR has focused on large corporations even though SMEs constitute the bulk of businesses worldwide (for example, Fox, 2005; Vivies, 2006; Jamali *et al*, 2009; Garaya and Font, 2012; Ma, 2012; Coppaa and Sriramesh, 2013) and are a significant sector in terms of their economic, environmental and social impact (Jarvis, 2004; Kechiche and Soparnot, 2012). SMEs are not merely small versions of big businesses but differ from large corporations in a variety of ways (Jarvis, 2004; Jenkins, 2004; Vives, 2006; Kechiche and Soparnot. 2012; Coppaa and Sriramesh, 2013) including the amount of resources available, strategies, drivers, importance of managerial values, level of involvement and stakeholder prioritization (Coppaa and Sriramesh, 2013). These factors impact the different ways in which CSR is perceived and practiced in SMEs in contrast to large companies (Coppaa and Sriramesh, 2013). SMEs for example, are subject to different stakeholder signals compared to their larger counterparts; many SMEs are family owned or privately held firms within a small group of shareholders (Jenkins, 2006; Vives, 2006). One of the most important drivers for CSR in larger enterprises is likely to be the protection and enhancement of reputation or the brand name and large firms feel the impact of the actions of consumers strongly (Vivies, 2006) whereas SMEs do not usually have a brand or image that requires protecting (Jenkins, 2004). SMEs are less susceptible to consumer pressure

and damage to public reputation as they often do not sell directly to the public, their customers generally being other companies; and SMEs are unlikely to spend limited financial and managerial resources designing matrices and carrying out risk reporting (Jenkins, 2004). SMEs tend to prioritise short-term economic survival as they are vulnerable to economic losses (Luetkenhorst, 2004).

In addition to the dissimilarities between SMEs and their larger counterparts, SMEs exhibit unique characteristics (Table 2.6). Jenkins (2006) suggests that SMEs tend to have a personalized style of management, and lack formal management structures with specialised staff. The most common form of SME is the owner-managed firm where ownership and control lie with the same person (Spence, 1999; Jenkins, 2006). SME characteristics vary widely depending on individual personalities and differing ownership structures, and where the business owner prioritizes CSR, the business is likely to prioritize CSR (Luetkenhorst, 2004; Lepoutre and Heene, 2006; Loucks *et al*, 2010) as SME owner-managers often have strong altruistic feelings towards social and environmental issues (Rutherford *et al*, 2000; Schaper, 2002; Perez-Sanchez *et al,* 2003; McKeiver and Gadenne, 2005; Revell *et al,* 2009; Battisti and Perry, 2011). Similarly, the knowledge, values, skills and experiences of employees have significant impacts on the social and environmental performance of SMEs (Loucks *et al*, 2010). Small businesses have the human element at the core of their work, which is likely to have implications for how they approach CSR (Ma, 2012). Moreover, SMEs exhibit a high degree of interrelation with their environment and/or communities in which they often act as benefactors or local activists (Murillo and Lozano, 2006). Some studies suggest that due to these unique characteristics, small firms are better positioned and equipped to take advantage of CSR programs than large firms (Lepoutre and Heene, 2006; Ma, 2012) and reap many of the same benefits that larger corporations do (Vives, 2006), such as, being a good global citizen, improved employee motivate and retention, the attraction of customers, cost savings and improved risk management (Sprinkle and Maines, 2010).

Table 2.6 Key characteristics that illustrate the distinctive nature of small business (Jenkins, 2004 and 2006; Murillo and Lozano 2006; Spence, 1999 and 2009; Ma, 2012)

Characteristic	**Description**
Lack of CSR system and monitoring	Small business is unlikely to use CSR terminology, implement CSR policies or establish CSR committees. As such, there is a difficulty in measuring and reporting on CSR in small businesses according to the measures used in large firms.
Personal	Small businesses are usually run by individuals who both own and manage

motivation for CSR	the organization. Motivation for CSR initiatives is on an *ad hoc* and personal basis. Small business is unlikely to have resources to focus on strategic gains or deal with the issues from a marketing or public relations perspective.
Lack of accountability to shareholders	Small businesses are usually run by individuals who both own and manage the organization. Other shareholders are limited to family member and/or business partners. Owner-managers have the right to spend company money as they see fit, including bringing their own integrity to bear, for example the giving of charitable donations and they are not answerable to shareholders to maximize profit.
Impact on local communities	Small businesses are often embedded in local communities. Small firms lack anonymity and questionable actions end with the owner-manager. This moral proximity with community and customers can focus the mind considerably on socially responsible behaviour.
Flexibility and a personal service	Flexibility and a personal service are often factors on which small businesses can differentiate themselves. Informal relationships are critical to the success of most small firms. This is closely linked to their reputation at a local, personal level and tied to a need to act with honesty and integrity.
Employees influence on CSR	Employees are very important stakeholders in small businesses. A key characteristic of small business CSR is responding to their preferences in terms of charitable support and giving, and focusing efforts on ensuring the maintenance of the livelihoods of employees, managers, and owners. In the case of family run business, this brings an additional influence on CSR, with family commitments being very much intertwined with business values. Conversely, it should be noted that the lack of formal codification of human resource management in small firms may result in poor protection for employees.
Sector context	The sector context is particularly important for small businesses, influencing the culture in relation to CSR. Some sectors competitors are often seen more as industry colleagues than adversaries and small firms may count competitors as stakeholders to whom they have a moral responsibility.

By reason that SMEs and larger corporations differ considerable, one cannot expect to transfer CSR practices developed by, and for, large corporations to SMEs and expect the same results (Jarvis, 2004; Ma, 2012). As a result, a body of academic work has focused on commitment to CSR in the SME sector debating for CSR and its understandings and prescription to be reconceptualization for small business (Table 2.7). Moreover, recognition of the growing significance of the SME sector has led to an emphasis on their social and environmental impact and prompted a number of studies in different countries (Table 2.8) (Jenkins, 2006; Murillo and Lozano, 2006; Kechiche and Soparnot, 2012). Despite this growing body of literature, knowledge on the nexus between CSR and SMEs is sparse (Santos, 2011; Coppa and Sriramesh; 2013) and fragmented, and has yet to be developed into a coherent theory (Lepoutre and Heene, 2006). There is even less to be reported on SMEs in developing countries (Spence and Painter-Morland, 2009).

Table 2.7 Consensus regarding SMEs and CSR in the literature

Studies that agree that given the importance of SMEs to most national economies, the area requires further empirical research.	• Spence (1999) • Luetkenhorst (2004) • Raynard and Forstater (2002) • Castka *et al* (2005) • Fox (2005) • Vives (2006) • Jenkins (2006 and 2009) • Lepoutre and Heene (2006) • Murillo and Lozano (2006) • Kusyk and Lozano (2007) • Spence (2007) • Jamali *et al* (2009) • Morsing and Perrinin (2009) • Spence and Painter-Morland (2009) • Jonkutė *et al* (2011) • Laurinkevičiūtė and Stasiškienė (2010) • Kechiche and Soparnot (2012)
Studies that have made the case for SMEs to be considered separately from larger enterprises in considering their CSR discourses and approaches.	• Spence (1999) • Jenkins (2004, 2006 and 2009) • Luetkenhorst (2004) • Castka *et al* (2005) • Fox (2005) • Lepoutre and Heene (2006) • Vives (2006) • Spence (2007) • Aragón-Correa *et al* (2008) • Jamali *et al* (2009) • Loucks *et al* (2010) • Jonkutė *et al* (2011) • Garaya and Font (2012) • Kechiche and Soparnot (2012) • Ma (2012)

Table 2.8 A sample of international studies relating to CSR in SMEs

Region	**Study**
United Kingdom	Jenkins (2004 and 2006) Tilley (2002) Battaglia *et al* (2010)
Spain	Aragón-Correa *et al* (2008) Murillo and Lozano (2006)
Portugal	Santos (2011)
Italy	Perrini (2006) Perrini *et al* (2007) Coppaa and Sriramesh (2013) Russo and Tencati (2009)
The Netherlands	Uhlaner *et al* (2012)
Ireland	Sweeney (2009)

Region	Study
Republic of Lithuania	Laurinkevičiūtė and Stasiškienė, 2010
South America	Vives, 2006 Coutino De Aurruda, 2009
New Zealand	Collins *et al*, 2009
Australia	Collins *et al*, 2009 Sen, 2011
United States	Baucus and Corchan, 2009
Canada	Fenwick, 2010
India	Srinivasan, 2009 Gupta and Khanna, 2011
Thailand	Eua-anant *et al,* 2011
China	Lui and Fong, 2010
Sri Lanka	Munasinghe and Malkumari, 2012
Lebanon	Jamali *et al*, 2009
Sub-Saharan Africa	Painter-Moreland and Dobie, 2009
Mauritius	Devi and Hemant, 2009

Small businesses are often celebrated for CSR benefits such as creating jobs, inducing economic growth and introducing innovations (Lepoutre and Heene, 2006). Given the significant scale of small business in nearly every economy, their aggregate achievements have a major effect worldwide (Jenkins, 2006) and the importance of SMEs for the development of a corporate social responsibility that matters on a global scale cannot be overemphasized (Morsing and Perrinin, 2009).

2.3.2 Corporate social responsibility (CSR) and environmental responsibility in SMEs in South Africa

Some authors (for example, Jenkins, 2004; Castka *et al,* 2005; Ma, 2012) have noted a language problem in the CSR debate that unintentionally alienates SMEs from engaging in CSR; the word 'corporate' should be understood on a larger scale allowing it to incorporate all businesses in all industries, with different structures, sizes, and ownership. In a South African context Pretorius and Dzansi (2007) debate the same issue stating that 'corporate' suggests something for large business only and prefer the term business social responsibility (BSR) as it is all inclusive.

The works of Dzansi (Pretorius and Dzansi, 2007, 2009a, 2009b; Dzansi, 2011) on CSR in SMEs in the South African context echo international findings; "although CSR has largely been discussed in the context of big enterprises, it is now becoming clearer that the concept

is very relevant to small businesses particularly in economically depressed areas of African countries where the critical role of small businesses in social transformation is becoming more and more indisputable" (Dzansi, 2011: 5713). There is limited literature on SME experiences in industrialised countries and even less in developing countries (Spence and Painter-Morland, 2009; Ladzani and Seeletse, 2012) and CSR in the African context remains underexplored (Dzansi and Pretorius, 2009a). This was evident from the literature review undertaken for this research, nine studies investing CSR in a SME context were found and only two investigated environmental responsibility in SMEs (Table 2.9).

Table 2.9 South African SME studies with a CSR focus

Study	Citation
The study aimed to discuss the environmental management of SMEs in general by presenting a case study of the automotive sector in the Western Cape.	Coleman (1997)
The study proposed an instrument for measuring BSR in small ventures.	Pretorius and Dzansi (2007)
The study aimed to ascertain South African SMEs owners / managers attitudes regarding the importance of CSR in their sector of the economy.	Viviers and Venter (2007)
The aim of this paper was to provide a systematic and sound framework for addressing and BSR in SMEs with specific focus on the African context.	Dzansi and Pretorius (2009a)
The study proposed an instrument, for measuring BSR in the African venture setting.	Dzansi and Pretorius (2009b)
The study investigated the level of environmental awareness and engagement among local SME owners/managers in the Nelson Mandela Bay region.	Viviers (2009)
The investigated the extent to which SMEs in the Nelson Mandela Metropole evaluate corporate social performance and taking care of stakeholder concerns.	Smith and Perks (2010)
The study examined the extent to which the CSR has permeated the small business mind set of a typical rural African setting located in South African.	Dzansi (2011)
The study examined the status of BSR in SMEs in Gauteng, South Africa.	Ladzani and Seeletse (2012)

South African studies (Table 2.9) on CSR in SMEs have been undertaken in two contexts, those in a rural African setting (Pretorius and Dzansi, 2007; Dzansi and Pretorius, 2009a, 2009b; Dzansi, 2011) and those in a metropolitan setting (Viviers and Venter, 2007; Smith and Perks, 2010; Ladzani and Seeletse, 2012).

Pretorius and Dzansi's (2007) study on small rural businesses in the greater Taung area found that owner-managers of small rural businesses perceive of themselves as being aware

of BSR as a concept and that they do exercise BSR activities (Table 2.10). The authors developed an instrument to capture the dimensions of BSR that were divided into six categories; biographical data, community involvement, customer relations, employee relations, outcomes/benefits, and BSR awareness. The empirical investigation found that small ventures are more likely to focus on employees, customers and local community issues than for example environmental issues (Pretorius and Dzansi, 2007). A later study by the same authors (Dzansi and Pretorius, 2009a) further developed the framework and identified customer-, employee-, and community-related issues as the key BSR activities of rural African small businesses (Table 2.10). The study substantiates that the dimensions of BSR in small businesses seem to have a stronger focus on the human aspects, that SME owner-managers perform socially responsible activities motivated by the expectation of certain rewards, and that there are benefits associated with BSR for both business and society. Dzansi and Pretorius (2009a; 12) argue "that survival and growth issues are paramount" in the mind of the SME owner-manager and environmental issues are rather an issue for government and legislation; "environmentalism is not a major concern for most small businesses and it is unlikely that they will concern themselves with such activities". Dzansi and Pretorius (2009b) then test the framework developed in their previous studies (Dzansi and Pretorius, 2007, 2009a) and survey small businesses from the greater Taung area (Table 2.10). The study identified five factors valid for measuring small business BSR in a rural African context; expected benefits; community or customer practices; realised or actual benefits; awareness or attitude and performance; and employee practices. Key findings showed that BSR in small business are likely to be oriented towards employees, customers and the community, since these form their most important stakeholders and that SMEs become involved in BSR because of perceived link with profit, rather than for altruistic and humanistic reasons. The most recent work of Dzansi (2011) examined the extent to which the concept of social responsibility has permeated the small business mind set of a typical rural African setting located in South African (Table 2.10). The results reveal high levels of awareness and performance of socially responsible activities among the small businesses surveyed, and suggest that these businesses may be performing these socially responsible activities with expectations of certain benefits. The results confirm customer, employee, and community issues are important social responsibility activities for the small businesses surveyed.

Viviers and Venter's (2007) study on the attitudes regarding the importance of CSR found that SME owner-managers in the Nelson Mandela Bay region placed the greatest importance

on their economic responsibilities followed by philanthropic responsibilities in that order (Table 2.10). SME owner-managers view ethical behaviour in the corporate environment as very important as well as building and maintaining relationships with primary stakeholders. This implies that many SMEs are engaging in a 'silent' form of social responsibility (Viviers and Venter's, 2007). Smith and Perks (2010) investigated the extent to which SMEs in the Nelson Mandela Metropole evaluate corporate social performance and taking care of stakeholder concerns by means of self-administered questionnaires. The study found that some SMEs do report on corporate social performance and those that do, take care of employee and community concerns differently compared to those that do not report on social performance; those that do report, tend to take care of employee and community concerns (Table 2.10). Moreover, SMEs with different income levels were found to have different perceptions regarding sustainable development, and SMEs seem to be indifferent towards taking care of owner and customer needs or concerns. Smith and Perks (2010) advise that all SMEs should report on social performance along with financial performance as this would result in SMEs being more responsive towards the concerns and needs of owners/investors, customers, employees and the community. Ladzani and Seeletse's (2012) examined the status of BSR in SMEs in Gauteng and found that SMEs in Gauteng do not incorporate BSR in their business dealings. Ladzani and Seeletse (2012) attribute this to two factors; first, there could be very little or no information on the benefits of incorporating BSR amongst SMEs in the area, and second, the limitations of study that was based on ten focus areas (Table 2.10). Ladzani and Seeletse (2012) stress that interventions are imperative to Gauteng SME practitioners in the area of social responsibility as social responsibility is a high priority in SME development.

Table 2.10 Key findings of South African CSR in SME studies

Context	Key findings	Citation
	• SMEs are more likely to focus on employees, customers and local community issues rather than for example environmental issues	Pretorius and Dzansi (2007)
Rural African setting	• SMES focus on the human aspects of BSR • SMESs perform socially responsible activities motivated by the expectation of certain rewards • There are benefits associated with BSR for both SMEs and society • Environmentalism is not a major concern for most SMEs	Dzansi and Pretorius (2009)

Context	Key findings	Citation
	• BSR in SMEs is likely to be oriented towards employees, customers and the community, since these form their most important stakeholders • SMEs are motivated to undertake BSR practices because of perceived link with profit • Altruistic and humanistic motives are not drivers for the adoption of BSR in SMEs	Dzansi and Pretorius (2009b)
	• SMEs exhibit high levels of awareness and performance of socially responsible activities • SMEs may be performing socially responsible activities with expectations of certain benefits • Customer, employee, and community issues are important social responsibility activities for the SMEs	Dzansi (2011)
Nelson Mandela Bay region	• SMEs prioritise economic, followed by philanthropic responsibilities • SMEs perceived ethical behaviour as being very important • SMEs perceived building and maintaining relationships with primary stakeholders as very important • Many SMEs may be engaging in a 'silent' form of social responsibility	Viviers and Venter (2007)
Nelson Mandela Metropole	• Some SMEs do report on corporate social performance • SMEs that do report social performance, tend to take care of employee and community concerns • SMEs with different income levels have different perceptions regarding sustainable development • SMEs seem to be indifferent towards taking care of owner and customer needs or concerns • By accepting and practising social performance obligations and sustainable development principles, SMEs would be more responsive towards the concerns and needs of owners/investors, customers, employees and the community	Smith and Perks (2010)
Gauteng	• Poor to zero uptake of BSR in SMEs • May be attributed to very little or no information on the benefits of incorporating BSR amongst SMEs	Ladzani and Seeletse (2012)

South Africa needs to improve the environmental performance of its SME sector (Josipovic, 2005) as the sector lags behind their international counterparts in terms of prudent environmental management (Blignaut and Demana, 2002). Environmental awareness levels amongst South African SMEs is low and there is a general problem of non-compliance with environmental legislation (Coleman, 1997; Blignaut and Demana, 2002). Non-compliance has been attributed to two factors; inadequate knowledge amongst SME practitioners regarding the potential welfare gains embedded in prudent environmental conduct, and a lack of communication through appropriate structures from the legislature's side motivating environmental legislation (Coleman, 1997; Blignaut and Demana, 2002). There is an "urgent

need for an environmental legislation guide for SMEs and a need for a cost-benefit approach to economic analysis of environmental management" for SMEs (Josipovic, 2005; 19). Furthermore, there is a need for "strategies to address the environmental problems of small business and that more detailed studies are required to identify specific policy mechanisms for sound environmental management in SMEs" (Coleman, 1997; 170).

The literature review conducted for the purpose of this thesis found two studies exploring environmental responsibility in SMEs in South Africa; Coleman (1997) and Viviers (2009). A case study on environmental management in SMEs in the automotive sector of the Western Cape, found that there is a lack of, awareness regarding environmental matters amongst SMEs, skills to address environmental concerns, regulatory enforcement and coordinated services such as specialist waste collection and recycling (Table 2.11). Coleman (1997) reasons that since the South African government is actively promoting SMEs it is pertinent that the potential environmental consequences of such activities be identified and policy option considered. Furthermore, there is a need for strategies to address the environmental problems of small business and that more detailed studies are required to identify specific policy mechanisms for sound environmental management in SMEs (Coleman, 1997).

Table 2.11 Findings of the study on environmental management in SMEs of the automotive sector in the Western Cape (Coleman, 1997)

1	Incapacity of small businesses in general to respond to respond effectively to environmental pressures
2	Regulatory enforcement is ineffective due to the lack of resources of regulatory authorities to carry out their responsibilities timeously, and the costly system of monitoring and enforcement
3	Market conditions do not encourage self-regulation or collaboration between different companies to address common problems
4	Many SMEs do not have appropriate skills or the expertise to address environmental problems
5	Typically there is a lack of awareness of global trends in legislation and technological alternatives for improving environmental performance
6	Typically there is a lack of knowledge about environmental hazards of certain materials
7	Typically there is a lack of insight onto the causes of, and potential solutions to, waste problems
8	Typically there is resistance to more sophisticated technology and increased skills requirements
9	Typically there is reliance on off-site waste processing facilities and neglect of in-house responsibility for addressing waste related problems
10	One of the main problems facing SMEs in the automotive service sector is the lack of coordinated services such as specialist waste collection and recycling
11	There is limited commercial interest from environmental consultants who focus on large

	industries
12	Seminars, training programmes and expert assistance are often too costly and time consuming

Viviers (2009) investigated the level of environmental awareness and engagement among local SME owners/managers in the Nelson Mandela Bay region. Findings showed that although SMEs exhibited a high level of concern for the environment, they did not necessarily engage in environmental responsible practices. SMEs view the adoption of environmentally responsible practices as costly and fail to recognise that environmental management could lead to improved profitability. SMEs view the role of government as very important in promoting improved environmental management in the SME sector, and perceived increased environmental legislation, stricter enforcement and tax incentives as mechanisms to drive improved environmental management. Environmentally responsible activities practiced amongst the SMEs were limited to conserving electricity, recycling paper and replacing hazardous materials with more eco-friendly alternatives.

Kehbila *et al*, (2009) investigated the drivers, barriers, benefits and dis-benefits of the South African automotive industry's implementation of the ISO 14001 standard using a questionnaire-based survey. The sample included both SMEs and larger companies, and although not specific to SMEs, some of the findings were relevant the SME experience of ISO 14001 adoption (Table 2.11). A sample size of 38 SMEs from the automotive industry found that the key barriers for the implementation of an environmental management system (EMS) is low awareness of, and buy-in from employees and the costs associated with EMS certification. Improved customer relations and competitiveness were the benefits accrued from the implementation of an EMS which the authors (Kehbila *et al*, 2009) suggest may be attributed to increasing international influence on the automotive sector. Suppliers may be required, by their customers, to become environmentally conscious and improve environmental performance in the supply chain. The main driver for EMS uptake amongst SMEs in the automotive sector is improving and achieving consistent compliance.

2.3.3 South African SMEs and environmental policy

During the apartheid regime SMEs were not priority for government and it was only during the early 1980s that the South African government realised the importance of the small enterprise sector and its contribution to the country's economy. The democratic regime of the early 1990s provided SMEs with an opportunity to participate in the South African

economy (Daile, 2009; Mathibe and van Zyl, 2011). Government proposals for facilitating small business development in South Africa were presented in the National Strategy for the Development and Promotion of Small Business in South Africa (RSA, 1995). The policy document outlines a framework for the arrangement of support organisations whose various roles are to provide finance, transfer information on commercial and technical issues, provide advice, training and education, and facilitate business linkage programmes (Coleman, 1997). The policy intended to prioritise support for black advancement and marginalised groups such as women, disabled people and rural families (Coleman, 1997).

During the mid-2000s, there was increasing pressure to evaluate and rethink the South African small business policy; this culminated in the Integrated Small Business Strategy of 2005 (DTI, 2005; Mathibe and van Zyl, 2011). The aim of the strategy was to enhance the contribution of small enterprises to the growth of the national economy through the creation of sustainable jobs in the SME sector, and through creating an enabling environment for SMEs. The new strategy re-emphasised a number of issues; addressing business growth and transformation, initiating a broad entrepreneurship drive, expanding education and training for small businesses, strengthening support for SMEs access to finance, expansion of market opportunities for small enterprises, facilitating the systematic expansion of sector support for SMEs, and creating a national information network for SMEs (DTI, 2005; Mathibe and van Zyl, 2011). In support of government policy, local business centres were established to provide services to SMEs, for example (Daile, 2009);

- The Centre for Small Business Development – responsible for all policies related to the SMEs, supports programs that are assisted by government, mobilizes funds and supervises the establishment of other new institutions;
- Ntsika Enterprise Promotion Agency – provides non-financial services and resources to local service delivery providers that offer training programs for entrepreneurs, mentoring of individual firms, marketing, procurement advice and technology assistance to SMEs;
- Khula Enterprise Finance Limited – provides capital for small business maximising access to finance for SME's; and
- The Companies and Intellectual Property Registration Office – responsible for matters relating to the registration of new businesses.

Environmental legislation directly influences the environmental management of SMEs (Borcosi, 2012). The cornerstone of environmental law in South Africa is The Constitution of

the Republic of South Africa (RSA, 1996). In accordance with the constitutional injunction, numerous laws protecting the environment have been passed in South Africa since 1994 (Table 2.12), the most important of which is the National Environmental Management Act (Hanks, 2007; Church, 2009; Kidd, 2011), though regulatory functions pertaining to environmental governance are still lacking (Fig, 2005). Moreover, numerous legislative developments since 1994 have been pertinent in shaping the country's CSR landscape (Table 2.12) (Hanks, 2007). The legislative terrain in South Africa is largely influenced by the socio-economic priorities that have arisen as a result of the country's political history, with a particular emphasis on transformation strategies, HIV/AIDS and job creation. Other drivers include labour, occupational safety and health matters, governance and transparency, stakeholder engagement, community development and environmental considerations (Hanks, 2007).

Table 2.12 Legislation of relevance to CSR in South Africa (Hanks, 2007; Hamann, 2009)

Legislation	**Overview**
The Companies Act, 2008 (the Act) (replaces the Companies Act, 1973 (as amended by the Corporate Laws Amendment Act) and amends the Close Corporation Act, 1984)	All companies (including SMEs) are governed by the Companies Act. The Companies Act contains various provisions regarding company registration and conduct including a standard for directors' conduct and regulates the liability of directors where the standard is not met
Occupational Health and Safety Act No. 85 of 1993 and Mine Health and Safety Act No. 29 of 1996	The Occupational Health and Safety Act provide requirements for health and safety management systems and standards in the workplace. The Mine Health and Safety Act is focused on the need to reduce the number of fatalities and injuries in the mining industry.
Labour Relations Act No. 66 of 1995 and Basic Conditions of Employment Act No. 75 of 1997	Provide for basic conditions of employment, promote collective bargaining at workplace and sector level, and promote employee participation in company decision-making through workplace forums.
Constitution No. 108 of 1996	Contains the Bill of Rights, including the right to equality, a clean and healthy environment, access to information, administrative justice, and others.
National Water Act No. 36 of 1998	Designates water as a national resource and requires water users to apply for licences from the state, with an allocation to a basic water right and a natural reserve, including stringent water pollution regulations.
Employment Equity Act No. 55 of 1998	Seeks to eliminate unfair discrimination in the workplace and implement affirmative action for black people, women, and people with disabilities.

Legislation	Overview
Competition Act No. 89 of 1998 (amended in 2000)	Defines and makes provision for the prevention of anti-competitive behaviour, and provides for the Competition Commission, Competition Tribunal, and the Competition Appeals Court.
Skills Development Act No 97 of 1998	The Skills Development Act requires companies to contribute a percentage of their total payroll to the National Skills Fund. Companies are compensated for training and skills development programmes.
National Environmental Management Act No. 107 of 1998	Promotes development that is socially, environmentally, and economically sustainable. Seeks environmental justice and equitable access to environmental resources. Promotes the precautionary principle. Promotes public participation in environmental decision-making. Provides for duty of care and remediation. Includes the possibility of directors' liability for environmental damages.
Promotion of Access to Information Act No. 2 of 2000	The Promotion of Access to Information Act enforces the constitutional right to access to information that is pertinent to the Bill of Rights.
Promotion of Equality and Prevention of Unfair Discrimination Act No. 4 of 2000	Seeks to prevent and prohibit unfair discrimination and harassment and to promote equality and eliminate unfair discrimination.
Mineral and Petroleum Resources Development Act No. 28 of 2002	Vests all mining rights with the state and requires mining companies to reapply for mining permits, with preference given to black economic empowerment companies. Companies need to demonstrate due diligence in social and environmental matters, and directors may be held liable for environmental damage.
National Black Economic Empowerment Act No. 53 of 2003	Sets out a national framework for the promotion of black economic empowerment. Establishes the Black Economic Empowerment Advisory Council; and empowers the Minister to issue codes of good practice on BEE, including a scorecard to measure achievement, and to promote sector-specific BEE Charters that are deemed to be in accordance with the objectives of the Act.

The most prominent drivers for CSR in South Africa are the second King Report on Corporate Governance (King 2), the JSE Social Responsibility Index, the development of several broad-based Black Economic Empowerment sector charters and improved corporate disclosure on sustainability related issues (Bezuidenhout *et al*, 2007; Viviers and Venter, 2007; Hamann, 2009). These drivers have not only affected large listed business but also SMEs (Viviers and Venter, 2007). The King Report on Governance for South Africa 2009 (King III) provides guidance to all corporate entities on various governance related aspects including; ethical leadership and corporate citizenship, Boards and directors, audit committees, the governance of risk, the governance of information technology, compliance with laws, rules, codes and standards, internal audits, governing stakeholder relationships

and integrated reporting and disclosure (DTI, 2011/2012). These best practise principles have become an indispensable guide on Corporate Governance to directors, executives and regulators (DTI, 2011/2012). Selected parts of the King Report have been adopted by the JSE as a listing requirement and it is widely accepted as best practice in corporate governance (Hanks, 2007).

In an attempt to redirect investment towards more sustainable areas of the economy, the Johannesburg Stock Exchange (JSE) aligned with the Financial Times and Stock Exchange (FTSE) to create a Socially Responsible model; the JSE socially responsible investment (SRI) index was launched in 2004 in South Africa (Fig, 2005; Skinner and Mersham, 2008). The SRI index provides a measurement of the environmental, social and economic performance of participating companies (Skinner and Mersham, 2008) and all companies listed on the All Share Index (approximately 160) are eligible to participate in the SRI assessment process (Hanks, 2007). Broad-Based Black Economic Empowerment (B-BBEE) is the South African Government's policy to drive and encourage economic transformation. The policy is aimed at empowering 'black' people and women, and redresses the inequalities of the past (DTI 2011/2012). The Department of Trade and Industry issues explanatory codes of practice on B-BBEE to give companies guidance on implementing the B-BBEE legislation and drafting their own industry sector transformation charters (Skinner and Mersham, 2008). Detailed negotiation has to date produced such agreements in the petroleum, mining, finance and tourism industries (Fig, 2005). B-BBEE covers seven key transformation elements; ownership, management and control, employment equity, skills development, preferential procurement, enterprise development and corporate social investment (Skinner and Mersham, 2008). The social responsibility of companies requires that they support and implement B-BBEE in the interests of nation building and addressing injustices of the past (Bezuidenhout *et al*, 2007).

Global codes of conduct have also impacted on the more globalized South African firms (Fig, 2005). The Global Reporting Initiative, which requires comprehensive social and environmental reporting, has attracted support among larger firms. In addition to these codes, the second King report on corporate governance for South Africa has recommended that firms comply with the AA1000 standard and the Global Sullivan Principles of Corporate Social Responsibility. More popular of the voluntary certifications being adopted are the ISO 14000 series of environmental management standards, and sectoral codes such as the

Forestry Stewardship Council or the Responsible Care programme in the chemical industry (Fig, 2005).

Irrespective of legislative and voluntary drivers for CSR in South Africa, SMEs are not productive enough in terms of CSR, and policies on CSR in SMEs are deficient (Ladzani and Seeletse, 2012). Moreover, the management of environmental conditions in smaller-scale companies remains principally the responsibility of government enforcement agencies which are highly fragmented and generally weak (Coleman, 1997). There is a lack of comprehensive position on regulating and improving environmental management in SMEs; the Small Business White Paper refers only to expectations of compliance with reasonable health and safety standards, and targeted assistance for SMEs in ecologically sensitive activities (Coleman, 1997). Where legislation is relevant, translating legislation to good environmental practice by SMEs is a challenge and there is a general problem of non-compliance with existing legislation (Blignaut and Demana, 2002) which can be attributed to a number of factors; there is inadequate knowledge amongst SMEs regarding the potential benefits of prudent environmental conduct (Blignaut and Demana, 2002), SMEs are characterised by financial difficulties and environmental compliance has to compete with a range of investment opportunities that may be crucial to the survival of the business (Church, 2009), and there seems to be a lack of communication through appropriate structures from the legislature's side motivating environmental legislation (Blignaut and Demana, 2002).

2.4 Corporate environmental responsibility (CER) in SMEs

As discussed in previous sections (2.3 Corporate social responsibility (CSR) and corporate environmental responsibility (CER) ER, 2.3.1 Corporate social responsibility (CSR) and SMEs), for over 50 years research concerned with CSR has been widely debated in the context of larger companies. For more than 20 years scholars have suggested that greater attention needs to be paid to the integration of CSR and environmental management into the activities and practices of SMEs (Brammer *et al*, 2011; Table 2.7). Currently, this trend prevails and most CSR and environmental management research is focused on the practices and activities of large corporations, a trend that leaves the role of CSR and environmental management amongst SMEs relatively unexplored (Brammer *et al*, 2011). Given the significance of SMEs it is troubling that there is extant research on environmental management within small and medium-sized companies is very scarce, in fact, it is

practically non-existent (Hillary, 2004; Ángel del Brío and Junquera, 2003; Brammer *et al*, 2011). Moreover, SMEs are not little versions of big firms and, consequently, require their own specific environmental solutions (Tilley, 1999). There is however, an increasing body of research literature examining environmental practices in the SME context and the ways in which SMEs engage in environmentally responsible practices continues to attract global research attention (Cassells and Lewis, 2011), for example, Tilley (1999), Williamson and Lynch-Wood (2001), Brammer *et al* (2011), Williams and Schaefer (2012), Blundel *et al* (2013), Roa *et al* (2006), Aragón-Correa *et al* (2008), Agan *et al* (in press), Uhlaner *et al* (2012), Battisi and Perry (2011), Campos (2012), Fernández-Viñé et al (2010), Lee (2009), Studer *et al* (2008), Zeng *et al* (2011), Stevens *et al* (2013), Nee (2011) and Natarajan and Wyrick (2011). Such studies have focused on three general topics; barriers and/or drivers for environmental practice uptake in SMEs (Friedman and Miles, 2001; Hitchens *et al*, 2003; Lefebvre, 2003; Pimenova and van der Vorst, 2004; Simpson *et al*, 2004; Williamson *et al*, 2006; Masurel, 2007; Lee, 2009; Zang *et al*, 2009; Iraldo *et al*, 2010; Lewis and Cassells, 2010; Raja Mohd Rasi, 2010; Zorpas, 2010; Brammer *et al*, 2011; Zeng *et al*, 2011; Williams and Schaefer, 2012; Agan *et al*, in press), environmental management standards and SMEs (Hillary, 2004; Hallinan, 2003; Hillary, 2004; Seiffert, 2008; Cassells *et al*; 2011) and environmental management and SMEs (Tilley, 1999 and 2000; Karvonen, 2000; Rutherfoord *et al*, 2000; Williams *et al*, 2000; de Bruijn and Hofman, 2001; Perez-Sanchez *et al*, 2003; Halila, 2007; Cambra-Fierro *et al*, 2008; Gadenne *et al*, 2008; Daddi, 2010; Darnell *et al*, 2010, Inmaculada *et al*, 2010; Cassells and Lewis, 2011; Zorpas, 2011).

Consensus in the literature exists around a lack of engagement on the part of SMEs in environmental practices and SMEs have generally been portrayed as 'hard to reach' and 'lagging' in relation to environmental sustainability due to their low take-up rates of sustainable business practices (Darnell *et al,* 2009; Gadenne *et al,* 2009; Daddi *et al*, 2010; Cassells and Lewis, 2011; Battisti and Perry 2011). Environmental responses have tended to be reactive and defensive, and environmental strategies are limited to comparative reactive processes (Worthington and Patton, 2005; Brammer *et al,* 2011). Environmental management among small business is in its infancy (Worthington and Patton, 2005; Brammer *et al,* 2011) and the scarce development of environmental responsibility in SMEs may be attributed to (Tilley, 1999; Ángel del Brío and Junquera, 2003; OECD, 2007; Revell *et al*, 2008; Gadenne *et al*, 2009; Brammer *et al*, 2011; Cassells and Lewis, 2011); smaller firms tend to be less aware of environmental externalities and of the legislation that governs their activities; they lack the resources (human and financial) to invest in environmental

improvements and management tools; they are characterised by a lack of environmental capacity, awareness and training; SMEs lack relations with external stakeholders, are less visible and are not exposed to the reputational risks; and they are sceptical regarding the business benefits of environmental responsibility (Brammer *et al,* 2011). SMEs are not a homogenous group in terms of their environmental management practices and they differ because the smallest businesses fail to see the benefits of such practices (Brammer *et al,* 2011).

2.4.1 The Impact of SMEs on the environment

There is little quantitative data available that measures the precise environmental impact of small firms (Labonne and Conseil, 2006; OECD, 2007; Daddi *et al*, 2010) and when considered in isolation, a SME may be perceived to be having little, or no, impact on the environment (Lewis and Cassells, 2010). Many smaller firms (especially those in developing countries) are characterised by their use of older technologies, a lack of awareness of legislation and of their own environmental impacts and their less structured management of such issues—all of which means that their impact on local ecosystems and communities can be significant (Hillary, 2000; OECD, 2007). More significantly, collectively, their sheer numbers may mean that their environmental impacts are substantial. Since they represent such a large percentage of economic activities globally, it is expected that the cumulative environmental impact of the sector, as a whole, could be significant (Tilley, 1999; Tilley, 2000; Hillary, 2000; EU, 2004; OECD, 2007; Lewis and Cassells, 2009 and 2011; Daddi *et al*, 2010) including the use of finite resources and generation of pollution and waste (Hillary and Burr, 2011).

It is generally agreed that the SME sector is under-researched and little is known about its attitudes to, and control of, its environmental impacts (Hillary, 2000; Hillary, 2004 eu, 2005; EU, 2007). It is widely accepted that even in terms of one type of pollution (for example air pollution), the environmental load from different types of pollutants (for example CO_2, SO_x, NO_x etc.) and the contribution made by SMEs is too complex to be mapped out even if data existed, which in many cases it does not exist (EU, 2007; Daddi *et al*, 2010). UK studies often cite a figure of 70% as SMEs' contribution to pollution levels (Hillary 2000, 2004), a percentage that Hillary (2000) argues is unsubstantiated. EU economic statistics do not tally with data collected on emissions, waste generation and effluents from firms, so it is doubtful whether smaller firms' contribution to pollution can be calculated at all. An EU (2007) study

argues that the quoted figure of 70% contribution of industrial pollution in Europe seems reliable as SMEs contribute approximately 60% of production in Europe, there is often a direct link between the level of output and the contribution to pollution and inspected or surveyed SMEs are often not compliant with specific pollution limits or environmental rules.

Only a few studies attempt to quantify the environmental impact of SMEs (OECD, 2007; Daddi *et al*, 2010). A study commissioned by the EU mentions that SMEs are estimated to generate as much as 60% of commercial waste and 80% of pollution incidents in England and Wales. The same study refers to work by the Wales Environment Centre in rural Wales, where SMEs constitute 97% of businesses, indicates that they produce approximately 91% of waste in the area (ECOTEC, 2000; OECD, 2007; Daddi *et al*, 2010; Cassells and Lewis 2011). A study conducted by The Carbon Trust (2005) during 2002 found that SMES account for 20% or 195.2 mega tonnes of carbon emitted by commercial and public sectors in the UK. In India it is estimated that SMEs produce over 65% of industrial waste and in China's Jiangsu Province that 67.7% of SMEs were causing serious pollution (UNEP, 2003). In France it is estimated that SMEs account for 40-45% of industrial air emissions, water consumption and energy consumption, and for 60-70% of industrial waste production (Daddi *et al,* 2010).

Sectors shown to have polluting SMEs include the agricultural sector, the manufacturing sector and service sectors (OECD, 2007). The agricultural sector, particularly for intensive livestock farming, is a major source of water pollution and land contamination. Manufacturing SMEs consume energy and natural resources, and generate waste and pollution. The service sector, particularly petrol stations and repair shops pose a risk of significant routine pollution or accidental releases (OECD, 2007). Other industrial sectors where SMEs have a particularly significant impact on the environment include printing, textile and leather manufacturing, and the timber, woodworking and paper industry (OECD, 2007).

Some authors (Niblock-Siddle and Black, 2008; OECD, 2000 and 2007; Moore and Manring, 2009; Lewis and Cassells, 2011) however, believe that in contrast to this negative impact, collectively, SMEs have the potential to fundamentally change the corporate social responsibility landscape and could make a significantly positive contribution to environmentally sustainable development. Considered collectively, SMEs could make a significant positive contribution in negating damage to the environment caused by their

activities (Lewis and Cassells, 2011). Companies that provide environmental goods and services, for example environmental consulting and waste management services, often belong to the SME sector. SMEs often serve as focal points for the sale of cleaner technologies and pollution control equipment (OECD, 2000 and 2007).

2.4.2 Environmental management systems (EMSs) and environmental certification in SMEs

Starkey (1998; 2000) explores voluntary environmental management tools that can be constructively used by SMEs; the environmental policy, environmental management systems, environmental auditing; environmental indicators, environmental labelling, environmental reporting, eco-balancing and life cycle assessment.

- The environmental policy sets out the overall aims and intentions of a firm with respect to the environment. An environmental management system can be used to realize the aims and intentions contained in its policy.
- Environmental auditing is an assessment tool for checking environmental practice in comparison to stated requirements. Auditing is an important part of an environmental management system.
- Environmental indicators allow a firm to measure its environmental performance and its efforts to improve its performance. Indicators can be used within an environmental management system to check that a firm has met environmental targets.
- Eco-balance, also known as input-output analysis, records the firm's physical inputs, stock and outputs enabling the firm to assess the particular environmental impacts of those inputs and outputs. Eco-balance enables a firm to undertake the comprehensive environmental review of its activities and set targets for improving its environmental performance.
- Life cycle assessment is a tool for identifying and assessing the various environmental impacts associated with a particular product throughout its life cycle, from the raw materials acquisition through its production and use to its final disposal.
- Environmental labelling schemes award an environmental label to those products that are less harmful to the environment than others within the same product group. To be awarded a label, a product has to meet a set of environmental criteria.

- An environmental report is a means of communicating a firm's environmental performance to stakeholders. Predominately issued by large companies, environmental reporting a useful for tool SMEs.

An environmental management system (EMS) provides an orderly method for integrating concern for the environment into an organisation's plans and decisions (Cohen and Robbins, 2011). It is a formal set of policies and procedures that define how an organisation will manage its potential impacts on the natural environment in a planned and systematic way and thus identify those ways of improving its environmental performance that most benefit its business performance (Starkey, 2998; Conglianese and Nash, 2001). The key requirements of an EMS are (Conglianese and Nash, 2001):

- Adopt a written environmental policy.
- Identify all environmental aspects and significant impacts of their activities, products and services.
- Set objectives and targets for continuous improvement in environmental performance.
- Assign clear responsibilities for implementation, training, monitoring and corrective actions.
- Evaluate and refine implementation over time so as to achieve continuous improvement both in the implementation of environmental objectives and targets and in the EMS itself.

The decision to adopt an EMS is an important one; many businesses are looking to EMSs at a strategic level, as a means of positioning their businesses to exploit market opportunities, rather than simply using them as a tool of environmental risk management (Cassells *et al,* 2011). The potential competitive advantages of the implementation of EMSs has been well researched and promoted (Bist, 2007) and the EMS has become one of the key concepts of environmental management (Lesourde and Schilizzi, 2001).

The two formal EMSs in the market place that are commonly referred to in the literature are eco-management and audit system (EMAS) and ISO 14001 (Strakey, 2998; Hillary, 2004; Zorpas, 2010) and have been the predominant models of reference for implementing EMSs in SMEs (Hillary, 2004; Heras and Arana, 2010; Zorpas, 2010). ISO 14001 is the most widely adopted voluntary environmental programme in the world (Prakash and Potoski, 2009) used by 92% of environmentally certified SMEs (ISO, 2005) with an increasing number of SMEs showing interest in the implementation of ISO 14001 (Nee, 2009). ISO 14001 is intended to

apply to any type of organization anywhere regardless of size, geographical, cultural or social conditions and ISO 14001:2004 was revised to amongst other objectives; make it more user-friendly for SME users (ISO, 2005). For the purpose of this thesis, only ISO 14001 will be discussed as this environmental certification is the most prevalent certification scheme in South Africa (Bezuidenhout, 2007) and commonly used amongst SMEs (ISO, 2005).

2.4.2.1 ISO 14001

The International Organization for Standardization (ISO), founded in 1947, is an independent, non-governmental organization made up of members from the national standards bodies of 163 countries. ISO is the world's largest developer and publisher of International Standards having developed over 19 000 International Standards on a diversity of subjects and more than 1000 new ISO standards are published every year (ISO website). The ISO 14000 suite addresses various aspects of environmental management providing practical tools for companies and organizations looking to identify and control their environmental impact and constantly improve their environmental performance. ISO 14001:2004 and ISO 14004:2004 deal with environmental management systems (EMSs) while the other standards and guidelines in the suite address specific environmental aspects, including; labelling, performance evaluation, life cycle analysis, communication and auditing (ISO website).

ISO 14001 describes the basic elements of an effective environmental management system (EMS) including; creating an environmental policy, setting objectives and targets, implementing a programme to achieve those objectives, monitoring and measuring it effectiveness, correcting problems, and reviewing the system to improve it and overall environmental performance (Table 2.13) (SAB, 2004; Prakash and Potoski, 2009). ISO 14001 does not establish performance standards nor does it stipulate the technological process that firms must apply to their environmental operations. The standard does not establish absolute requirements for environmental performance beyond commitment, in the environmental policy, to comply with applicable legal requirements and with other requirements to which the organisation subscribes, to prevent pollution and to continual improvement. This means that ISO 14001 is relevant to organisations of all sizes and types (SAB, 2004; Prakash and Potoski, 2009). The requirements for the ISO 14001: 2004 EMS are set in clause 4 of the standard under six headings; general requirements, environmental

policy, planning, implementation and operations, checking and corrective action, and management review (Table 2.13) (SABS, 2004).

Table 2.13 Requirements of the ISO 14001:2004 standard (SABS, 2004)

Clause	Requirement	Description
4.1 General requirements	EMS	ISO 14001:2004 requires a documented EMS, which is defined as "part of an organisations management system used to develop and implement its environmental policy and manage its environmental aspects" (SABS, 2004;3).
4.2 Environmental policy	Environmental policy	ISO 14001:2004 requires that an organisation's top management define the organisations environmental policy. Amongst other requirements, the environmental policy must be communicated to all staff, be available to the public and include commitment to comply with relevant environmental legislation and regulations. The environmental policy is the "overall intentions and direction of an organisation related to its environmental performance as formally expressed by top management" (SABS, 2004;2).
4.3 Planning	Environmental aspects and impacts	ISO 14001:2004 specifies that the organisation must define its processes for evaluating the environmental aspects of its business and determining its most significant environmental impacts (Jackson, 1997). The standard defines an environmental aspect as an "element of an organisation's activities or products services that can interact with the environment" (SABS 2004:3). An environmental impact is defined as "any change to the environment, whether adverse or beneficial, wholly or partially resulting from and organisations aspects" (SABS, 2004:3).
	Environmental legal requirements	ISO14001:2004 requires that the organisation establish, implement and maintain procedures to identify environmental legal requirements.
	Environmental objectives and targets	ISO 14001:2004 stipulates the establishment, implementation and the documented maintenance of environmental objectives and targets that must be measurable, and consistent with the environmental policy. Programmes must established, implemented and maintained in order achieve the targets, these must be reviewed periodically. An environmental objective is the "overall environmental goals, consistent with the environmental policy, that an organisation sets itself to achieve" (SABS 2004:2). An environmental target is the "detailed performance requirement, applicable to the organisation, or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives" (SABS, 2004:3).
4.4 Implementation and operation	Resources, roles and responsibility	Adequate resources must be provided for implementation and improvement of the EMS for example, human and financial resources. Responsibilities must be defined,

Clause	Requirement	Description
		documented and communicated. Environmental representatives must be appointed to implement the EMS and report on performance of the EMS.
	Competence, training and awareness	All employees must be aware of environmental objective, have appropriate job training in relevant environmental procedures and know the consequences of departing from procedures.
	Communication	There must be a system for receiving and responding to communication regarding environmental aspects from both external and internal sources.
	Documentation	There must be a documented description of the EMS.
	Control of documents	There must be a system for document control.
	Operational control	Documented procedures and work instructions must be prepared where they are needed to ensure compliance with the EMS.
	Emergency preparedness and response	Reasonably foreseeable and emergency situations must be identified and appropriate procedures implemented and periodically reviewed.
4.5 Checking	Monitoring and measurement	There must be procedures for monitoring activities that impact on the environment. Monitoring equipment must be calibrated.
	Evaluation of compliance	Procedures to identify environmental legal requirements must be established and maintained.
	Non-conformance, corrective and preventative action	The must be a system for handling non-conformances, with investigation and corrective action.
	Control of records	Records must be kept to demonstrate conformity to the requirements of the EMS.
	Internal audit	The EMS must be audited regularly to ensure the system is operating optimally.
4.6 Management review	Management review	Management must review the EMS and environmental policy and objectives periodically to ensure they are still relevant and effective.

ISO 14001:2004 requires that the organisation achieve continual improvement of their environmental performance. Continual improvement is the "recurring process of enhancing the environmental management system in order to achieve improvement in overall environmental performance consistent with the organisations environmental policy" (SABS, 2004:1). Environmental performance is the "measurable results of an organisations management of its environmental aspects" (SABS, 2004:2). Starkey (1998) outlines the five steps of ISO (Figure 2.1) that translate into continual improvement; environmental policy, planning, implementation and operation, checking and corrective action and management review.

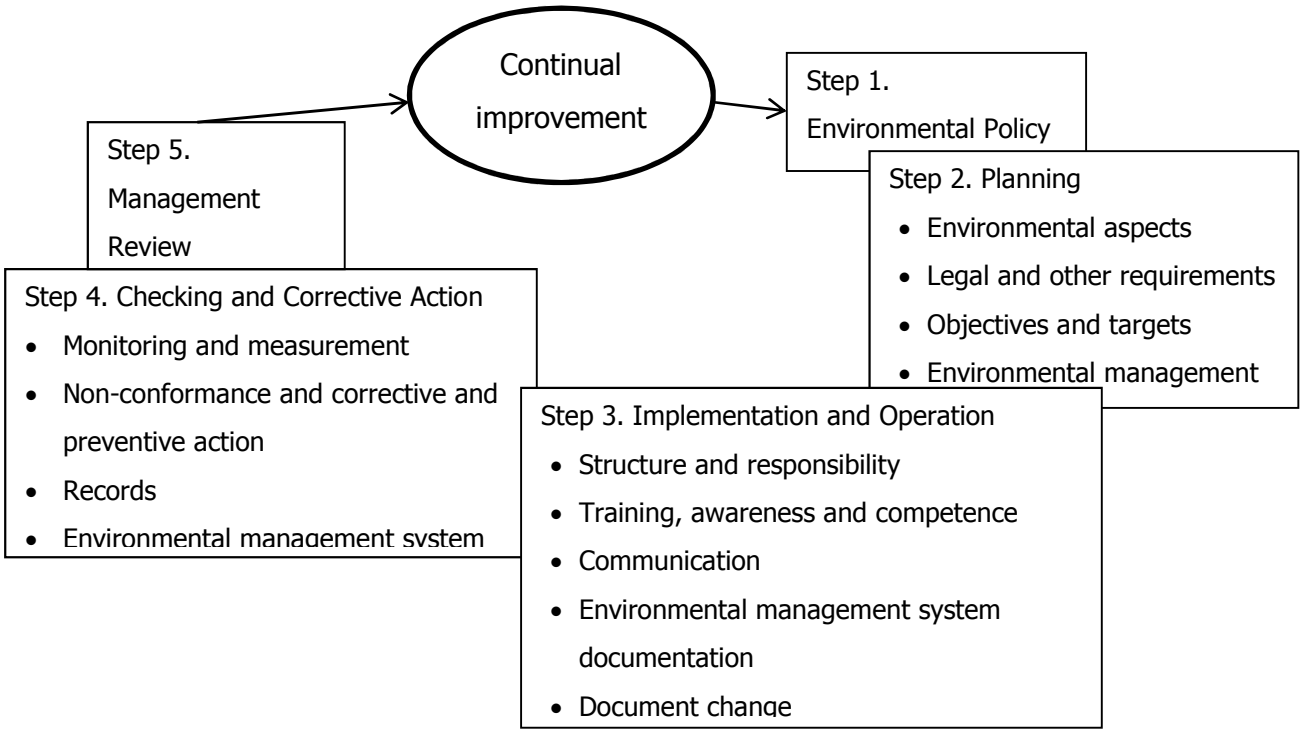

Figure 2.1 The five steps of ISO (Starkey, 1998: 44)

2.4.3 SMEs and environmental regulatory compliance

Studies have demonstrated that SMEs compliance with environmental legislation is severely lacking (Hillary, 1999, 2000 and; 2004; OECD, 2007; Daddi *et al*, 2010; Heras and Arana, 2010; Lewis and Cassells, 2009). A key factor affecting the compliance behaviour of SMEs is their limited competence level and capacity (OECD, 2007; Iraldo *et al*, 2010); SMEs are often ignorant about the legislation that governs their activities or do not know enough about environmental legislation to ensure that they are compliant (OECD, 2007; Lewis and Cassells, 2009; Daddi *et al*, 2010; Heras and Arana, 2010; Iraldo *et al*, 2010; Zarpos, 2010). Moreover, the proliferation of, and multiple amendments to, environmental law create confusion and make it difficult to understand what compliance involves and small businesses cannot keep up with the volume of regulations that are produced by many government authorities (OECD, 2007; Zarpos, 2010). Low environmental compliance by SMEs has also been attributed to the excessive administrative and financial burden of environmental compliance and the perception that environmental protection is costly and has little benefit to the business (Daddi *et al,* 2010; Iraldo *et al*, 2010).

By being unaware of the environmental legislation affecting them, SMEs represent a significant threat to the environment (EU, 2007). Environmental laws, for example those

related to air emissions, the use of chemicals and other dangerous substances and waste processing and disposal, protect the environment and the health and safety of the workers of the company (EU, 2007). Moreover, the low awareness of the need to comply with respective regulations, and the lack of information available to the regulator regarding SME levels of compliance or the factors that affect their compliance, results in difficulties in regulating SMEs (Mazur, 2012). The SME sector is diverse and complex, within and across sectors, affecting the type and degree of environmental problems in a particular sector or group of businesses and the way in which this sector should be regulated (Mazur, 2012).

Contrary, a number of studies have identified legislation as the key driver of environmental initiatives within firms (Hillary, 1999; Lefebvre *et al*, 2003; Lee, 2009; Williamson *et al*, 2006; Lewis and Cassells, 2009). This suggests that tougher legislation whilst maintaining high levels of implementation and enforcement is key to ensuring the improved environmental performance of the SME sector (Lefebvre *et al*, 2003; Lee, 2009; Lewis and Cassells, 2009; Revell *et al,* 2010). The potential downside of reliance on legislation to dictate levels of environmental performance is the attitude that 'compliance is enough' and the expectation that government will take responsibility for environmental management. This neither encourages nor stimulates voluntary environmental management, environmental leadership, best practice or invocation (Lewis and Cassells, 2009).

2.4.4 SMEs awareness and attitudes to environmental issues

Small businesses have traditionally been perceived as disinterested and apathetic towards the environment, however the key problem for many small businesses has not been apathy but lack of awareness (Zorpas, 2010). The majority of SMEs are characterised by a lack of awareness of their environmental impacts, the management of their environmental impacts and relevant impinging legislation (Hillary, 2000; EU, 2007; Lewis and Cassells. 2009; NatRegs, 2009; Daddi *et al*, 2010; Iraldo *et al,* 2010; Zorpas, 2010). SMEs tend to grossly underestimate their environmental impacts (OECD 2007; Battisti and Perry, 2011), do not see the benefit of a formalised approach to environmental management (NatRegs, 2009); as is evident from a survey conducted in the UK. The survey (NatRegs, 2009) demonstrated that 90% of SMEs believed strongly that they did not undertake any activities harmful to the environment, 92% stated that they did not have an EMS in place, and three quarters of these businesses did not have an Environmental Policy, and 89% considered an Environmental Policy or an EMS to be of 'no use' or 'of little use' to their business (NatRegs,

2009). It is notable that the size of the SME is pertinent when it comes to these observations; smallest (mostly micro) companies perceive significantly fewer benefits of engagement with environmental issues and have little interest in environmental protection (Brammer *et al,* 2011). Zorpas (2010) states that without stakeholder pressure it is not surprising that SMEs have little interest in taking an active role in environmental protection, and SMEs are more likely to respond to tightening legislation.

Studies (Rutherford *et al*, 2000; Schaper, 2002; Perez-Sanchez *et al,* 2003; McKeiver and Gadenne, 2005; Revell *et al,* 2009; Battisti and Perry, 2011) have found that values and attitudes of owner-managers are highly influential factors in determining whether SMEs embrace environmental good practice. SME owner-managers have strong altruistic feelings towards the environment and environmental issues are seen as important. However, there is a general lack of participation in environmental responsible business practices and owner-managers meaning that their generally positive environmental attitudes rarely translate into action. This has been referred to as the 'value-action' gap (Rutherford *et al,* 2000; Schaper, 2002; Perez-Sanchez *et al,* 2003; McKeiver and Gadenne, 2005; Revell *et al,* 2009; Battisti and Perry, 2011). This disconnection between perception and practice can be attributed to a wide range of potential impediments that are discussed in detail in the following section (2.4.5). Some studies do not support the 'value-action' gap theory and found that practices pursued by the small-business owners are consistent with their understanding of environmental responsibility, which may be lacking (Battisti and Perry 2010). Raising the awareness of environmental management in small and medium-sized enterprises is difficult (EU, 2007b) as owner-managers are preoccupied with short-term survival of the enterprise and many SMEs may not see social and environmental issues as immediately relevant to their business (EU, 2007b). In fact, economic consideration are key for SMEs, even where environmental impacts are considerable, actions are taken to avoid costs, not for environmental protection (Zorpas, 2010).

2.4.5 Drivers and benefits of environmental management in SMEs

Drivers of environmental behaviour in companies is an under-researched and under-developed area of study, particularly in the context of SMEs (Worthington and Patton, 2005). The ways in which SMEs engage in environmental responsibility has attracted research attention and a number of studies have sought to explain the motivations behind, and the rationale for, engagement in environmental responsibility, for example Biondi *et al,*

(2000); Ángel del Brío and Junquera (2003); Pimenova and Van der Vors (2004), McKeiver and Gadenne (2005), Worthington and Patton (2005), Lepoutre and Heene (2006), Williamson *et al* (2006), Bist (2007), Lewis *et al* (2010), Zorpas (2010), Brammer *et al* (2011), Hillary and Burr (2011), and Corkcer (2012). Notwithstanding, the most comprehensive coverage of this topic has come from Hillary's (2000 and 2004) work in the United Kingdom (Cassells *et al,* 2010).

Hillary's work (2000; 2004) found that there are many internal and external benefits from the implementation of formal EMSs (Table 2.14). Internal benefits are positive outcomes which relate to the internal operation of a SME and external benefits are positive outcomes from the implementation of an EMS that relate to the external interactions of a SME (Hillary, 2004). Internal benefits are broadly grouped into three categories; organisational, financial and people benefits, and external benefits are broadly grouped into three categories; commercial, environmental and communication benefits (Table 2.14).

Adoption of an EMS by SMEs resulted in numerous organisational improvements and efficiencies, a range of financial savings and improved communication channels, skills and knowledge within the SME, as was the attraction of new business and the satisfaction of customer requirements (Hillary, 2004). Improved environmental performance, legal compliance and energy and material efficiencies were also resultant (Hillary, 2004).

Table 2.14 A summary the benefits to SMEs when adopting EMSs (Hillary, 2004)

Type of benefit	Description of benefit
Internal benefits	Organisational benefits, for example: • improved quality of environmental information • improved environmental legal compliance • demonstrate environmental responsibility • encourages innovation • improved working conditions and safety • stimulate process, transport, raw materials and packaging changes
	Financial benefits, for example: • cost savings from material, energy and waste reductions and efficiencies
	People benefits, for example: • increased employee motivation, awareness and morale • creates a better company image among employees
External benefits	Commercial benefits, for example: • competitive / marketing advantage • gain new customers / business and satisfy existing customers • develop more environmental friendly products
	Environmental benefits, for example: • improved environmental performance • improved environmental legal compliance • increased energy and materials efficiencies • reduced pollution • increased recycling
	Communication benefits, for example: • create positive public image • better customer relationships • improved communication with stakeholders, especially regulators and administrative bodies • set an example for other companies

Reiterating and building on the findings of Hillary's work (Hillary 2000; 2004), later studies have found that there are numerous internal and external benefits from the implementation of an EMS (Table 2.15) (OECD, 2007, Zorpas, 2010; Hillary and Burr, 2011; Brammer *et al,* 2011). Benefits are derived from planning, improved quality of internal procedures, information and management (OECD, 2007, Zorpas 2010). Financial benefits, such as cost savings are obtained by optimising resource use and increasing efficiencies i.e. reducing raw materials, electricity and water and by waste recycling (Biondi *et al,* 2000). Enterprises with certified EMSs have a full awareness of the legal and statutory requirements associated with their operation, usually operate well within those requirements (Zorpas, 2010) and are aware of their environmental impacts which are well documented (OECD, 2007; Zorpas, 2010). Environmental benefits, derived from improved environmental performance, include increased energy/material efficiencies and recycling, and reduced pollution (OECD, 2007; Zorpas, 2010). Improvement of their 'environmental image' is an important perceived

benefit. The competitive advantage gained by adopting an EMS can result in business opportunities such as preferred supplier status, and positive environmental profile and customer satisfaction (Biondi *et al,* 2000; OECD, 2007).

Table 2.15 SME benefits from the implementation of an EMS

Benefits (in order of priority)	**Study**
1. organisational and managerial efficiency 2. the continuous monitoring of compliance requirements 3. the improvement of the firm's image	Biondi *et al* (2000)
1. improved image 2. better competitiveness 3. financial benefits	Pimenova and Van der Vors (2004)
1. perception of customer requirements 2. compliance with legislation 3. improved environmental performance 4. HR benefits	ISO (2005)
1. a cleaner working environment 2. a safer working environment 3. an improved local environment 4. waste minimization 5. recycling, cost reductions 6. increased efficiencies 7. compliance with legislation	McKeiver and Gadenne (2005)
1. improved environmental performance 2. waste minimisation 3. energy and water conservation 4. enhanced corporate image, 5. reduction in environmental risks and incidents 6. compliance with legislation	Cassells *et al* (2010)
1. cost savings 2. consumer demand 3. legal compliance 4. community and employee relations	Zorpas (2010)
1. legal compliance 2. energy and resource efficiency savings 3. better marketing 4. cost savings 5. qualifying for new opportunities in the public sector	Hillary and Burr (2011)

Human resource benefits in SMEs implementing EMSs are notable, opening up new interactions between staff and management and providing intangible benefits such as increased employee motivation and morale, enhanced skills and qualifications, and a better company image among employees. Training personnel and the improved definition of responsibilities and tasks accrues benefits in terms of efficiency thereby improving skills and

raising employee awareness, SMEs obtain positive management results (Biondi *et al,* 2000; OECD, 2007; Zorpas, 2010).

Lewis and Cassells' (2010) identify financial, compliance and personal motives as critical drivers that motivate owner-managers of SMEs to engage in environmentally responsible behaviour. Legislation appears to be one of the primary drivers of environmental management amongst SMEs (Hillary, 2004; Williamson *et al*, 2006; Worthington and Patton, 2005). SMEs find it difficult to maintain continuous compliance with environmental legislation moreover environmental legislation is subject to frequent revisions and an EMS is a useful instrument to manage and monitor legal compliance (Biondi *et al,* 2000). Cost reductions are another key driver for SMEs to implement environmental improvements, as improved efficiency in use of resources and better waste management, for example can result in cost savings (Lewis and Cassells, 2010; Zorpas, 2010). Nee's (2009) study on Malaysian SMEs demonstrated that organizational capital resources have an overriding influence on EMS implementation.

SMEs owner-manager's values and perception are a further important driver. Owner-managers are increasingly perceiving environmental problems as an issue they need to deal with despite the costs involved (Ángel del Brío and Junquera, 2003; 2003; Williamson *et al*, 2006). Some SMEs highlighted a commitment to reducing their environmental impact as their motivation for undertaking environmental activities (Zorpas, 2010). Pimenova and Van der Vors' (2004) study of London SMEs found that social responsibility was the primary driver for environmental actions and that growing public awareness was an important driver, second to social responsibility, as SMEs are concerned with their public image. Another important driver for SMEs is the demand from larger firms for responsible practices in their SME suppliers, precisely to maintain the reputation for responsibility (Biondi *et al*, 2000; Vives 2006). Lewis and Cassells (2010) report that external pressure is being exerted on SMEs to make environmental improvements in the supply chain and this can play a key role in influencing SMEs to be more active in terms of implementing environmental practices.

2.4.6 Factors preventing uptake and dis-benefits of environmental management in SMEs

The studies by Hillary (2000 and 2004) attempt to map the drivers and barriers to EMS implementation by SMEs and found that internal barriers are more important that external

or commercial barriers. Internal barriers are obstacles that arise within the firms and prevent or impede EMSs implementation or the adoption of EMSs and external barriers are obstacles that arise outside the firms and prevent or impede EMS implementation from the adoption of EMSs (Hillary, 2004). Internal barriers were broadly grouped into four categories; resources, understanding and perception, implementation and attitudes and company culture (Table 2.16) and included; a lack of training and resources, understanding and perception issues, the implementation process, and attitudes and company culture. External barriers were grouped into four categories; certifiers/verifiers, economics, institutional weaknesses and support and guidance (Table 2.16) and included; the high cost of certifiers, changing economic climates, and a lack of support and guidance available from experienced consultants.

Table 2.16 A summary of factors preventing SMEs from implementing EMS (Hillary, 2000 and 2004)

Type of barrier	**Description of barrier**
Internal barriers	Lack of resources, for example: • requirements for capital expenditure • lack of specialist staff/champions • lack of management and/or staff time for implementation and maintenance • inadequate technical knowledge and skills • lack of training
	Lack of understanding and perceptions, for example: • lack of understanding of EMS and value of reporting • lack of knowledge of formalised systems • perception of high cost for implementation and maintenance of EMS • lack of awareness of benefits
	Lack of awareness, for example: • lack of awareness of benefits of EMS implementation
	Challenges with implementation of the EMS, for example: • doubts about on-going effectiveness of the EMS to deliver objectives • internal auditor independence difficult to achieve in a small firm • difficulties with environmental aspects/effects evaluation and the determination of significance • uncertainty about how to maintain continual improvement
	Attitudes and company culture, for example: • Inconsistent top management support for EMS implementation • Management instability • Low management status of person spearheading EMS implementation • Resistance to change • Lack of internal marketing of EMS • inconsistent top management support, management instability, • minimal management involvement in implementation, • resistance to change • lack of internal marketing of EMS

Type of barrier	Description of barrier
External barriers	Certifiers/verifiers, for example: • the high cost of certification/verification • a lack of experienced verifiers
	Economics, for example: • changing economic climate alters the priority given to an EMS in SME • insufficient economic drivers and benefits • uncertainty about the value of an EMS in the market place
	Institutional weakness, for example: • lack of promotion of EMSs, financial support and clear legislative framework
	Support and guidance, for example: • lack of experienced consultants to assist SMEs • lack of tools and examples • lack of business network support • more guidance needed on environmental aspects and significance valuation

One of the most consistently cited barriers for SMEs to engage with environmental management is a lack of time. SME owner-managers are overburden with tasks and an emphasis on investing time in economic survival rather than environmental management is prioritised (Luetkenhorst, 2004; Pimenova and Van der Vors, 2004; Lewis and Cassells, 2010; Loucks *et al*, 2010; Lepoutre and Heene, 2006). Financial and human resources are the major barriers impeding EMS implementation (Hillary, 2004). SMEs are often characterised by constrained financial resources (Pimenova and Van der Vors, 2004; Lewis and Cassells, 2010) and there are direct and indirect costs associated with an EMS; the costs incurred obtaining third-party verification, costs relating to EMS implementation and costs relating to the necessary technical measures to ensure the improvement in environmental performance (Biondi *et al*, 2000). In this regard, a potentially significant issue for SMEs, in respect of their investments in environmental management, is the fact that often SMEs fail to see the potential benefits, cost savings and customer rewards, of such activities (OECD, 2007; Revell and Blackburn, 2007). In fact, SMEs are largely ill-informed about the benefits of environmental management, which not only represents a barrier to implementation, but represents a barrier to enhancing firm and operational performance (Hillary, 2004). The other type of resource scarcity that characterises SMEs are human resources. The difficulties that SMEs experience in fully understanding and satisfying environmental management requirements are mostly due to their lack of technical expertise in environmental management i.e. difficulties in understanding, interpreting and applying the EMS (Biondi *et al*, 2000). Some structural and management characteristics of SMEs are posited to prevent

efficient and effective engagement with environmental improvements. Whilst the simple organisational structures of SMEs could be viewed as conferring some advantages in terms of responding to environmental issues, they have more often been reported as being a hindrance than a help (Lewis and Cassells, 2010).

Dis-benefits are negative outcomes or non-materialisation of benefits from the adoption of EMSs (Hillary, 2004). Hillary (2000; 2004) grouped the dis-benefits that can befall an SME during and/or post EMS adoption into three categories; resources, lack of rewards and EMS surprises (Table 2.17) and included continuing resourcing requirements, a lack of rewards resulting from the EMS's implementation and unexpected requirements.

Table 2.17 A summary the dis-benefits to SMEs when adopting EMS (Hillary, 2000 and 2004)

Description of dis-benefit
Resources, for example: • capital expenditure (certification fees) • time and cost required to develop EMS • higher than expected staff costs
Lack of market rewards
The unexpected, for example: • paper work emphasised instead of environmental performance • consultants over-emphases documentation and over complicate system • complexity of approach • underestimation of external communication aspects of EMSs • problems meeting different stakeholders demands

Hillary's later study (Hillary and Burr, 2011) reaffirmed that the cost of EMS implementation is a dis-benefit. Costs incurred included direct costs such as expenditure on consultancy support, third party certification fees and capital expenditure on environmental improvement measures, and indirect costs such as staff time spent implementing and maintaining the EMS. In some cases, SMEs stated that they cannot justify investments in environmental initiatives as they do not see any immediate economic benefits of such activities (Brammer *et al,* 2011). A survey conducted by the International Organization for Standardization (ISO, 2005) suggested that SMEs have difficulties with the implementation of the EMS itself, particularly the identification of aspects and impacts and the determination of significance. Documentation preparation and maintenance is a significant problem with EMS implementation in SMEs (Cassells *et al,* 2010). SMEs had difficulties defining the environmental policy and programmes, and difficulties regarding knowledge about environmental effects and availability of technical instruments to perform necessary

environmental analyses (Biondi *et al,* 2000). Difficulties with EMS implementation and maintenance have been attributed to a lack of technical knowledge and experience with management systems and a lack of environmental management skills (Biondi *et al,* 2000).

The environmental audit by third party certification auditors usually implies a serious obstacle for a small enterprise as they do not have the technical expertise and capability to addressing non-conformities raised (Hillary and Burr, 2011). Thus, SMEs are wary of external communication as they are not used to continuous interaction with stakeholders and often consider environmental aspects as delicate and confidential (Biondi *et al,* 2000).

2.4.7 Supply chain pressures on SMEs

Increased globalisation and a trend of continued outsourcing have caused organizations to function on a supply chain level; organizations are being held responsible for the environmental and social performance of their suppliers and partners (Kovács, 2008; Seuring *et al,* 2008). Global supply chains are driven by large multinational enterprises, yet they rely significantly on the participation of numerous SMEs as suppliers of products, services and innovation. Therefore, SME's can help improve or harm environmental performance within the supply chain (Talbolt *et al,* 2007). Extended producer responsibility assigns the manufacturer of the product the responsibility for its product through the products life cycle, through all downstream levels of its supply chain and to the point of end-of-life management (Kovács, 2008). As an active response to this pressure and obligation companies need to assume environmental responsibility for their products downstream in the supply chain and for their suppliers' upstream in their product chain (Kovács, 2008). Green supply chain management is the "integrating of environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life" (Srivastava, 2007:54). Green supply chain programmes disseminate environmental management practices through the entire supply chain, by using the relationships between large-sized buying firms and their suppliers (Lee, 2008). Suppliers are screened for their environmental performance and those that meet the regulatory standards are suitable for supply (Liang and Chang, 2008). Supplier performance may be monitored using, for example surveys and physical inspections or audits, to verify compliance with environmental requirements (Ciliberti *et al,* 2008). In addition to compliance requirements, larger firms may adopt capacity building strategies

along the supply chain, contributing to suppliers' awareness building and training on the company's policy regarding CSR issues (Ciliberti *et al,* 2008). Green supply chain management promotes efficiency and synergy among business partners and their lead corporations, and helps to enhance environmental performance, minimize waste and achieve cost savings. This synergy enhances the corporate image, competitive advantage and marketing exposure (Liang and Chang, 2008).

An important driver for environmentally responsible practices in SMEs is the demand from larger firms for responsible practices in their SME suppliers (Jenkins, 2006; Murillo and Lozano, 2006; Vives 2006; Spence, 2007; Baden *et al,* 2008). Larger firms may specify CSR criteria either as a precondition for tendering to supply, or as a variable to be considered in the purchasing decision alongside value-for-money (Baden *et al,* 2008). Supply chain pressure has been shown to be an equally effective driver for the uptake of CSR by SMEs as regulation, however the use of supply drivers to promote CSR to SMEs has certain disadvantages (Baden *et al,* 2008). A key risk of not engaging in CSR is exclusion from supply chains (Baden *et al,* 2008) and SMEs selling to these larger firms need to adopt responsible practices to keep their clients (Vives, 2006). In some instances, large corporations have been seen to regulate the behaviours of the SMEs beyond legal regulation and against the interests of the SMEs (Morsing and Perrinin, 2009). There is evidence of double standards when it comes to CSR; large corporations, who have the resources to implement CSR practices, pass the responsibility to put these codes into practice down the supply chain to SMEs who do not have the resources (Painter-Moreland and Spence, 2009). This may result in SMEs being deterred from tendering for, or supplying to, larger corporations that include CSR criteria into procurement strategies (Baden *et al,* 2008).

While these findings are evidence that supply chain drivers towards CSR are increasing, there is little data on the success of this approach (Baden *et al,* 2008) and it is suggested that supply chain pressure does not yet affect many SMEs (Vives, 2006). However, it is evident that CSR is likely to become an increasingly important business issue for many SMEs in the future (Baden *et al,* 2008).

2.5 Summary

This chapter reviewed the literature relevant to corporate social responsibility, corporate environmental responsibility, SMEs and their role in sustainable development and response

to corporate social and environmental responsibility, and the CSR and small business legislative environmental in South Africa. In the following chapter, waste management in an international context, the environmental impacts of waste management and the waste management environment in South Africa will be reviewed.

CHAPTER THREE
LITERATURE REVIEW: WASTE, A BUSINESS RESOURCE PERSPECTIVE

3.1 Introduction

Small to medium enterprises (SMEs) represent an important means to address the challenges of job creation, economic growth and equity in South Africa (RSA, 1995). This is particularly evident in the waste sector where it is envisaged that the waste sector will contribute to the green economy through job creation and participation by SMEs and marginalised communities in the waste management activities (DEA, 2011). Waste has become an increasingly important environmental concern over the past two decades (Chapple *et al*, 2005) and industry is expected to play its role in responsible waste management and take responsibility for the waste generated throughout the life cycle of a product, including waste service delivery and recycling (DEA, 2011). Historically, South Africa has relied on landfills for the disposal and management of waste (DEAT, 2009; DEA, 2011) however the National Environmental Management: Waste Act 2008 (Act 59 of 2008) (Waste Act) provides for integrated waste management and formalises the waste management hierarchy within South African legislation (Peter *et al,* 2010; Perry-Davies, 2012). No longer is the emphasis on the disposal of waste, but rather on avoiding its generation and minimising the waste stream wherever possible (DEAT, 2009).

Packaging waste is a growing and important waste stream accounting for between 15% and 20% of the municipal solid waste in different countries (OECD, 2011) and as such the packaging industry is under international pressure to reduce the environmental impacts of its products (Lewis, 2005). Extended Producer Responsibility (EPR) is an important policy approach for environmental protection particularly the prevention and better management of waste (OECD, 2004) in which producer's responsibility for a product is extended to the post-consumer stage of a products life cycle (OECD 2001). The South African Waste Act provides for the introduction of EPR as a mechanism for bringing about waste reduction in South Africa (DEAT, 2009b) and Government has targeted packaging waste as a priority waste stream for which EPR should be implemented (Nahman, 2010).

This chapter explores the definition of waste, the environmental importance of responsible waste management and integrated waste management. The relevant literature on environmentally responsible waste management, the importance of, and policy to support

such waste management is presented. Emphasis is given to packaging waste management and policy. Packaging waste constitutes a significant portion of the recyclable waste stream and the generation of recyclable materials stimulates small business and the informal sector (Beede and Bloom, 1995).

3.2 Waste, a business resource perspective

The identification and management of waste is a fundamental environmental issue in industrial and developing countries throughout the world (Twardowska, 2004). How waste is defined is important as it impacts on the ownership of waste; the development of sustainable waste management systems; the role of legislation in waste management; and waste statistics at a regional and global regional level (Pongrȧcz and Pohjola, 2004). The precise definition of waste, however, differs from one country to another and there is no international harmonization of national standards on waste terminology, the definition and scope (Twardowska, 2004; Kaseva and Mbulingwe, 2005).

The literature offers a plethora of definitions (for example, White *et al,* 1995; Lemann, 2008; Sasikumar and Krishna, 2009) and different countries define waste within their own legal frameworks (for example, OECD, 1998; Bontoux and Leone, 1997). Similarly, South African legislation provides at least two legal definitions of waste; the definition provided by The Environment Conservation Act, Act 73 of 1989 and a second described in The National Environmental Management: Waste Act 2008 (Act 59 of 2008) (Oelofse and Godfrey, 2008)[2]. Oelofse and Godfrey (2008) caution that the legal definition of waste can often be

[2] The Environmental Conservation Act (Act 73 of 1989) defines waste as:

> "*any matter, whether gaseous, liquid, or solid, or in any combination thereof, originating from any residential, commercial or industrial area or agricultural area identified by the Minister as an undesirable or superfluous by product, emission, residue or remainder of any process or activity*".

The National Environmental Management: Waste Act 2008 (Act 59 of 2008) provides a more detailed definition:

> ""*waste" means any substance, whether or not that substance can be reduced, re-used, recycled and recovered -*

vague and dependent on factors other than the composition or possible after-use of the material. Furthermore, the use of legal definitions and the fact that South Africa has more than one legal definition of waste complicates the classification of material as waste. The exact definition of waste is a topic of on-going debate as a consequence of an increasing trend to reduce, reuse, rework, recycle and recover waste products. This trend means that a waste stream from one industry can now become another valuable raw material to another (Oelofse and Godfrey, 2008; Perry-Davies, 2012; Pongrácz and Pohjola, 2004; Sasikumar and Krishna, 2009).

There are numerous different types of waste that may be characterised in different ways. Waste is usually characterised according to its source for example, domestic, commercial, medical, agricultural; or its chemical properties for example, inert, toxic or flammable; or its physical properties for example, moisture content, liquid or solid (Bosman, 2009; Powell and Craighill, 2000; White *et al*, 1995). Municipal solid waste (MSW) is a term usually applied to a heterogeneous collection of wastes produced in urban areas, the nature of which varies from region to region (UNEP 2005; El-Haggar, 2007). MSW is considered a major global environmental problem and constitutes a large percentage of the total waste generated in urban and rural areas (Beede and Bloom, 1995; El-Haggar, 2007). Besides its abundance, MSW is an important waste stream for consideration as it has a resource value that is captured through informal and formal recycling both of which promote social good (Beede and Bloom, 1995). Sources of MSW include households, commercial enterprises, and institutions such as schools, transportation terminals, and hospitals (Beede and Bloom, 1995).

(a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
(b) which the generator has no further use of for the purposes of production);
(c) that must be treated or disposed of; or
(d) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but -
(i) a by-product is not considered waste; and
(ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste."

This research purposes to explore environmental responsibility in SMEs in the waste sector and their role in environmental and extended producer responsibility for larger business, in waste management and recycling; it is therefore pertinent to explore the concept of business waste. The National Environmental Management: Waste Act 2008 (Act 59 of 2008) describes business waste as "*waste that emanates from premises that are used wholly or mainly for commercial, retail, wholesale, entertainment or government administration purposes*". This definition is consistent with the concept of pre-consumer waste. Pre-consumer or post-industrial materials are a product of manufacture, have not been, and will not be used, and thus stay at the manufacturer. These materials are diverted from the waste stream during industrial production. Examples of pre-consumer waste include manufacturing scrap, trimming and cuttings (Howe and Gerrard, 2010; Lancaster, 2012, EPA, nd). This factory floor waste is often homogenous and 'clean' and can easily and cost effectively be recycled (Porter, 2002). There is however, another dimension to business waste. When a business sells its products, it not only passes on the product to the customer, but the duty to dispose of the packaging and the product at end-of-life (Porter, 2002). Post-consumer material is material that has been used as a consumer item, has completed its lifecycle as a consumer product and is discarded or separated for recycling and diverted from landfill. Examples of post-consumer materials include recyclables collected in commercial and residential recycling programmes such as office paper, cardboard, aluminium cans, plastic and metals (Howe and Gerrard, 2010; Lancaster, 2012, EPA, nd).

3.2.1 Integrated waste management (IWM) and the waste hierarchy

Historically, South Africa has relied on landfills for the disposal and management of waste as landfilling has predominantly been regarded as the most affordable way to manage waste (DEAT, 2009; DEA, 2011). Disposal in landfill however, does not take into account the external (environmental and social) costs of landfilling that are difficult to quantify in monetary terms and include; the decomposition of organic wastes that produces both landfill and gas leachate, emissions to air that impact negatively on both human health and the global climate, emissions to soil and water (in the form of leachate) and 'nuisances' associated with living in the vicinity of a landfill site in the form of noise, odour, litter, vermin, dust and traffic (Nahman, 2011). The costs of developing and maintaining additional landfill capacity to accommodate the increasing rate of waste disposal, and the cost of closing and remediating the landfill area also negated (Nahman, 2011; DEAT, 2009; DEA,

2011). Disposal in landfill is now the lowest environmental priority option for the treatment and disposal of waste (DEAT, 2009; DEA, 2011).

The Waste Act provides for integrated waste management and formalises the waste management hierarchy within South African legislation (Peter *et al,* 2010; Perry-Davies, 2012). Integrated Waste Management (IWM) refers to the integrated planning, implementation, monitoring, and review of waste management measures to ensure sustainability and prevent detrimental impacts on human health and the environment (Bosman 2009). Integrated waste management considers a broad hierarchy of preferred options for managing waste streams and begins with the prevention of waste and the minimisation of waste as a by-product of production (DEAT, 2009; Bosman 2009; Perry-Davies, 2012). IWM has a cradle-to-cradle approach which differs from a cradle-to-grave approach in that it encourages conceptualisation of the future use of a product once its lifecycle, as that product, has ceased (DEAT, 2009).

The waste management hierarchy is broadly made up of five steps (as described by DEA, 2011; Bosman, 2009 and Perry-Davies, 2012), (Figure 3.1):

- The first step in the waste hierarchy is waste avoidance. The aim of this first step is the reduction of waste at source. This is achieved through the design of goods in a manner that minimises the creation of waste within the industrial process thereby reducing the need for virgin materials. Reduction of the quantity and toxicity of waste generated during the production process is important.
- The next step of the hierarchy is re-using waste. Re-using goods removes them from the waste stream. The item/s are used for a similar, or a different purpose, in its original form i.e. without transformation of the product.
- The third step in the waste hierarchy is recycling. The Waste Act defines recycling as: "*a process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material*" (RSA, 2009; 16). Items are separated from the waste stream and manufactured into a new product.
- The fourth step, recovery, involves reclaiming components or materials from the waste stream for re-use or recycling. Recovery may involve using waste as fuel or energy recovery.
- The final and least desirable step in the hierarchy is disposal. Treatment, the process of changing the physical and/or chemical properties of a waste product, or

incineration may be necessary to ensure that waste is disposed of in a controlled and safe manner.

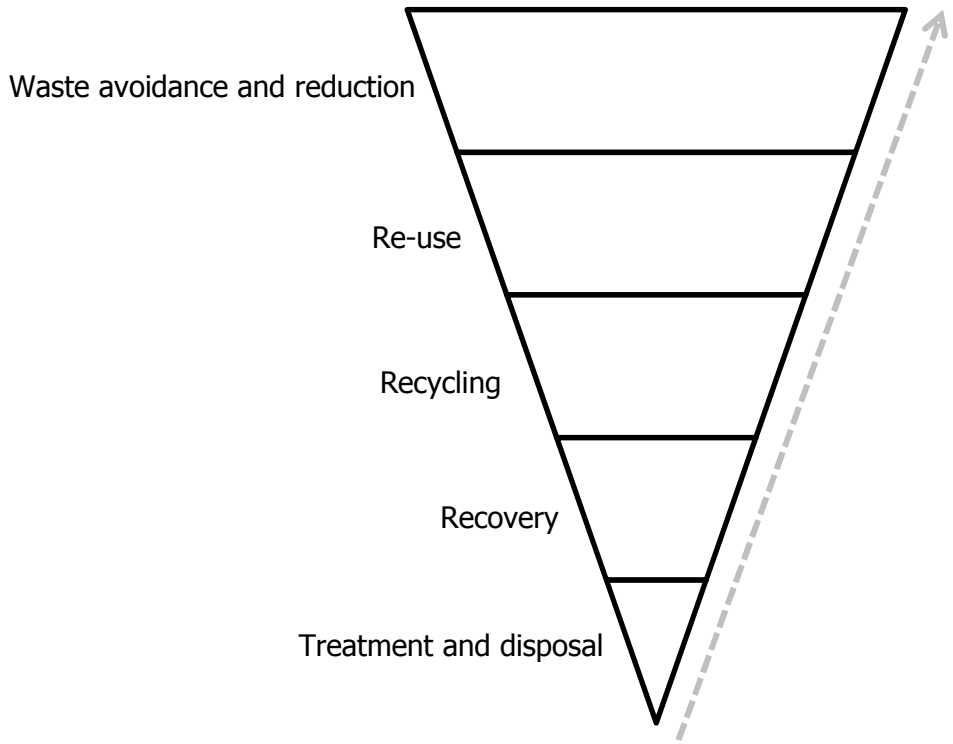

Figure 3.1 Waste management hierarchy (adapted from DEA, 2011)

The purpose of implementing the waste management hierarchy is to use waste as a resource and divert these potential resources from landfill. The first three steps in the waste hierarchy are the foundation of cradle-to-cradle waste management (Perry-Davies, 2012; DEA, 2011). The cradle-to-cradle approach considers the entire life cycle of a product and seeks to re-use or recycle a product when it reaches end-of-life. In this way, it becomes inputs for new products and materials. The goal is to shift from landfilling waste to using it as a resource, promoting sustainability with regards to waste management (Perry-Davies, 2012; DEA, 2011). The cradle-to-cradle approach needs to be considered as part of an extended producer responsibility (Perry-Davies, 2012; DEA, 2011).

3.3 The environmental importance of waste management and recycling

Effective solid waste management systems can contribute to improving public health by reducing opportunities for disease spreading vermin to thrive and enhanced environmental quality by protecting watercourses, ground water and preventing illegal dumping and littering (National Treasury, 2011). Well-designed solid waste management systems support

both higher levels of economic activity and can contribute directly to poverty alleviation through job creation (National Treasury, 2011).

When managed incorrectly, waste has a number of direct and indirect impacts on the environment, primarily negative effects (Table 3.1). The lack of planning, poor service delivery, inadequate waste site operation, human indifference, lack of environmental consciousness by industry and by limited enforcement of statutory regulations further exasperate these impacts (Fiehn and Ball, 2005). Negative impacts on the environment that may result from incorrect waste management include (Fiehn and Ball, 2005):

- The potential release of leachate may contaminate water courses and ground water in the vicinity of the waste disposal site.
- Emissions and releases of contaminants into the air such as volatile organic carbons for example, dioxins and furans which could be harmful to health and greenhouse gas emissions for example, methane and carbon dioxide which contribute to global climate change.
- Waste is malodorous and can become a nuisance factor.
- Decaying of waste attracts vermin and harbours vectors and the pathogens, diseases and viruses found in waste can pose a health risk.
- Safety risks are found in hazardous waste or health care waste if an individual comes into contact with, or is exposed to, these wastes.
- Ecosystems and biomes can change and even sterilisation of land can occur when large volumes of waste are disposed of on the land.
- The disposal of waste, both formally and informally, alters the natural topography of land.

Conversely, where waste is managed correctly, social and environmental benefits can be derived from the waste stream (Fiehn and Ball, 2005). The reclamation, recycling and reuse of waste can create jobs and increase income in the poorer sector of the population, primarily through scavenging for recyclable materials. Recycling reduces the use of virgin material and leads to the saving of resources. Waste materials themselves can be used as an input raw material, or a resource for example tyres and other wastes are used to fuel cement kilns (Fiehn and Ball, 2005).

Table 3.1 Environmental impact of waste management options (EU, 2001)

Waste management option	Main environmental impact
Landfill	• Methane emissions from biodegradable waste, contributing to global warming and local hazards such as the risk of fires and explosions • Risks of water pollution from leachate formed as waste decomposes • Non-sustainable use of resources i.e. land use • Noise and odour • Some carbon compounds may be retained in the landfill for long periods (sequestered) and not returned to the atmosphere as CO_2
Incineration	• Emissions of harmful airborne pollutants such as NO_x , SO_2 , HCl, fine particulates and dioxin • Emissions of CO_2 from fossil-derived waste for example, plastics and N_2O contributing to global warming • Energy recovered can replace fossil fuels thus avoiding emissions of CO_2 • Fly ash and residues from air pollution control systems require stabilisation and disposal as hazardous waste • Bottom ash may be reused as a secondary aggregate i.e. metals may be recovered for recycling from bottom ash
Recycling	• Saves energy (generally less energy is required to manufacture products from recycled materials) and hence emissions of greenhouse gases and other pollutants • Prolongs reserves of finite resources for example, metal ores and thereby contributes to the sustainable use of resources • Avoids impacts associated with extraction of virgin materials for example, quarrying of ores and sand
Composting	• Avoids methane production from degradation of organic waste in landfills (as degradation is aerobic) • Compost can be used as a soil improver and can replace fertilisers and peat to some extent • Potential for carbon sequestration through increasing the store of soil organic matter • Improvements in soil fertility and soil organic matter content leading to possible downstream benefits from reduced need for inorganic fertilisers, reduced need for irrigation and lower soil erosion rates. • Needs careful control of the composting process to avoid bioaerosol

3.3.1 The environmental impacts of landfill

There are several environmental impacts associated with landfills. Impacts can be short and/or long-term, short-term impacts include nuisance problems such as noise, pests, odours, air pollution from dust and litter and long-term impacts include pollution of ground and surface water with leachate and uncontrolled landfill gas generation, for example landfill sites generate methane that contributes to greenhouse gas emissions (Table 3.1) (Bosman, 2009; Makgae, 2011).

The production of leachate is one of the most significant hazards associated with landfills and can cause severe long-term groundwater and surface water pollution. Waste buried in landfill comes into contact with water percolating down from the surface (rain) or with groundwater moving laterally through the refuse, this contact with water produces leachate (Bosman, 2009). Leachate is a noxious, mineralised liquid with high organic content capable of transporting bacterial pollutants (Bosman, 2009; Botkin and Keller, 2010). Approximately 10 to 20% of carbon in waste going to landfills is incorporated into dissolved organic matter in leachate (EU, 2001).

Furthermore, landfill disposal of waste can result in the production of atmospheric emissions such as volatile compounds, acid gases, dust and biogas. Decaying wastes use up the oxygen entrained within the waste mass, creating anaerobic conditions (Bosman, 2009). Biogas is the natural product of anaerobic decomposition of biodegradable refuse, and typically contains approximately 50% methane with the complement predominantly carbon dioxide (Bosman, 2009; EU, 2001). In sites with no gas control, the gas migrates to the surface of the landfill site, is released and in some cases can result in an explosion (Bosman, 2009; EU, 2001). In sites with gas control, a low permeability cover prevents gas release and a system of wells and pumps is used to extract the gas (EU, 2001). The collected methane, which makes up approximately 40 to 65% of the collected gas by volume, is either flared or combusted for energy recovery (EU, 2001).

3.3.2 Environmental impacts of recycling

The objectives of recycling are to save resources, and reduce the environmental impact of waste by reducing the amount of waste disposed at landfills (Table 3.1) (DEAT, 2005c; Magram, 2011). The environmental benefits of recycling are many; materials collected for recycling are refined and processed in their original production, re-processing usually consumes less energy and emissions of greenhouse gases and other pollutants are reduced; re-processing prolongs the reserves of finite resources used in the original production of the material and avoids the further extraction of virgin materials (EU, 2001; DEAT, 2000b); and habitat damage, pollution and waste associated with the extraction of raw materials is therefore reduced (Magram, 2011). Furthermore, recycling can reduce the problem of litter; informal sector initiatives that have developed in the urban centres to collect recyclable materials for example, paper, plastic, cans and glass have impacted positively on the litter problem in these areas (DEAT, 2000b). These types of initiatives and the general

participation in recycling helps to raise awareness of the environment, increasing awareness and responsibility towards waste production (Bryne, 2001; Magram, 2011). Job creation is a key social-economic benefit of recycling, particularly in developing countries. The informal and small business sector play an important role in job creation in this regard and the informal recovery of waste materials associated with this sector provides a livelihood for marginalised individuals (DEAT, 2000b).

The key disadvantages of recycling are economic (Bryne, 2001). In terms of profitability, recycling, in some cases is not able to compete as a method of waste disposal. In such cases, the cost of recovery and transport of the recyclable material may outweigh the value of the material and there is no profit in the recycling of that material and sponsorship may be required to support the recycling of such materials. Recycled materials have to compete with virgin raw materials that are established in the market and available on demand, whereas the production of recycled material is determined by the production of waste, and the supply of recycled products cannot respond directly to changes in demand (Bryne, 2001). There are difficulties in comparing the costs of virgin and recycled materials as the environmental cost of not recycling is difficult to estimate (Bryne, 2001).

3.3.3 Environmental impacts of incineration

During the combustion of waste, the waste is burnt in the presence of air so that organic carbon is oxidised to carbon dioxide, which, along with water vapour and trace products of combustion (oxides of sulphur, nitrogen and other gaseous pollutants), are discharged into the atmosphere (Bosman, 2009; EU, 2001). The main environmental impacts as a result of air pollution are; acid deposition i.e. acid rain, smog, stratrospheric ozone depletion and global climate changes (Bosman, 2009). Water resources are the ultimate receivers of air pollution, particles come down as atmospheric outfall that pollutes soils and ultimately water resources (Bosman, 2009). Non-gaseous pollutants produced during incineration include fly ash and unburned solid residues (Bosman, 2009) which may represent between 20 to 30% of the mass of waste consumed (EU, 2001).

Some incinerators recover energy in the form of steam, which is used to drive turbines for electricity generation, whilst others may provide steam or hot water for process or community heating schemes and electricity in combined heat and power applications (EU, 2001). A drawback of incineration when used to generate energy is that it potentially

creates a demand for waste which detracts from recycling and waste minimisation (Harris, 2004).

3.3.4 Environmental impact of composting

The benefits of composting include the recovery of materials for beneficial reuse, the control of the biological stabilisation to assure proper and complete decomposition, and the finished materials can be used for erosion control and land reclamation (Curzio *et al*, 1994). When compared to landfill, the benefits of composting include the removal or reduction of groundwater contamination and the control of leachate and surface water runoff from the composting site (Curzio *et al*, 1994). The key environmental impact associated with composting are the loss of typically 60% of the initial mass of the material, which is released and carbon dioxide and water during the composting process (EU, 2001). Composting plant debris previously treated with herbicides may produce contaminated compost (Botkin and Keller, 2010).

3.4 Current waste management practices

3.4.1 Developed Nations

Waste management in developed countries is characterised by four major trends; increasing use of sophisticated technology, emphasis on waste minimisation and recycling, greater responsibility and participation of householders in the waste management process and stringent legislation on all aspects of the waste management process (Water Research Commission, 1996). The increasing sophistication of waste management reflects a high level of basic service provision and generally households in developed countries enjoy a regular and efficient domestic waste collection service (Water Research Commission, 1996).

Landfill reduction is one of the primary aims of solid waste policies however landfilling remains the most important waste management option for Organisation for Economic Co-operation and Development (OECD) countries (OECD, 2011).. Environmental policies are predominantly orientated towards reduction in the amount of municipal solid waste and the promotion of other forms of waste disposal such as incinerations and recycling and upstream prevention (OECD, 2011). There is usually a combination of command and control instruments, aimed at regulating specific aspects of waste disposal. This includes bans on landfilling of specific materials, technical requirements for the construction of landfill sites and incineration plants, specific limits on the heavy metal contained in plastic and paper

packaging, etc. Furthermore, many countries have shifted the responsibility from the consumer to the producer as is the case with plastic and paper packaging. Often legislation imposes specific performance targets for example, share of waste to be recycled (OECD, 2011). The motivation for policy efforts which encourage diversion is due in part to the negative environmental impacts of landfilling. While landfill activities remain the most common means of waste disposal, and in many cases continued landfilling is economically justified, it is not necessarily the most efficient strategy of certain waste streams where it remains the dominant practice (OECD, 2011).

3.4.2 Developing Nations

Solid waste management is one of the most challenging issues faced by developing countries. The generation of large quantities of waste, yet deficient waste management services results in public health and pollution issues (Al-Khatib, 2010; Ejaz *et al*, 2011; Coffey and Coad; Marshall and Farahbakhsh, 2013). Matters that contribute to the problem include (Coffey and Coad, 2010; Ejaz *et al*, 2011; Guerrero 2013):

- rapid urbanisation and urban population growth,
- increasing per capita generation of solid waste,
- the lack of land conveniently situated for waste disposal,
- the lack of understanding of waste management life cycle,
- the physical composition and density of the waste, and
- insufficient treatment capacity,

These difficulties, coupled with limited financial and human resources and the high costs associated with waste management, result in problems with waste management for the authorities in developing countries (Ejaz *et al*, 2011). Most developing countries are not able to provide proper facilities for collection and disposal of solid waste to the whole population (Ejaz *et al*, 2011), and the service is commonly irregular and efficiency and productivity are low (Coffey and Coad, 2010). It is not uncommon to find that less than one third of the wastes generated in urban areas are collected by the municipal authorities entrusted with their disposal (Coffey and Coad, 2010). In the absence of a regular solid waste collection service, waste is dumped inappropriately and informal dumps are invaded by waste pickers, and serve as breeding grounds for disease vectors (Coffey and Coad, 2010). The presence of waste pickers is a feature of refuse disposal in many developing countries as they rely on the refuse dumps for food, a livelihood and shelter, though some waste pickers may scavenge nearer to the source for example, from city street and alleys. Scavenging can be

combined with small scale contracting for refuse removal for example, the 'scavenger' is given the responsibility to collect recyclables from a residential area that is picked up from a central point by another waste contractor or the municipality (Blight and Mbande, 1998).

Fourie (2004) attributes the lack of political will and poorly executed legislation as key causes for the poor quality of municipal solid waste management service in developing countries. Many developing countries have world-class environmental legislation, on par with, if not more refined and visionary than that of developed countries. However, the lack skilled government personnel result in poor interpretation and enforcement of the legislation. Lack of enforcement of the legislation further places unfair responsibility and pressure on municipal officers (Fourie, 2004).

Ball (2006) sums up waste management practices in developing countries with a description of the seven characteristics of waste management in developing countries:

1. Priority standing: Society lives by a hierarchy of needs, basic needs include water, food and shelter. Waste management is seldom a priority and is usually relegated to a relatively low priority with regards to the attention it receives.
2. Political will: Given the priority standing and general poverty common in developing countries, there is generally very little political will to initiate improvements in waste management.
3. Lack of resources: Developing countries are characterised by a general lack of resources for example, staff, knowledge, funds dedicated to developing and executing waste management services.
4. Local factors: Local culture and politics are significant in determining the attitude towards waste management; unfortunately the absence of altruism and presence of corruption are often major factors in the politics of developing countries.
5. Systems and information: The lack of reliable system in place in developing countries means that there is a general lack of relevant or reliable information and statistics.
6. Unacceptable waste management practices: These factors result in the objectives of waste management not being achieved and consequent adverse effects on the environment, quality of life and public health.
7. Donor funding: In response to the poor waste management practices in developing countries and the adverse effects thereof, developed countries have in some cases provided donor funding which is used to improve poor practice and contribute significantly to addressing the associated problems. This can result in developed

country approaches to waste management being inappropriately applied in developing countries and waste management objectives are often not achieved.

3.4.3 South Africa

Municipal solid waste management constitutes one of the most crucial health and environmental problems facing the South African government (Muzenda, 2011). Key issues include; the lack of available or current waste information from all sectors, illegal dumping and dump sites, salvaging at waste disposal facilities, use of unpermitted landfills by municipalities, limited environmentally accepted landfill airspace, large portions of the population not receiving a weekly or adequate waste collection service, recycling not generally undertaken or encouraged by municipalities, waste minimisation which is almost exclusively industry driven, government departments' lack of waste databases, lack of regulation and enforcement of legislation and limited waste related legislation (Fiehn and Ball, 2005). Core urban areas have relatively good access to refuse removal services while peri-urban and rural areas have limited access to formal services (Muzenda, 2011). In response to these difficulties, the National Waste Management Strategy (NWMS) emphasises the need for integrated waste management, the White Paper on Integrated Pollution and Waste Management and the recently promulgated Waste Act address many of these issues (Nahmana and Godfrey, 2010). The Local Government Municipal Systems Act (No. 32, 2000) was enacted to address the imbalances in service delivery (Matete and Trois, 2007). The Act requires that municipalities strive to ensure that services are provided to local communities in a financially and environmentally sustainable manner, and that local communities have equitable access to such service (Matete and Trois, 2007). The Municipal Systems Act allocates responsibility for managing all processes involved in the solid waste management function to the local municipality i.e. general area cleansing, waste minimisation, waste collection, waste transportation, waste disposal site and planning (DEAT, 2007). However, 87% of municipalities reported a lack of capacity and infrastructure in pursuing waste minimisation (DEAT, 2007).

Waste infrastructure in South Africa includes landfill sites, waste storage facilities, recycling facilities, materials recovery facilities and waste transfer facilities (Muzenda, 2011). South Africa has a well-established recycling industry and recyclable materials are collected by organised scavenging, public drop-off centres and buy-back centres (Matete and Trois, 2007). Scavenging takes place on landfill sites, kerbside reclamation or transfer stations and

is sold at the buy-back centres. Drop-off centres are operated by municipalities and used by the general public (Matete and Trois, 2007). Most of the formal recycling in South Africa is conducted by the packaging industry and the collection of recyclable materials occurs predominantly through private entrepreneurs and agents for the different recycling companies (Matete and Trois, 2007). The focus to date has been on pre-consumer recovery and recycling from business and industry (Oelofse and Strydom, 2010). With a very young pro-environmental consciousness in South Africa, limited post-consumer separation at source and recycling has occurred. Any post-consumer recovery which has taken place has predominantly been supported by a large informal recycling sector which is dependent upon the income stream associated with informal collection (Oelofse and Strydom, 2010).

General landfills sites accept domestic waste, commercial and industrial non-hazardous wastes, building waste and garden waste. These sites are more often owned and operated by the local authority, yet are not licenced in accordance with application waste legislation (Fiehn and Ball, 2005). A major challenge facing municipalities is the lack of waste management capacity and funding to undertake the required waste management activities (Purnell, 2009). Many larger industries have developed their own hazardous landfill sites (H:H – high hazard sites; H:h – low hazard sites) and other industries have to make use of limited private hazardous waste disposal sites (H:H and H:h) operated by private companies (Fiehn and Ball, 2005). South Africa has over 2 000 waste handling facilities, of which only 530 are licensed in terms of legislation (DEAT, 2007).

Historically, due to the lack of capacity and funds, many of the landfills do not have records of incoming waste (Fiehn and Ball, 2005). During 2006, The Department of Environmental Affairs and Tourism (DEAT; presently known as The Department of Environmental Affairs or DEA) developed and implemented the South African Waste Information System (SAWIS) as part of the National Waste Management Strategy Implementation (NWMSI) project. DEA requires certain public and private waste organisations to report to SAWIS on the monthly tonnages of waste that they landfill, treat, and reprocess (Godfrey *et al*, 2012). The national waste baseline report conducted during 2011, found that South Africa generated approximately 108 million tonnes of waste during 2011 of which 97 million tonnes was disposed of at landfill, only 10% of all waste generated was recycled (Figure 3.2) of the 108 million tonnes, approximately 59 million tonnes was general waste and 49 million tonnes was unclassified and hazardous waste. The report concluded that waste management in South Africa is heavily reliant on landfilling as a waste management option (DEA 2012).

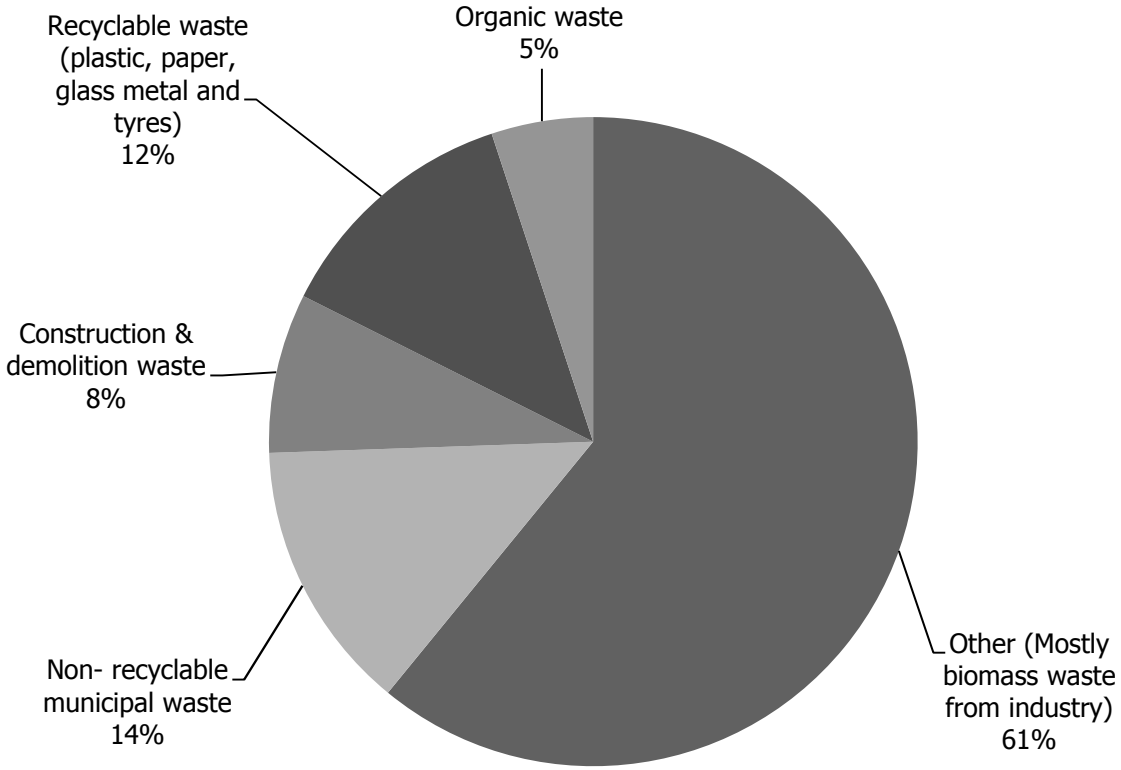

Figure 3.2 General waste generated in South Africa, 2011 (DEA, 2012)

3.4.4 Waste generation in South African business

South Africa's growing population and economy have resulted in increased volumes of waste. Population growth has escalated domestic waste generation and economic growth has led to increased industrial, hazardous and radioactive waste volumes whilst urbanisation and industrialisation have increased the complexity of the waste stream. The complexity of the waste stream directly affects the complexity of its management which is compounded when hazardous waste mixes with general waste (Freemantle 2008; Purnell 2009; NWMS, 2011; DEA 2011; National Treasury 2011b).

Approximately 24,1 million tons per year of general and business waste was generated and disposed of in 2006/7 (Makgae, 2011). Business and commercial waste from offices, stores, and schools consists mainly of consumer goods, defective products packaging materials;

glass, metal cans, paper (packaging and print) and plastic packaging (Table 3.2) (CSIR, 2005; Purnell, 2009). Despite this high portion of recyclable waste, the majority of domestic residential and commercial, business and industrial waste from urban areas is disposed to landfill sites that are owned and operated by local authorities (Purnell, 2009; Makgae, 2011). A significant portion of business waste however, is collected by private contractors (Purnell, 2009). An additional 710 000 tons of hazardous waste from business and commerce was disposed of in 2007 (Purnell, 2009) which is a key environmental challenge that needs to be addressed (Makgae, 2011).

The national waste baseline report conducted during 2011, found that South Africa generated approximately 12 111 267 tonnes of industrial and commercial general waste. Approximately 77% of this volume was recycled and the rest was disposed of in landfill sites (DEA, 2012) suggesting that recycling has increased significantly since 2006/7.

Table 3.2 Business waste generation (extracted from Purnell 2009)

Business type	**Type of waste**	**Volume of waste generated (kg/employee/day)**
Suburban business centre / office park	Old office material Packaging Furniture Electronic Food Street sweepings/litter	0.8 to 1.7
Central business area / office buildings and towers	Old office material Packaging Furniture Electronic Food Street sweepings/litter	0.7 to 2.0
Industrial: • Light • Heavy • Services / garages • Chemical and allied	Packaging/crates Used chemicals Old lubricants Used spares Old tyres Old office material	0.5 to 3.0

In terms of the domestic and business waste stream, the area of greatest focus of waste minimisation has been recycling (Purnell, 2009). However, the South African NWMS states that industry is expected to proactively take responsibility for waste generated throughout the life cycle of a product. Legislative mechanisms to support this include industry waste

management plans and extended producer responsibility programmes. Industry must institute cleaner technology practices to help minimise waste and have accessible take-back facilities for particular products or waste streams (DEA, 2011).

In the face of stringent waste legislation, business need to lead the way in reducing, re-using, recycling and disposing of waste responsibly (Worthington-Smith, 2009). Benefits of waste management in business include reputational gains from being perceived as an environmentally responsible business and reduced operating costs by treating 'waste' as an intrinsic part of operations, rather than a by-product. Business may support micro-enterprise and local economic initiatives through waste recovery and recycling projects (Freemantle 2008; Worthington-Smith, 2009). Business that do not practice waste management risk reputational damage, higher operational overheads as the cost of waste disposal increases and non-compliance with waste legislation and the associated penalties (Bryne, 2001; Freemantle 2008; Worthington-Smith, 2009).

3.5 South African waste legislation, an overview

Environmental legislation, in particular pollution and waste legislation, is relatively young in South Africa, with the majority of environmental legislation having only been passed since 1998 (Oelofse and Strydom, 2010) and has historically been fragmented and to some extent, still is fragmented (DEA, 2011c). However, South Africa has made great strides in addressing key issues, requirements and problems experienced in waste management. A significant stride was the coming into effect of the National Environmental Management: Waste Act (Act No. 59 of 2008) on 1 July 2010 (DEA, 2011c; Perry-Davies, 2012).

The Constitution of the Republic of South Africa (Act 108 of 1996) for the first time defined the right of South Africans to a clean and healthy environment and promotes sustainable development (Perry-Davies, 2012). The Constitution is the foundation of the system of environmental regulation and policy, and creates a human rights foundation for society and government (DEAT, 2009). The Environment Conservation Act (ECA), Act 73 of 1989, provides for the protection and control of the environment. Section 20 of the Act was the first attempt to control and regulate waste management in South Africa. Following the enactment of The National Environmental Management Act, No. 107 of 1998 (NEMA) and The National Environmental Management: Waste Act, No. 59 of 2008 (Waste Act), a number

of provisions of the ECA have either been repealed or reassigned to the provinces (Engledow, 2010; Kidd, 2011).

The publication by the South African Government of the White Paper on Integrated Pollution and Waste Management (IPandWM), 17 March 2000, heralded a new approach to waste management, with a shift towards a holistic integrated approach (DEA, 2005c). The IPandWM set the principles that underpin the National Waste Management Strategy (NWMS) translating the IPandWM policy principles into high level strategic plans and actions (DEAT, 1999b). Waste management in South Africa is based on the principles of the IPandWM and the NWMS and the subsequent enhancement of the Waste Act (SAIWC, nd).

3.5.1 The Constitution of the Republic of South Africa (No. 108 of 1996)

Section 24 of Chapter 2 (The Bill of Rights the Constitution) provides that everyone has the right to:

(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that- -

  (i) prevent pollution and ecological degradation;

  (ii) promote conservation; and

  (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Through the inclusion of the environmental right into the Constitution, environmental law found firm entrancement into the South Africa legal system with a sound basis and constitutional mandate for further development and improvement (Van der Linde and Feris, 2010). Hence, a number of significant policy and legislative steps have been taken to give effect to these environmental rights. In relation to waste management, they include:

- the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- the 1997 White Paper on Environmental Management, which first defined a hierarchy of waste management practices that remains a key principle of our waste management policy;
- the White Paper on Integrated Pollution and Waste Management (1998); and

- the promulgation of the National Environmental Management Act (NEMA) (1998), which established the principles that govern all environmental management activities (DEAT, 2009a).

3.5.2 Environmental Conservation Act (No. 73 of 1989) (ECA)

The Environmental Conservation Act (ECA) was the main legislation regulating waste in South Africa until the provisions in this Act were repealed by the Waste Act in 2009. Provisions in the ECA important to waste management were (Bosman, 2009; Engledow, 2010; Kidd, 2011):

- section 20 dealt with the permitting and operation of disposal sites,
- section 24 empowered the Minister to make regulations with regards to waste management. A brief set of regulations was promulgated dealing with the application for a disposal site permit and the Minister published directions with regards to the control of general communal and small waste disposal sites, and
- section 19 prohibits littering.

During the reign of the ECA, the Minister the Department of Water Affairs and Forestry was the controlling authority of disposal sites (this responsibility was subsequently transferred to the Minister of Environmental Affairs and Tourism). The Department of Water Affairs and Forestry published Minimum Requirement Guideline Documents to guide authorities for the issuing of permits for disposal, hazardous waste management and monitoring requirements (Engledow, 2010; Kidd, 2011).

3.5.3 National Environmental Management Act (No. 107 of 1998)

The National Environmental Management Act (NEMA) creates the fundamental legal framework that gives effect to the environmental right guaranteed in Section 24 of the Constitution. The Act repeals the greater part of the ECA and sets out the fundamental principles that apply to environmental governance and decision making (Van der Linde and Feris, 2010). Several sector-specific National Environmental Management Acts have been promulgated under the overarching NEMA. The point of departure of NEMA is a set of National Environmental Management Principles that inform any subsequent environmental legislation, implementation of that legislation and formulation and implementation of environmental management plans at all levels of government (Perry-Davies, 2012).

NEMA introduced a number of additional guiding principles into South African environmental legislation, including the life-cycle approach to waste management, producer responsibility, the precautionary principle and the polluter pays principle (DEA 2011; Kidd, 2011). NEMA places a duty of care on any persons who may cause significant pollution or degradation of the environment, requiring them to institute measures to either prevent pollution from occurring, or to minimise and rectify the pollution or degradation where it cannot reasonably be avoided. (DEA 2011; Kidd, 2011). Chapter five of NEMA provides instruments for integrated waste management. (DEA 2011). The NEMA Waste Act echoes the duty of care provision by obliging holders of waste to take reasonable measures to implement the waste management hierarchy (Dittke, 2010; DEA 2011).

3.5.4 White Paper on Integrated Pollution and Waste Management for South Africa, 17 March 2000 (IPandWM)

During 2000, the Department of Water Affairs and Forestry produced the White Paper on Integrated Pollution and Waste Management (IPandWM) for South Africa (Kidd, 2008). The IPandWM sets out the vision, principles, strategic goals and objectives that government will use for integrated pollution and waste management in South Africa (Wiechers, 2010).The IPandWM heralded a transformation in South African waste management, from dealing with waste after it is generated towards pollution prevention, waste minimisation, cross-media integration, institutional integration of department and spheres of government and involvement of all sectors of society in pollution and waste management (Kidd, 2011).

3.5.5 The National Waste Management Strategy (NWMS)

The overall purpose of the National Waste Management Strategy (NWMS) is to give effect to the objects of the Waste Act, which are to protect health, well-being and the environment through sound waste management and application of the waste management hierarchy. The NWMS focuses on measures to avoid or minimise the generation of waste, and where waste cannot be avoided or reduced, measures to ensure that it is re-used, recycled or recovered, and only treated and safely disposed of as a last resort (DEAT 2009). The strategy provides a plan to provide practical effect to the Waste Act, and as such seeks to ensure that responsibility for waste management is properly apportioned (DEA, 2011; Wiechers, 2010, Cobbinah, 2010).

The strategy for waste minimisation emphasises the need for industry cooperation at the product and process design phase, which will be undertaken in conjunction with the Department of Trade and Industry. This will be complemented by a shift towards full cost accounting for waste disposal to ensure that disposal services are priced correctly to encourage waste minimisation. Expansion of recovery, reuse and recycling will build on existing recycling activities through the establishment of norms and standards; encouragement of industry led initiatives (tying into industry waste management plans); stimulation of the recycling sector; source-separation of waste materials; and target setting (Peter and Swilling, 2010; Wiechers, 2010)

The eight strategic goals around which the NWMS (DEA, 2011) is structured are as follows:

Goal 1: Promote waste minimisation, re-use, recycling and recovery of waste.

Goal 2: Ensure the effective and efficient delivery of waste services

Goal 3: Grow the contribution of the waste sector to the green economy economy.

Goal 4: Ensure that people are aware of the impact of waste on their health, wellbeing and the environment.

Goal 5: Achieve integrated waste management planning.

Goal 6: Ensure sound budgeting and financial management for waste services.

Goal 7: Provide measures to remediate contaminated land.

Goal 8: Establish effective compliance with and enforcement of the Waste Act.

3.5.6 The National Environmental Management: Waste Act (No. 59 of 2008) (Waste Act)

The National Environmental Management: Waste Act (Waste Act) regulates waste management to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. It provides for institutional arrangements and planning matters; national norms and standards for regulating the management of waste, and specific waste management measures. It provides for the licencing and control of waste management activities and the remediation of contaminated land and a national waste information system. It also deals with the issue of compliance and enforcement (Van der Linde and Feris, 2010).

The Waste Act is the primary law in South Africa that regulates waste management. The Act addresses the previous fragmentation of waste legislation providing a coherent and integrated legislative framework addressing all the steps in the waste management hierarchy (DEA, 2011; DEA, 2011b; Perry-Davies, 2012). The objectives of the Act include minimising the consumption of natural resources, avoiding and minimising the generation of waste and reducing, re-using, recycling and recovering of waste; and promoting and ensuring the effective delivery of waste services (DEA, 2011b). The Act provides tools to implement the waste hierarchy through integrated waste management planning, providing for the development of integrated industry waste management plans, the identification of priority waste, waste licencing and the development of regulations to manage specific waste streams. Managing waste in line with the waste hierarchy has the potential to provide jobs as recycling requires infrastructure and opens new markets (National Treasury, 2012).

The Waste Act requires the development of the National Waste Management Strategy and the establishment of national norms and standards for waste classification and management. The Act further requires the development of Integrated Waste Management Plans at national, provincial and local government level and waste management plans from the private sector. The Act introduces extended producer responsibility, whereby manufacturers can be held responsible for post-consumer impacts of their products; impact assessment and licensing procedures for waste management activities; identification, liabilities and remediation of contaminated land; and the establishment of a National Waste Information System to collate data on waste generation and management (Bosman 2009; Peter and Swilling, 2010).

3.5.7 National Environmental Management: Waste Act 2008 (Act 59 of 2008) and Extended Producer Responsibility (EPR)

The Waste Act establishes Extended Producer Responsibility (EPR) as a regulatory mechanism for bringing about waste reduction in South Africa, through the minimisation, reuse and recycling of waste products (DEA, 2010; DEAT, 2009). EPR applies to instances in which the nature of the waste from products is of sufficient threat to require producers to take responsibility for aspects of a products management beyond the point of sale (DEA, 2010).

> The Waste Act defines 'extended producer responsibility measures' as:
> *Measures that extend a person's financial or physical responsibility for a product to the post-consumer stage of the product, and includes –*
> *(a) waste minimisation programmes;*
> *(b) financial arrangements for any fund that has been established to promote the reduction, reuse, recycling and recovery of waste;*
> *(c) awareness programmes to inform the public of the impacts of waste emanating from the product on health and the environment; and*
> *(d) any other measures to reduce the potential impact of the product on health and the environment.*

EPR aims to keep consumer products and materials out of the waste stream and to reduce their environmental impact. Manufacturers can play a role beyond the point of sale or warranty by, for example, designing products that produce less waste, use fewer resources, and contain more recycled and less toxic components (DEAT 2009b). The Waste Act provides for the declaration of mandatory EPR schemes whereby the Minister prescribes how a waste stream should be managed and the required funding mechanism to do so. Mandatory EPR schemes can be declared when voluntary schemes provided for by Integrated Waste Management Plans have failed to effectively manage a waste stream (DEA 2011).

3.5.7.1 The Waste Act and business

The Waste Act prescribes a general duty of care in respect of waste management. A company must take reasonable measures within its power to avoid the generation of waste or minimise the toxicity and amounts of waste unavoidably generated (Cross, 2010). The Waste Act further criminalises non-compliance with a number of its provisions whereby if provisions are contravened, penalties and imprisonment may be imposed. Examples of provisions include failure to apply for a waste management licence and failure to submit site assessment reports (Cross, 2010). The Waste Act contains provisions for both voluntary and mandatory industry waste management plans. Industry waste management plans have been identified as the central instrument of a co-regulatory waste management system (DEAT, 2009c; Dittke, 2010). The following industries have been identified by DEA to prepare

mandatory Industry Waste Management Plan in consultation with the Department (DEA, 2011):

- Tyre industry for waste tyres,
- Paper and packaging for packaging and paper waste,
- Lighting industry for mercury containing lamps for example, CFL light bulbs, and
- Pesticide industry for residual pesticides and pesticide containers.

Where industries have not voluntarily developed plans, the Minister may require certain industries to produce industry waste management plans (DEAT, 2009c).

The Waste Act further requires all waste producers to implement integrated waste management solutions into their operations (Worthington-Smith, 2009). The commencement, undertaking or conducting of any waste management activity is prohibited unless in accordance with the prescribed requirements of a waste management licence (Cross, 2010). Where waste poses a threat to the health, wellbeing or the environment because of its quantity or composition, it must be declared as a priority waste. The generation of priority wastes may be prohibited, and/or measures for the management, storage, reuse, recycling, treatment and/or disposal of priority waste must be taken (Cross, 2010). Companies dealing with the storage, collection and transportation of waste will have to adhere to certain provisions. For example, a duty is imposed on persons transporting waste to take reasonable measures to prevent any waste spillage or littering from the vehicle transporting waste (Cross, 2010).

3.5.8 National Environmental Management: Waste Act 2008 (Act 59 of 2008) National Waste Information Regulations

The Waste Act requires the establishment of a national waste information system for the recording, collection, management and analysis of data and information on waste management. The South African Waste Information System (SAWIS) was developed to support the reporting framework for the generators, recyclers, exporters and disposers of waste (DEA 2012b). Waste management facilities register and report waste management information to the SAWIS and the data gathered has been useful in informing waste management decisions for government and industry (DEA 2012; DEA, 2012b). Due to a lack of voluntary reporting, the National Waste Information Regulations took effect on 1 January 2013, enforcing the compulsory reporting of waste data and information to fulfil the objectives of the SAWIS as set out in section 61 of the Waste Act. Any person conducting

the identified activities, must be registered on the SAWIS, report waste management information on a quarterly basis, and keep a record of all the waste management information submitted for a period of at least five years (DEA, 2012b). The information collected by the SAWIS are presented in the National Waste Information Baseline Report; an estimate of waste generation, recycling, treatment and landfilling in South Africa (DEA, 2012).

3.5.9 The Consumer Protection Act (No. 68 of 2008) (CPA)

The primary purpose of the Consumer Protection Act is to protect consumers against exploitation and unfair practices by unscrupulous businesses, and to empower consumers to make wise purchasing decisions (DEAT 2009b). The CPA will have a substantial impact on all organisations dealing with consumers, especially in respect of contractual terms, potential liability, marketing practices, liability insurance, complaints handling, product labelling and display, product safety, loyalty schemes, pricing, sales records, pre-paid credits and waste disposal (DEAT 2009b). Section 59 of the Act stipulates that a supplier can be required to take back goods if legislation prohibits the disposal of goods into a common waste collection system. This could apply to packaging that has been contaminated by hazardous product residues or that has been used in an infectious environment (PACSA, 2011).

3.5.10 Polokwane Declaration

South Africa's first Waste Summit was held in Polokwane (Limpopo Province), 26 to 28 September 2001. The Summit was consultative process attended by Government, civil society and business. The Summit was held in recognition that waste management should be a priority for all South Africans and that there is an urgent need to reduce, reuse and recycle waste to protect the environment. The parties undertook to work together to meet the challenges of waste management and contribute to sustainable development (Wiechers *et al*, 2002). The outcome of the Summit was captured in the Polokwane Declaration, a political statement of intent, focusing the efforts of government, civil society and the business community to make a paradigm shift from their current positions (Wiechers *et al*, 2002; DEAT 2005c)

Participants of the Summit reaffirmed their commitment to the objectives of the IPandWM and the NWMS. The vision of the Summit was "To implement a waste management system which contributes to sustainable development and a measurable improvement in the quality

of life, by harnessing the energy and commitment of all South Africans for the effective reduction of waste" (The Polokwane Declaration, 2001:1). To meet this objective a goal – "To reduce waste generation and disposal by 50% and 25% respectively by 2012 and develop a plan for zero waste by 2022", was agreed by all the participants (The Polokwane Declaration, 2001:1; Wiechers *et al*, 2002; DEAT 2005c).

3.5.11 The National Cleaner Production Strategy (2004)

During 2004, The Department of Environmental Affairs and Tourisms Branch for Environmental Quality Protection embarked on developing a National Strategy for Cleaner Production and Sustainable Consumption. The strategy was prepared by DEAT through the implementation of the Johannesburg Plan of Implementation, with particular reference to the implementation of recommendations on sustainable consumption and production (DEAT, 2004). The implementation of the strategy resides with the Department of Trade and Industry, which has overseen the establishment of the National Cleaner Production Centre who will encourage the uptake of cleaner production technologies by industry. To minimise the generation of hazardous waste, substitution of non-hazardous materials into production and manufacturing processes will be promoted (DEA, 2010). The strategy has yet to be approved by Cabinet.

3.5.12 Other South African legislation

3.5.12.1 Legislation dealing with impacts on the environment

The Atmospheric Pollution Prevention Pollution Act of 1965 was replaced with The National Environmental Management: Air Quality Act (Act 39 of 2004). Both national and provisional legislatures are competent to enact legislation on air pollution and air pollution legislation is administered at a local level (Kidd, 2011). As a result of certain 'limitations' of the Act such as lack of capacity, DEA has had to rely on industry-generated emission values rather than independent monitoring (Kidd, 2011).

The National Water Act (No. 36 of 1998) was promulgated to provide for the fundamental reform of the law relating to water resources and is the primary legislation regulating pollution of water (Van der Linde and Feris, 2010; Kidd , 2008). The Act further provides for authorisation for the use of water, which includes disposal or discharge of waste into water resources, or in a manner that could affect water resources (Bosman, 2009).

3.5.12.2 Legislation dealing with the transport of waste products

Section 54 of the National Road Traffic Act (93 of 1996) regulates the transportation of dangerous goods (Bosman, 2009; Kidd, 2011).

3.5.12.3 Legislation dealing with the substances as waste sources and their impacts on human health

The Health Act (63 of 1977) provides for measures for the promotion of health, the rendering of health services and the duties, powers and responsibilities of certain authorities which render health services (Van der Linde and Feris, 2010). The Act has provisions which relate expressly to waste and others which relate to nuisance, of which solid waste would be an example (Kidd, 2011) and provides for local authorities to take measures to maintain hygienic and clean conditions in its district (Van der Linde and Feris, 2010).

The purpose of The Occupational Health and Safety Act (No. 85 of 1993) is to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of, or in connection with the activities of persons at work; and to establish an advisory council for occupational health and safety (Kidd, 2008). The act provides regulations for the control of hazardous chemical substances, regulates the removal and disposal of lead and asbestos, requires general administration on substances, including requirements for Materials Safety Data Sheets (Bosman, 2009; Van der Linde and Feris, 2010).

The Hazardous Substances Act (15 of 1973) regulates the control of disposal of substances which may cause injury, illness, or death to human beings (Bosman, 2009). The Act classifies hazardous substances into four groups, group I and II substances which may be toxic, corrosive or flammable, group III substances are electronic products and group IV substances consist of radioactive materials. The Hazardous Substances Act regulates the disposal of empty containers of group I hazardous substances (Kidd, 2011).

3.5.12.4 Legislation assigning responsibility for waste management

The Municipal Structures Act (117 of 1998) and The Municipal Structures Amendment Act (33 of 2000) stipulates that a municipality must ensure integrated, sustainable, and

equitable social and economic development through providing services and regulating, amongst other requirements (Bosman, 2009):

- domestic waste-water and sewage disposal systems;
- solid waste disposal sites in so far as it relates to the determination of a waste disposal strategy;
- the regulation of waste disposal and the establishment;
- operation and control of waste disposal sites;
- bulk waste transfer facilities; and
- waste disposal facilities.

3.5.13 International Obligations

South Africa is party to a number of multi-lateral environmental agreements (Van der Linde and Feris, 2010; DEA, 2010), some of which are relevant to waste and waste management:

- The Basal Convention, 1989 acceded to by South Africa in 1994. The Basal Convention regulates the international transport and disposal of hazardous and toxic waste (Van der Linde and Feris, 2010).
- The 1972 London Convention was acceded to by South Africa in 1978. This protocol regulates the use of the sea as a depository for waste materials (Van der Linde and Feris, 2010).
- The Rotterdam Convention (1998) was acceded to by South Africa in 2002. The Rotterdam Convention promotes and enforces transparency in the importation of hazardous chemicals and whilst it explicitly excludes waste, its implementation may lead to bans on listed chemicals. Extended producer responsibility schemes will be used to effectively manage obsolete chemicals (DEA, 2010).
- The Montreal Protocol Treaty (revised 1999) was acceded to by South Africa in 1990. This protocol protects the ozone layer by phasing out substances that contribute to ozone depletion (DEA, 2010).
- The Stockholm Convention (2001) was acceded to by South Africa in 2002. This convention aims to protect human health and the environment from the effects of persistent organic pollutants (Van der Linde and Feris, 2010).
- The New Mercury Convention. Negotiations on a global convention on mercury were initiated in Stockholm in June 2010 and will cover all mercury uses and emissions. It is anticipated that a legally binding treaty to control mercury pollution will be adopted (DEA, 2010).

3.6 Packaging waste, packaging legislation and the environment

The term packaging refers to materials which are used to contain, protect, handle, deliver and display goods i.e. empty glass bottles, used plastic containers, food wrappers and cans (Curzio *et al*, 1994; Davis and Song, 2006; Pongracz, 2007; OECD, 2011). A wide range of materials are used for packaging applications for example, metal, glass, wood, paper or pulp-based materials, plastics, ceramics, or a combination of more than one of these materials as an amalgamated product (Pongracz, 2007). These materials have several functions; the protection, transport and marketing of products and consumer goods (Curzio *et al*, 1994). Packaging can be divided into three categories; primary, secondary and tertiary packaging. Primary packaging creates sales units and is the packaging that the consumer needs to transport and protect the product. Secondary packaging is used to protect the product against theft or apply additional advertising for example, the cardboard boxes that hold tubes of toothpaste, or the packaging used to carry quantities of primary packaged goods. Tertiary packaging is bulk packaging which is exclusively used for protecting the product during transport for example, pallets and shrink warp (Brisson, 1993; Davis and Song, 2006; Pongracz, 2007). The most common types of material used for primary packaging are paper or pulp-based materials, glass, metals (for example, 85uropa85ng and steels) and plastics. Paper or pulp-based materials, ranging from wrapping paper, cartons boxes, disposable cups and plates, bags and envelopes to corrugate cardboard used both for primary and secondary packaging (Davis and Song, 2006).

Packaging has a relatively short lifetime, consequently, the amount of packaging waste approximately equals the amount of packaging in the market (Huang and Ma, 2004). Packaging waste arises from a wide range of sources for example, households, retail and manufacturing industries. Primary packaging waste is largely found in household waste which may contain elements of secondary packaging and the commercial sector produces a mix of secondary and transport packaging (Brisson, 1993). Secondary and tertiary packaging materials normally occur in larger quantities and have less material variation and thus are relatively easier to collect and sort by wholesalers or retailers for recycling or reuse purposes. Primary packaging materials are not only more dispersed into households, they are largely mixed, contaminated and often damaged and thus pose problems in recycling or reuse of the materials (Davis and Song, 2006).

Packaging waste is broadly classed as municipal solid waste that ultimately has to be collected and disposed of (OECD, 2011) and is a growing and important waste stream accounting for between 15% and 20% of the municipal solid waste in different countries (OECD, 2011). Perchard (1994) states higher figures estimating that accounts for between 25 and 30% of municipal solid waste. In Germany, during the 1990s, packaging accounted for 50% of the volume and 30% of the weight of municipal solid waste making it the largest source of municipal solid waste in Germany (Fishbein, 1994). In 2010, the total generation of waste from economic activities and households in the EU amounted to 2 570 million tonnes. Municipal waste constitutes approximately 10% of total waste generated and packaging waste generated was approximately 59 000 000 tonnes or 157 kg/capita (EUROSTAT, 2012). In 2010, the Americans generated approximately 250 million tons of municipal solid waste. Containers and packaging made up the largest portion of municipal solid waste approximately 76 million tons (30%) (EPA, 2010). Though a significant portion of municipal solid waste stream, packaging makes up an estimated mere 4% of total waste generated (Perchard, 1994) or an even smaller proportion in some countries for example, packaging waste is estimated to make up 1.5% of total waste generated in Belgium and 1.6% of total waste generated in the Netherlands (Bisson, 1994). In this respect, it may seem that much political attention has been given to a relatively minor environmental problem however packaging is more than a waste management problem (Bisson, 1994; Perchard, 1994).

The packaging industry is under international pressure to reduce the environmental impacts of its products. Public concerns regarding packaging and the environment have their roots in the 1960s and 1970s, when vocal parts of the environment movement began to express concern about the impact of modern consumption patterns on the environment. Environmental concerns regarding packaging have largely been attributed to waste and litter generation (Lewis, 2005). Litter is often equated with packaging, materials such as glass and plastic bottles, cans, paper cups, paper and plastic wrappings are the main constituents of litter. Litter is an unpleasant sight, constitutes a hazard to animals, and is a possible health hazard to humans. The effect of plastics litter on the marine environment is of particular concern (Pongracz, 20009). The growth in packaging is often cited as a major culprit in waste disposal systems and solid waste generation (Stana, 1994).

Ucherek (2003) states that in the ecological assessment of packaging, to determine environmental impacts, the entire life cycle should be evaluated and seven fundamental

criteria must be considered; destruction of the environment, resource depletion, energy consumption, emission load, production of solid waste, impact on human health and suitability for further processing. In considering the life cycle of the packaging, it has been found that packaging-related solid wastes arise throughout the life cycle of the packaging resulting in pre- and post-consumer waste generation (Pongracz, 20009). The disposal of this waste has environmental implications; landfill disposal may cause water pollution from the release of landfill leachate and air emissions such as carbon dioxide and methane whereas incineration may cause air pollution (Pongracz, 2009). The production packaging materials causes environmental harm (Dewees and Hare 1998) and utilises natural resources. Oil and gas are among the inputs into packaging materials, and warrant serious resource conservation concerns (Dewees and Hare, 1998). During the production of packaging materials, pollution may arise from wastewater discharge of some material manufacturing. The manufacture of miscellaneous materials used in packaging, such as adhesives, coatings, and inks are a source of hydrocarbon pollution. Accidental emissions during production of packaging materials are also a concern, especially the risk of fire-fighting activities during accidental fires that may further emit pollutants (Pongracz, 2009).

3.6.1 Extended Producer Responsibility (EPR)

Extended producer responsibility (EPR) has become an established principle of environmental policy in many countries (Walls, 2006). EPR is an important policy approach for environmental protection and in particular the prevention and better management of waste (OECD, 2004). While there are many definitions of EPR, it is generally described as a pollution prevention policy that focuses on whole product systems rather than individual production facilities, the responsibility for the product is therefore, broadened to include the management of the product once it is discarded (DEAT, 2005b; Walls, 2006, Nahman, 2010). The ultimate goal of EPR is sustainable development through environmentally responsible product development and product recovery (Milojković and Litovski. 2005). The Organisation for Economic Co-operation and Development (OECD) define extended producer responsibility as "an environmental approach in which producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a products life cycle" (OECD 2001: 12). There are two related features of EPR policy (OECD, 2001);

1. The shifting responsibility (physically and/or economically; fully or partially) upstream to the producer away from municipalities; and

2. To provide incentives to producers to incorporate environmental considerations in the design of their products.

In line with the polluter pays principle, EPR shifts the physical and financial responsibility for the environmental impacts (waste) associated with products throughout their lifecycle from society as a whole (and municipalities in particular) toward the generators of waste i.e. manufacturers, importers, distributors, retailers and consumers (Nahman, 2010). EPR aims to ensure that the external costs associated with products throughout their lifecycle, including final disposal, are internalised in the costs faced by waste generators for example, in the market price of the product (Nahman, 2010). In addition to shifting responsibility, incentives are provided to producers to incorporate environmental considerations in the design of their products i.e. design for environment. Changes to products may include improving product recyclability and reusability, reducing material usage and downsizing products (OECD, 2001; Walls, 2006).

3.6.2 Packaging waste and EPR, a global perspective

The increasing trend of municipal waste generation and growing awareness of the risks and costs associated with landfill have generated pressure on governments to tighten waste regulations, and those which affect packaging waste in particular (Brisson, 1993; OECD 2011). EPR is a policy concept that can be implemented through a variety of regulatory, economic, and information-based policy instruments (Nahman, 2010; Walls, 2006) with the objective of preventing environmental degradation thereby combating pollution, generation of waste and conserving natural resources (Nnoroma and Osibanjo, 2008).

As described by Nahman (2010), Walls (2006) and Nnoroma and Osibanjo (2008), three key policy tools are commonly practiced:

1. Administrative instruments

Administrative instruments include; take–back programs (mandatory or voluntary), recovery/recycling obligations, re-use and recycling targets, product technical standards, for example prohibitions of certain hazardous materials and disposal bans. Voluntary product take-back occurs where the producers agree to organize a take-back system for their products and set recycling goals. This type of take-back is not legislated and and no penalties are incurred for not meeting the recycling goals. Mandated product take-back is a policy approach where government mandates manufacturers, importers and/or retailers to take-back products at the end of life. Usually recycling or waste diversion targets are set.

Landfill bans are instituted where a ban on the disposal of particular items in landfills or incinerators is enforced, usually in the case of products with a hazardous component.

2. Economic instruments

Economic instruments include; product taxes, material levies, virgin material taxes, subsidies, upstream combined tax/subsidies, deposit-refund schemes, collection and disposal fees. Economic instruments necessitate that the producer covers all or part of the costs for collection, recycling or the final disposal of the products they manufacture, and may charge a special fee for this service (Milojković and Litovski, 2005). Recycling or disposal fees for example, are a tax assessed on product sales, used to cover the cost of recycling or disposal of products at end of life. This can be based on the volume, weight or potential toxicity of the product. Recycling subsidies are provided by government to subsidise recycling, for example per unit or per weight of material recycled, or lump-sum grants to communities or recycling centers. Economic instruments render the producer financially or physically responsible for the end-of-life environmental impacts of their product.

3. Informative instruments

Types of informative instruments include; environmental reports, environmental labelling, awareness-raising campaigns and information provision to recyclers, about the structure and substances used in products to consumers, collectors, recyclers. Informative instruments mandate the producer to provide information about the product or its effects at various stages of its life cycle.

EPR instruments seek to influence the reduction of life cycle impacts from products by creating incentives through responsibility and should stimulate change in three priority areas; resource efficiency, cleaner production and waste management (OECD, 2001).

The effects of environmental packaging legislation can be seen in an extreme form in Germany where the most far reaching legislation has been introduced (Perchard, 1994). Germany has set the agenda for Europe and its approach has interested legislators on other continents and therefore represents very specific and well documented case for consideration (Perchard, 1994). European countries have followed the Germany example but are in general building more flexibility into their legislative frameworks (Perchard, 1994).

3.6.3 Packaging waste and EPR in Germany

The German Packaging Ordinance was adopted during June 1991. The Ordinance required industry to take back, re-use and/or recycle packaging waste materials. By making industry take back its packaging, it shifts the burden of managing packaging waste from municipal authorities to manufacturers, distributors and retailers. The goal is to provide private industry with incentive to consider the solid waste consequences when it designs packaging (Fishbein, 1994; Halpert, 2001). The philosophy of the Ordinance was based on the resources economics 'polluters pay principle'; the cost of preventing and reducing damage to the environment must be borne by those who produce the packaging. Industry retains responsibility for its packaging after they have been discarded by consumers. Consumers however, share the cost; industry incorporate the collection, sorting, recycling and disposal costs into the prices of the packages (Fishbein, 1994; Halpert, 2001).

The Ordinance states that retailers had to 'take-back' primary packaging as of 1 January 1993, and re-use or recycle it independently of the public waste management system (Fishbein, 1994). The German government did not impose taxes or fees, and did not get involved in creating markets for recyclable materials. This strategy allowed the industry to create an alternative 'take-back' packaging system, the Duales System Deutschland (DSD) which is a privately owned, non-profit, public limited company (Halpert, 2001). The DSD licenced a trademark 'green dot' as a symbol that is placed on primary packaging, signifying that they will be recycled. Most retailers do not carry packaging without the green dot. To qualify for a green dot, the company must specify a guarantee from a designated recycling company that the specific type of packaging material will be recycled and a contract with the DSD indicating that the licence fee has been paid (Fishbein, 1994). The DSD is harmonised with, and runs parallel to, municipal waste management systems (Fishbein, 1994; Halpert, 2001).

The Ordinance sets out four major objectives (Fishbein, 1994; Halpert, 2001):

1. Packaging should be made from 'environmentally responsible' materials compatible with recycling;
2. Weight and volume of packaging should be minimised;
3. Packaging should be refillable, if feasible; and
4. Packaging should be recycled if it cannot be refilled.

The Ordinance sets quotas for collecting packaging waste and for sorting the collected material. The Ordinance requires the federal government to publish packaging statistics every three years and must include the average amount of packaging consumed per person in each state classified by type of packaging (Fishbein, 1994). A group of private companies called Technische Überwachungsvereine perform technical inspections and certify products that meet government specifications, monitor DSD recycling activities and submit regular reports on incoming and outgoing recyclable materials (Fishbein, 1994).

3.6.4 Packaging waste and EPR in the EU

European Parliament and Council Directive 94/62/EC on Packaging and Packaging Waste (the Packaging and Packaging Waste Directive) was adopted on 20 December 1994 (Hitchens *et al*, 2000; EUROPEN, 2012). The Directive was driven by a number of factors including the decreased availability of land suitable for landfill sites and the growing concern regarding increasing packaging waste from both domestic and industrial sources (Hitchens *et al*, 2000). The aim of the Directive was to reduce the overall impacts of packaging on the environment by reducing the volume of waste for disposal through waste minimisation strategies (Hitchens *et al*, 2000; Powell and Craighill, 2000) which include; the prevention of, or reduction in the production of, waste for example but the use of cleaner technology; the promotion of waste recovery, this could involve either recycling, reuse or energy recovery (Hitchens *et al*, 2000). A twin objective of the Directive is to bring national measures closer together to remove obstacles to trade thereby promoting the free trade of recovered packaging (Hitchens *et al*, 2000; EUROPEN, 2012).

Since the original 1994 Directive was adopted, twelve more countries have joined the EU. Directive 2005/20/EC establishes deadlines for the ten Member States that joined in May 2004 to meet the recovery and recycling targets set out in Directive 2004/12/EC; and targets for Bulgaria and Romania, which joined the EU in January 2007, were set out in their accession agreements (EUROPEN, 2012). Member States are required to establish systems of return, collection and materials recovery to enable them to meet targets set in the directive (Powell and Craighill, 2000).

Other provision of the Directive include Article nine, Annex II; packaging must comply with 'essential requirements' which include the minimisation of packaging weight and volume, and noxious or hazardous constituents, and suitability reuse, recycling, energy recovery or

composting. Article four as amended requires that other preventative measures are taken such as collecting and taking advantage of the many initiatives being taken within the member states on packaging waste prevention. Article 11 states that heavy metals present in packaging material must be limited (EUROPEN, 2012).

3.6.5 Packaging waste and EPR in South Africa

The Waste Act provides for the introduction of EPR as a mechanism for bringing about waste reduction in South Africa, through the minimisation, reuse and recycling of waste products (DEAT, 2009b). The National Environmental Management: Waste Act 2008 (Act 59 of 2008) provides a definition of extended producer:

> "extended producer responsibility measures" means measures that extend a person's financial or physical responsibility for a product to the post-consumer stage of the product, and includes:
> (a) waste minimisation programmes;
> (b) financial arrangements for any fund that has been established to promote the reduction, re-use. Recycling and recovery of waste;
> (c) awareness programmes to inform the public of the impacts of waste emanating from the product on health and the environment: and
> d) any other measures to reduce the potential impact of the product on health and the environment.

The Waste Act provides for voluntary and mandatory EPR schemes. Provision has been made for the submission of voluntary industry waste management plans to the Minister for particular waste streams, these are typically undertaken by industry, and are usually aimed at post-consumer waste. Where voluntary EPR schemes fail to effectively manage a waste stream, mandatory EPR schemes can be declared, where the Minister will prescribe how a waste stream should be managed and the required funding mechanism to do so (DEA, 2011). The Minister may further specify measures in managing waste throughout the product lifecycle and the requirements in the implementation, financial responsibility, institutional arrangements, percentage of products and labelling of products. The Minister of DEA will consult with the Minister of Trade and Industry to avoid negatively affecting the economy and the general public will be provide with an opportunity to comment on the

process (Dittke, 2010; Baloyi, 2011; DEA, 2011). Mandatory EPR initiatives fall into two categories (Nahman, 2010; DEA, 2011);

Category 1: Government regulatory support to existing voluntary initiatives i.e. where industry has initiated a voluntary EPR scheme but mandatory formalization of certain elements is deemed necessary to effectively enforce it.

Category 2: EPR initiated by government through regulatory intervention in response to intractable problems.

The tyre recycling scheme initiated by South African Tyre Recycling Process Company is an example of an industry that has initiated a voluntary EPR scheme that was given government regulatory support. The South African Tyre Recycling Process Company (SATRPCo) is a non-profit company established by the manufacturers, importers and re-treaders in the tyre industry in response to the DEA's policies towards Producer Responsibility as per the Waste Tyre Regulation, 2009. SATRPCo was formed with the vision to solve the waste tyre problem in South Africa, the large volume of waste tyres and poor recycling rate thereof, and support a sustainable waste tyre producer industry (SATRPCo, 2011). In response to the Waste Act and the Waste Tyre Regulations of 2009 SATRPCo submitted an Integrated Industry Waste Tyre Management Plan. Despite various court cases lead by the tyre industry, opposing The Recycling and Economic Development Initiative of South Africa (REDISA) Integrated Industry Waste Tyre Management Plan, a government initiative, the plan came into effect on 23 July 2012 (REDISA, nd). Manufacturers and importers of tyres pay a levy of R2.30 (excluding VAT) on every kilogram of new rubber tyre. The levy will subsidise the collection and recycling of tyres by attaching a value to waste and incentivising their return to the depots. Job creation and environmental protection are central to the plan (REDISA, nd).

The mandatory point-of-sale levy on plastic bags is an example of an EPR scheme initiated by government through regulatory intervention in response to an intractable problem. During the 1990s plastic shopping bags were distributed free of charge, providing little incentive for re-use or recycling, and instead encouraging overconsumption and littering. As a result, plastic shopping bag litter were ubiquitous. Due to the nature of plastic, print on the bags and the low value of the post-consumer material, recycling was neither viable nor cost-effective (Nahman, 2010; Dikgang *et al*, 2012). The government's response was to impose legislation with respect to the thickness of, and printing on, plastic bags manufactured and imported, and a mandatory levy of 31c per bag was imposed on plastic

bag manufacturers and importers; Regulations under Section 24 (d) of The Environmental Conservation Act (Act No. 73 of1989) Plastic Carrier Bags and Plastic Flat Bags, 9 May 2003. It was envisaged that the plastic bag legislation would alleviate litter (Dikgang *et al*, 2012). The legislation had three aims (Nahman, 2010; Dikgan *et al*, 2012):

1. The regulations on bag thickness and printing increase the range of potential end uses of recycled plastic bags and lower collection and processing costs, increasing the viability and cost-effectiveness of plastic bag recycling.
2. The levy, which is essentially and advance recycling fee, is passed onto the consumer at the point of purchase in the form of a plastic bag tax. The tax aims to decrease consumers' demand for plastic bags and encourages re-use among consumers (thereby reducing demand for plastic bags and plastic bag waste).
3. Promote the return and collection of used plastic bags and create employment through the establishment of a non-profit company, Buyisa-e-bag.

Buyisa-e-bag was a joint venture between government, labour and the private sector and was funded by the plastic bag levy. Buyisa-e-Bag was mandated to promote waste minimisation and awareness initiatives in the plastics industry, expand collector networks, create jobs and initiate rural collection small medium and micro enterprises (Nahman, 2010; Dikgang *et al*, 2012). On 1 June 2011, DEA released a media statement (SA Government Information, nd) stating that DEA had requested the board to wind up the operations of Buyisa-e-Bag with a view to the absorption of the functions into the Department. The Department concluded that the company has failed to meet the objectives as set out in the founding objective of the organisation. While the legislation has arguably been effective in reducing plastic bag production and waste, it has been far less successful in terms of creating a viable plastic bag recycling industry and associated employment (Nahman, 2010). This was primarily attributed to revenue from the plastic bag levy being apportioned to general government funds rather than being used to finance recycling of plastic bags, (Nahman, 2010; Dikgang *et al*, 2012).

Government has targeted packaging waste as a priority waste stream for which EPR should be implemented (Nahman, 2010). EPR initiatives currently in existence are mainly voluntary, industry-lead initiatives, and are predominantly post-consumer solutions which were implemented prior to the promulgation of the Waste Act. There are a number of industry-initiated buy-back and deposit-refund schemes, relating largely to glass and plastic beverage containers and steel beverage cans (DEAT, 2009b; Baloyi, 2011).

3.6.5.1 Packaging waste generation and recovery in South Africa

The Packaging Council of South Africa (PACSA) monitors the packaging market. According to PACSA during 2011 South Africans consumed an estimated 2,8 million tons of packaging (PACSA, 2012). The main materials used by the packaging sector, in order of significance by volume are paper, glass, plastic and metal (Marthinusen, 2010; PACSA, 2012). Approximately one third of household waste relates to consumer packaging (Freemantle, 2008) and the Waste Act has identified five waste products as priority waste; glass, plastic, cans, tyres and paper (DEAT, 2009).

Packaging data provided by PACSA (Marthinusen, 2012 pers. comm.) show that a total of 3 720 828 tons of packing were consumed during 2012 (Table 3.3). This includes all types of packaging; plastic, metal, glass and paper. PACSA (Marthinusen, 2012 pers. comm.) state that this is a small portion of solid waste generated in South Africa, in total 18% of municipal waste, and approximately 47,6% of the total packaging and paper consumed is recycled. PACSA anticipate an overall plastics packaging recycling rate of 35 % or 236 000 tons by 2015 (PACSA, 2011).

Table 3.3 Annual production versus consumption of packaging material (Marthinusen, 2012 pers. comm.)

Packaging material	**2010** (tons)	**2011** (tons)	**2012** (tons)
Packaging and paper	6 674 284	4 509 588	4 584 942
Minus direct and indirect imports	1 160 279	895 808	920 943
Plus indirect imports	57 497	58 839	56 829
Total packaging consumption	**3 544 502**	**3 672 619**	**3 720 828**

The national waste baseline report conducted during 2011, found that non-recyclable municipal waste contributes 34% (by weight) of the overall general waste in South Africa, construction and demolition waste (21%), followed by metals (14%), organic waste (13%) and mainline recyclables including paper, plastics, glass and tyres (18%) (**Figure 3.3**) (DEA 2012).

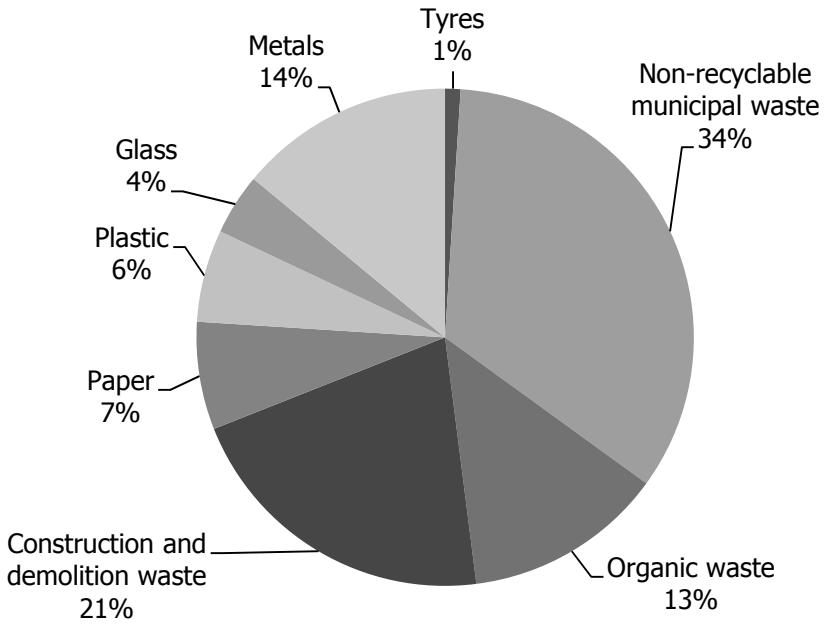

Figure 3.3 Waste composition for South African general waste (DEA, 2012).

A large portion of commercial and industrial waste is collected as part of the municipal waste stream and contains predominantly mainline recyclables from offices and organic waste, 77% of which was recycled during 2011 (Table 3.4). Pre-consumer recyclables from industrial sources are not collected as part of the municipal waste stream (DEA, 2012).

Table 3.4 General waste by management option (selected data from DEA, 2012).

General waste 2011	Generated (tonnes)	Recycled (tonnes)	Disposed (tonnes)	Recycled (%)
Municipal waste (non-recyclable)	7 878 564	0	7 878 564	0
Commercial and industrial waste	12 111 267	9 325 676	2 785 591	77
Waste of Electric and Electronic Equipment	62 581	6 884	55 697	11
Paper	1 694 752	966 009	728 743	57
Plastic	1 278 713	230 168	1 048 545	18
Glass	937 869	300 118	637 751	32
Metal	3 121 203	2 496 962	624 241	80
Tyres	246 631	9 865	236 766	4

3.6.5.2 Paper recovery and recycling

Paper recycling in South Africa is represented by the Paper Recycling Association of South Africa (PRASA). PRASA is a non-profit organisation that was established in 2003 and is a subsidiary of PAMSA (Paper Manufacturers Association of South Africa) (PAMSA, 2013).

PRASA is funded through a levy paid by its members and subsidies from PAMSA (PACSA, 2011) and aims to promote paper recycling in South Africa through increased education and awareness about the recovery of paper, increased recovery of packaging materials and increased use of recovered paper in packaging manufacture (PRASA, nd).

According to PRASA, paper recovery in South Africa during 2011 was approximately 59.5% (Figure 3.4), a recycling rate that has remained steady over the past four years (for paper that can be recycled, paper that cannot be recycled includes toilet tissue and wax paper). More than half of the country's paper mills depend on recycled fibre and many of them use it as their only fibre source, some 65% of recovered paper used as raw material in paper mills. As with the pulp and paper manufacturing industry, paper recycling creates employment and economic empowerment opportunities (PRASA, nd).

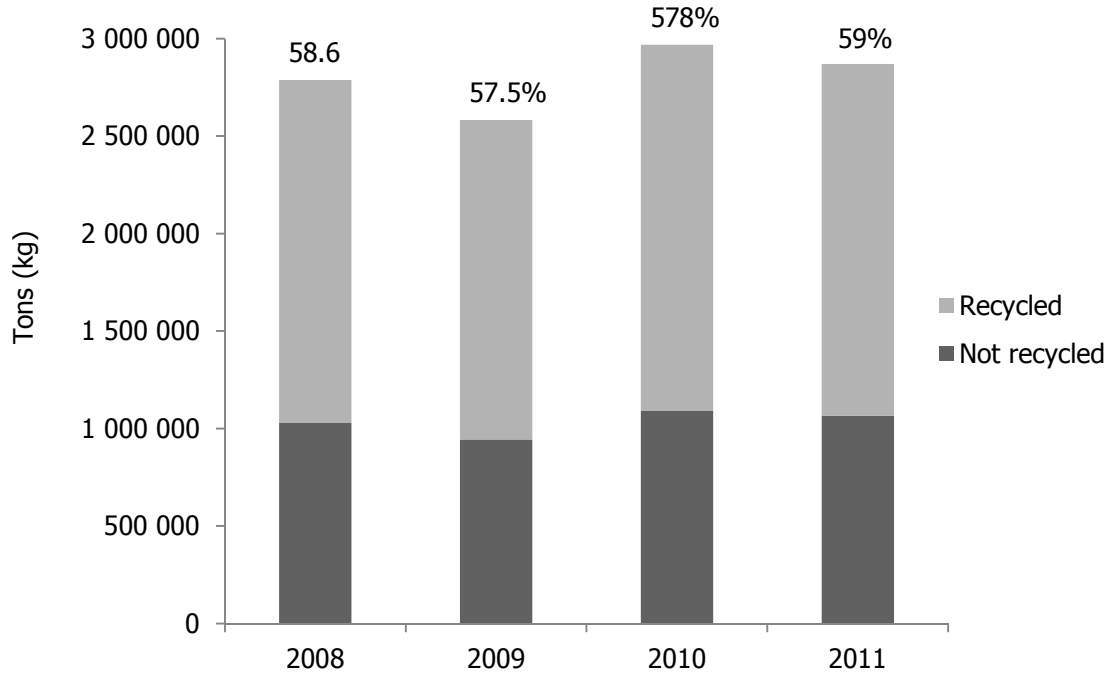

Figure 3.4 Paper recycle and not recycled in South Africa (PRASA, nd)

3.6.5.3 Glass recovery and recycling

It is estimated that glass comprise 4.5% of the municipal waste; bottles, jars, sheet glass, laboratory glass, mirrors, windshields and window glass, crystal and opaque drinking glasses, heat-resistant ovenware and light bulbs (DEA, 2012). Users of glass packaging and bottle glass are represented by The Glass Recycling Company (TGRC). TGRC is a non-profit joint industry initiative that was formed to facilitate recycling growth and is supported by government, bottle glass manufacturers, such as Consol, users of glass to package their

products, such as Coca-Cola and SAB Miller, and bottle glass recyclers, such as Nampak (DEAT, 2009c; TGRC, nd). Initially conceptualised by Consol, the TGRC is funded through a levy on glass i.e. Rands per ton generated. Twenty users of glass packaging support the levy (DEAT, 2009c; PACSA, 2011).

TGRC are mandated to implement education, marketing and capacity building to enable all South Africans to recycle glass (TGRC, nd). TGRC create entrepreneurship opportunities by offering assistance and support to members of the informal sector who wish to run their own glass recycling businesses. These entrepreneurs in turn purchase glass for cash from waste scavengers generating livelihoods for unemployed individuals (TGRC, nd).

TGRC recovered more than 1 billion glass bottles, which equated to 338 265 tons of glass during 2010/2011 (Figure 3.5). This represents a recycling rate of 40%, which is representative of all food and beverage glass containers (TGRC, 2010/11). The recycling rate of glass packaging in South Africa has improved from 18% in 2005/6 to 40% in 2010/11 (TGRC, 2010/11). TGRCs has implemented a fleet of more than 2000 glass banks and supported more than 900 glass collection entrepreneur projects (TGRC, 2010/11). Approximately 32% of all non-returnable glass containers produced annually were retrieved for recycling in South Africa in 2010 (DEA, 2012).

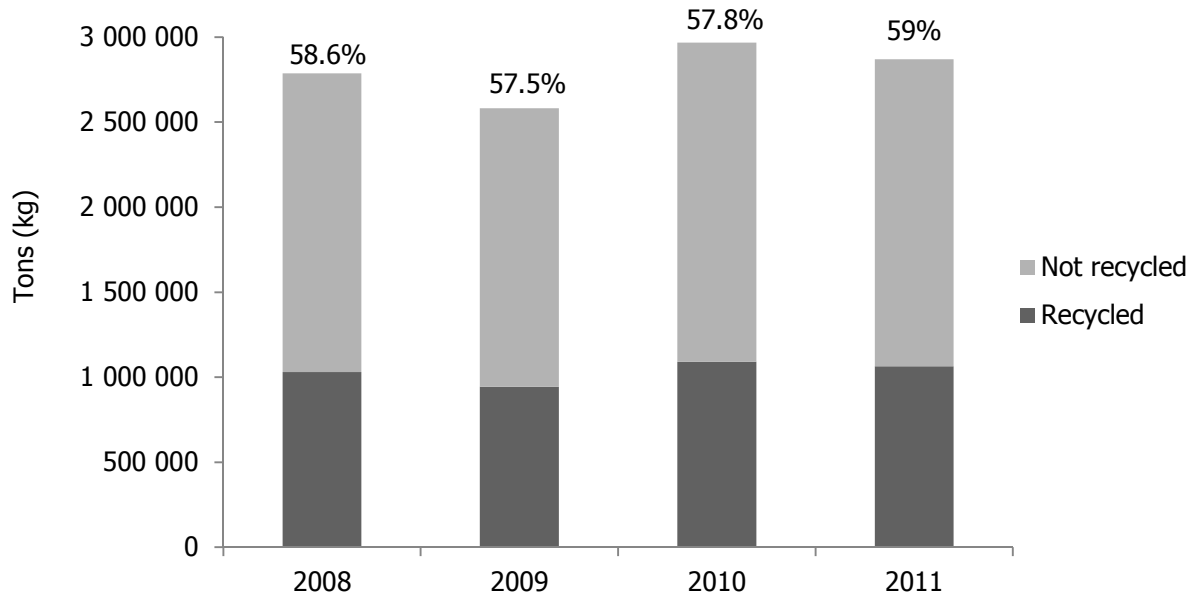

Figure 3.5 Glass recycled and not recycled in South Africa (TGRC, 2010/11)

3.6.5.4 Plastic recovery and recycling

The plastics industry in South Africa is represented by the Plastics Federation of South Africa (PFSA) whose members are plastic producers and suppliers, plastics converters for example The Plastics Converters Association of South Africa, and research and recycling organisations such as The South Africa Plastics Recycling Organisation (Purnell, 2009; PFSA, nd). The recycling surveys undertaken by PFSA are considered to be the most comprehensive source of plastics waste data in South Africa (DEA, 2012). PFSA aim to promote the use of plastics, provide industry related accredited training and support environmentally responsible actions that benefit the plastics industry and society (PFSA, nd).

An international system is used to identify plastics, each plastic product is marked with a plastic (polymer) identification code; a triangle of three cyclic arrows, encloses a number giving the plastic type (PFSA, nd). Plastics packaging consists of six main materials that need to be separated prior to recycling as their properties differ and they generally cannot be reprocessed together. This adds complexity in the recycling of plastics (PACSA, 2011). These materials are (PFSA, nd):

1. Polyethylene terephthalate (PET) for example, soft drink and water bottles
2. High density polyethylene (PE-HD) for example, shopping bags and milk bottles
3. Polyvinyl chloride (PVC), rigid (PVC-U) and flexible (PVC-P) for example, plumbing pipes
4. Low and linear low density polyethylene (PE-LD and PE-LLD) for example, cling wrap and garbage bags
5. Polypropylene (PP) for example, bottles and ice cream tubs
6. Polystyrene (PS) and expanded polystyrene (PS-E) for example, CD cases and imitation glassware
7. Other plastics such as the plastic used for electronics.

The plastics industry consists of three materials producers and raw material importers that supply more than 1 200 converters; organisations that convert raw or recycled materials into a product (Purnell, 2009). The plastics recycling sector consists of 194 recyclers who purchase recyclable plastics and process them to raw materials for supply to converters (PFSA 2010/11). Pre- and post-consumer plastic is collected from scavengers from curb-sides and picking from waste dumps and landfills, and through the organised collection of pre-sorted plastic wastes from businesses. Collectors transport plastic wastes depending on

level of collection utilising trolleys, light motor vehicles or trucks to recyclers for sale (Purnell, 2009).

Approximately 245 696 tons of plastics were recycled during 2011 and virgin consumption decreased from 1 313 000 tons to 1 300 000 tons (Table 3.5) (PFSA 2011/12). During this period, 76.7% of plastics recycled originated from packaging, 30% of all packaging material was recycled and almost 70% of all recyclables were sourced from post-consumer sources (PFSA 2011/12).

Table 3.5 Plastic recycling in South Africa (PFSA, 2011/12)

	2009	**2010**	**2011**
Total tons converted	1 280 000	1 313 000	1 300 000
Total tons recycled	228 057	241 853	245 696
Recycling rate	17.8%	18.4%	18.9%

The polyethylene terephthalate (PET) bottle is the most common container used by the soft drink industry in South Africa (PACSA, 2011). PETCO was established with the objective of promoting and improving the waste management and recycling of post-consumer PET products. The board of PETCO is made up of representatives of brand owners for example, Coca-Cola, bottlers, resin manufacturers, converters and bottlers (PETCO, nd). PETCO is funded by a recycling levy that is collected at source by resin manufacturer Hosaf (the sole resin manufacturer in South Africa) who add the recycling levy of R275 per ton of resin purchased (PETCO, nd). PET recycling, over the last 10 years has grown from less than 1 000 tonnes recycled in 2000 to 42 562 tonnes (42%) of post-consumer beverage bottles recycled during 2010. When pre-consumer beverage bottles are included the recycling rate increases to 46% (PETCO, 2011) (Figure 3.6).

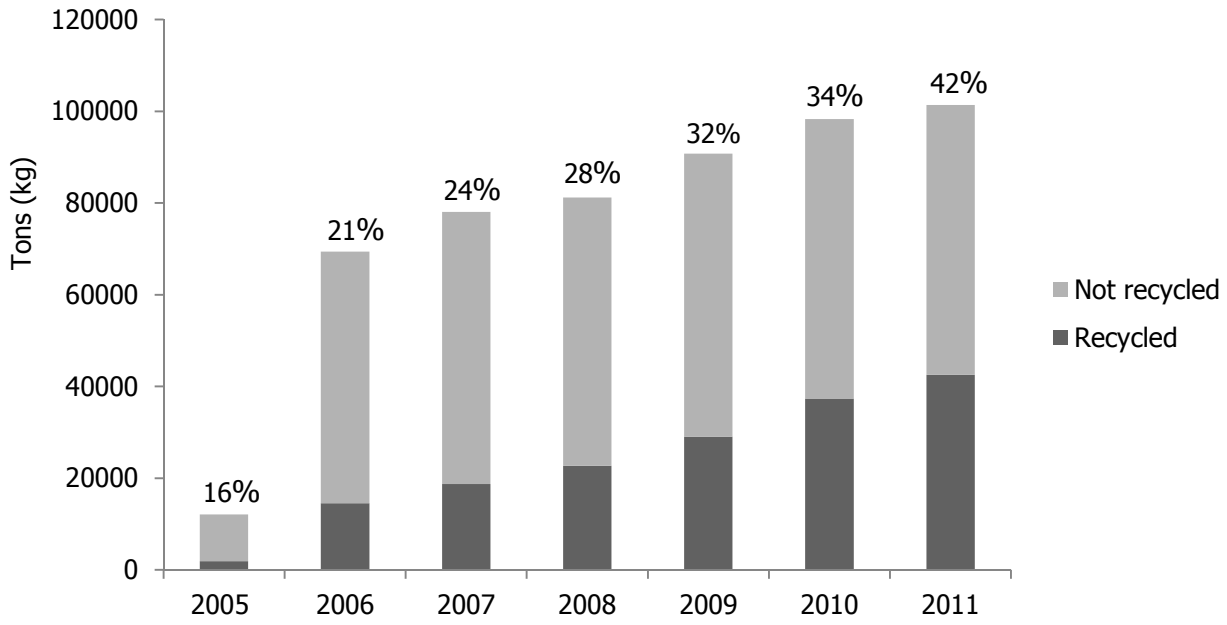

Figure 3.6 PET recycled and not recycled in South Africa (PETCO, 2011)

Polyolefins is the collective description for plastics types that include polyethylene; low-density polyethylene (PE-LD), linear low-density polyethylene (PE-LLD); high-density polyethylene (PE-HD) and polypropylene (PP). These plastics account for more than 57% or 775 000 tonnes of South Africa's total consumption of 1,34 million tonnes of plastics each year. The Polyolefin Recycling Company, Polyco, is a not-for-profit industry body that was formed by polyolefin converters to promote the collection and recycling of post-consumer polyolefin packaging containers. The polyolefins industry fund Polyco through an industry levy (Polyco, nd).

Polyvinyl chloride (PVC) is used in everyday products such as pipes, floor coverings, cabling, toys, pool membranes, medical drainage tubing and food packaging. PVC is widely used in cling film, shrink wrap, bottles and blister packaging. SAVA's objective is to create consumer confidence within the industry and to develop and sustain markets for vinyl applications. SAVA Product Stewardship Programme aims to promotion the vinyl business interests throughout the whole PVC supply chain by focussing on areas such as recycling campaigns (SAVA, nd).

Polystyrene (PS) is a comparatively small member of the plastic packaging family. It is a durable material extensively used by consumers in packaging such as packaging for rigid durable products such as TV and computer cabinets, CD's and jewellery cases and

packaging such as meat trays and fast food packaging (PACSA, 2011). The Polystyrene Packaging Council (PSPC) was formed by the polystyrene industry the polystyrene industry to actively demonstrate its commitment to the environment, through collection and recycling, and the safety and health of polystyrene food packaging users. The PS industry fund PSPC through an industry levy (PSPC, nd).

3.6.5.5 Metal recovery and recycling

Steel has an intrinsic value and it is therefore the most recycled material on earth (Purnell, 2009). The South African Iron and Steel Institute (SAISI) is a non-profit organisation serving the collective interests of the primary steel industry in South Africa (SAISI, 2013). SAISI's membership includes four primary carbon steel producers and South Africa's only stainless steel producer, ArcelorMittal who Chair SAISI (Purnell, 2009; SAISI, 2013). According to SAISI (2013):

- South African crude steel production amounted to 7 617 million tonnes in 2010,
- carbon steel deliveries by the South African primary steel industry amounted to 5 665 million tonnes in 2009,
- imports of carbon and alloy primary steel products during 2010 amounted to 0,657 million tonnes,
- a volume of 1 225 million tonnes of ferrous-scrap were exported and 0,054 million tonnes were imported in 2010, and
- 6.2% of steel sales during 2009 were used for packaging materials (Figure 3.7).

The range of primary carbon steel products and semi-finished products manufactured in South Africa includes billets, blooms, slabs, forgings, light-, medium- and heavy sections and bars, reinforcing bar, railway track material, wire rod, seamless tubes, plates, hot- and cold-rolled coils and sheets, electrolytic galvanised coils and sheets, tinplate and pre-painted coils and sheets (SAISI, 2013).

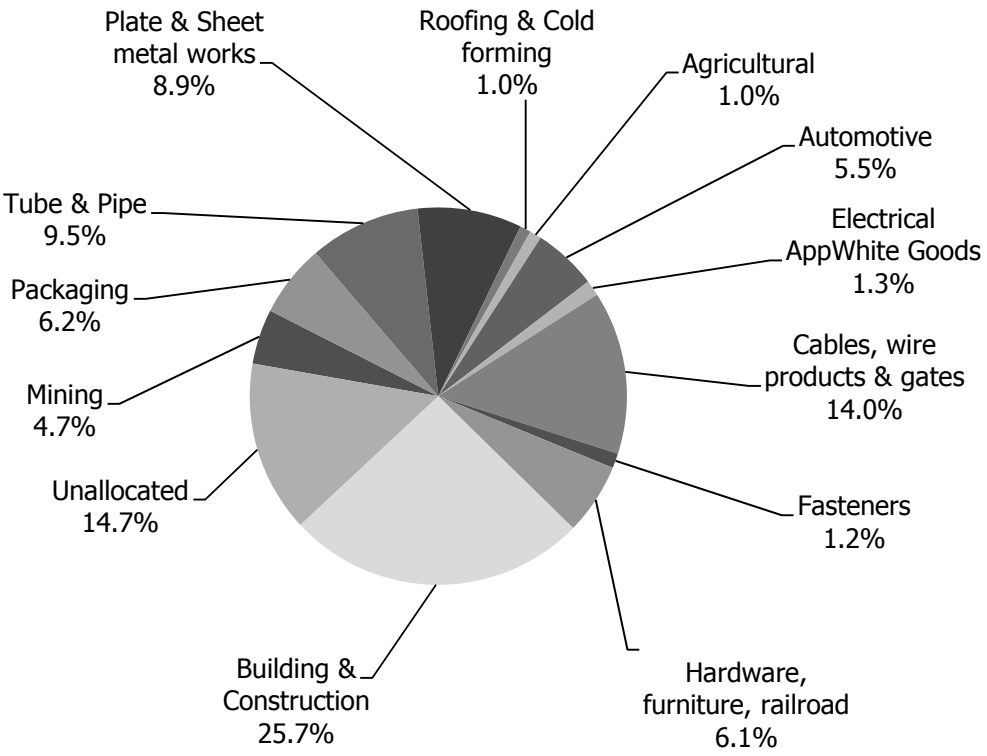

Figure 3.7 Sale of steel in South Africa during 2009 (SAISI, 2013)

SAISI does not represent the interests of the downstream steel industry which is organised into autonomous sectors, associations or clusters (SAISI, 2013). The Metal Recyclers Association (MRA) is an example of such an association that represents almost 100 metal recyclers and/or dealers involved in the collection of about 80% of all scrap metal in South Africa (Purnell, 2009; MRA, 2013).

ArcelorMittal South Africa is also a producer of tinplate for food and beverage cans and together with Nampak started the Collect-a-Can recycling initiative (Purnell, 2009). Registered as a not-for-profit company, Collect-a-Can facilitate the recovery of used beverage cans, aerosols, aluminium, food, oil and paint cans, thereby addressing the 'cradle-to-cradle' needs of the metal can industry. The recovery rate for used beverage cans has grown from 18% in 1993 to a high of 72% in 2008 and 2011 (Figure 3.8) (Collect-a-Can, nd).

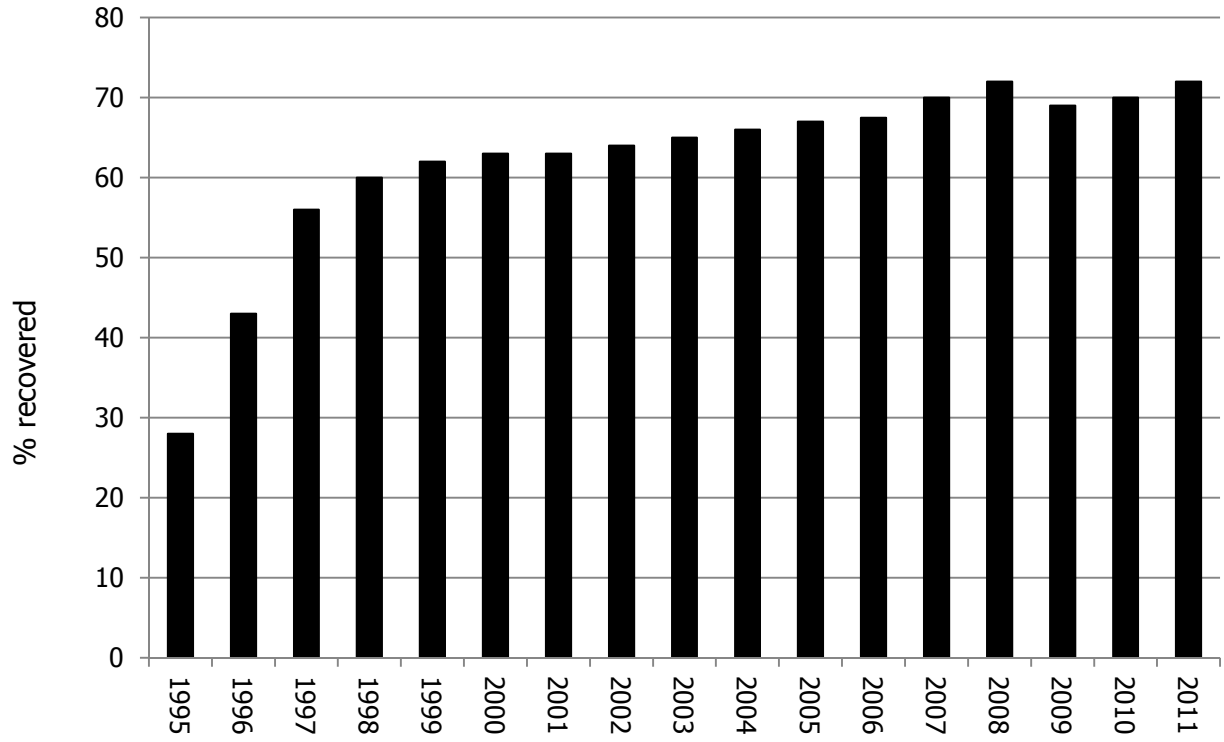

Figure 3.8 Beverage can recycling in South Africa (Collect-a-Can, nd)

3.6.6 Extended Producer Responsibility, implications for business

Examining industry-led, voluntary based EPR initiatives has resulted in the identification of drivers for business to adopt EPR (Table 3.6) (OECD, 2001; Palmer and Waller, 2002; DEAT 2009b) for example economic, operational and reputational benefits.

Table 3.6 Drivers for business to adopt EPR (OECD, 2001; Palmer and Waller, 2002; DEAT 2009b)

Driver	Explanation
Reduced costs	EPR initiatives have been shown to reduce the use of raw materials thereby reducing manufacturing costs. This is achieved through the re-use of recovered materials and the re-design of products for example, light weighting.
Reduced liability	The design of products to eliminate hazardous substances decreases liabilities associated with product storage, shipping, handling, and disposal.
Reduced production time	Product design that considers recyclability and reuse for example, products with quick-release fasteners and fewer parts to facilitate easier disassembly and recovery, can be quicker to manufacture. Speedier manufacture decreases the amount of time to get a product to market.
Open new market opportunities	An EPR approach can spark innovation in product design and delivery, opening up new market opportunities and enhancing competitiveness.
Proactively prepare for regulation	Business that follow global EPR trends have been able to prepare to inevitable coming trends.

Driver	Explanation
Retention of customers	When companies offer leasing and take-back programs, customers become long-term clients rather than one-time purchasers.
Gain market advantage	Customers increasingly demand environmentally preferable products without a price premium. Customers expect companies to bear the financial burdens of minimizing the impact of their products without compromising environmental concerns. Companies that can creatively and strategically meet this goal while maintaining product performance and price will have a marketing advantage with an increasing number of discriminating consumers.
Generate consistent corporate environmental principles	Many companies that work to support their environmental principles with measurable improvements are using EPR as a way to reach corporate environmental goals and as a means to demonstrate product stewardship.

3.7 Literature review summary

The literature review has identified that although difficult to define, SMEs contribute significantly to the GDP and employment in countries globally (OECD, 2007) and are a significant sector in terms of their economic, environmental and social impact (Fox, 2005). In fact, engaging SMEs in corporate social and environmental responsibility is vital if sustainable development is to become a meaningful objective for society (Hillary, 2000). However, corporate social and environmental responsibility has focused on large corporations and SMEs are not merely small versions of big businesses but differ from large corporations in a variety of ways (Jenkins, 2004) and CSER practices developed for large corporations cannot simply be transferred to SMEs (Jarvis, 2004; Ma, 2012).

Increased globalisation and a trend of continued outsourcing have caused organizations to function on a supply chain level and organizations are being held responsible for the environmental and social performance of their suppliers, many of whom are SMEs (Kovács, 2008; Seuring *et al,* 2008). However, CSER within SMEs is under researched and studies on the topic are limited (Brammer *et al*, 2011), particularly in the South African context (Dzansi, 2008). The review of the literature concludes that despite their potential impact on the environment, there is a general lack of uptake of CSER by SMEs, they often perceive little benefit, motivation and there are a range of perceived barriers that prevent them from engaging in good environmental practices. However, an increasing number of SMEs are now doing this, due to a number of drivers and benefits such as improved environmental compliance, to gain a competitive advantage and achieve cost savings. Studies on CSER are scarce, and the little evidence that exists in the literate indicates that South Africa SMEs are

not necessarily engaging in environmental responsible practices (Viviers, 2009) and CSER is a high priority in SME development (Ladzani and Seeletse, 2012).

Recently, the South African Government have highlighted the role that SMEs and the waste sector have to play in the green economy, emphasising that in recycling, there are significant opportunities for the creation of small enterprises though extracting re-usable resources from industrial waste streams (DBSA, 2001; EDDRSA, 2011). Over the last two decades waste has become an increasingly important environmental concern (Hugo, 2004). South African legislation supports the waste hierarchy in its approach to waste management (SAIWC, 2006) however, South Africa is still heavily reliant on landfilling as a waste management option (DEA 2012) which has many negative environmental consequences (Fiehn and Ball, 2005). Extended Producer Responsibility as a regulatory mechanism, requires that producers to take responsibility for products' management beyond the point of sale (DEA, 2010), particularly in the prevention and better management of waste thoughout the products life cycle (OECD, 2004). Packaging is a growing and important waste stream accounting for a significant portion of the municipal solid waste stream (OECD, 2011) yet is largely made up of recyclable materials (Brisson, 1993). Most of the formal recycling in South Africa is conducted by the packaging industry and the collection of recyclable materials occurs predominantly through private entrepreneurs (Matete and Trois, 2007).

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1 Introduction

Research is a process for collecting, analysing and interpreting information to answer questions. To qualify as research, the process must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical, and critical (Kumar, 2005). Research employs a research methodology, a way to systematically solve the research problem (Kothari, 2008; Kumar, 2008). Research methodology is distinct from research methods; research methods are the tools or instruments utilised to gather empirical evidence and to analyse data (Daniel and Sam, 2010) whereas research methodology considers the research methods and techniques; which are relevant and which are not, how to apply them, understanding the assumptions underlying them, and what they may mean and or indicate (Kothari, 2008; Kumar, 2008). The logic and reasoning for the choice of methods and techniques in the context of the study must be specified so that the research results can be evaluated either by the researcher or others (Kothari, 2008; Kumar, 2008; Daniel and Sam, 2010).

This chapter presents the methodology of the research. It describes, discusses, identifies the strengths and limitations, and justifies methods and techniques used. Qualitative methods taking an exploratory, descriptive approach to a multiple case study methodology were employed to address the objectives of the research. Literature review, semi-structured interviews, observation and document analysis were the primary data collection techniques.

4.2 Research setting: eThekwini

eThekwini Municipality is located on the east coast of South Africa in the Province of KwaZulu-Natal (KZN). The Municipality spans an area of approximately 2 297km^2 and is home to some 3.5 million people (eThekwini Municipality, 2012). Waste generation in the municipal area is estimated at 0.5 to 0.8 kg per person per day in the suburbs and 0.4 kg per person per day in township areas (eThekwini Municipality, 2004).

The eThekwini Municipality Integrated Waste Management Plan (eThekwini Municipality, 2004) subdivides the eThekwini Municipality into four regions; the Central, Northern,

Southern, Inner West and Outer West Regions. The Integrated Waste Management Plan describes eight active landfill sites:

- Three general landfill sites owned by the Cleansing and Solid Waste Department (DSW); Bisasar Road, La Mercy and Marianhill
- Two low hazardous landfill sites privately owned; Bulbul Drive and Shongweni
- Three garden refuse and building rubble landfill sites; the privately owned Umkomaas and DSW owned Shallcross and Wyebank.

According to 2004 figures, these landfills accept approximately 1 266 220 tons of general and low hazardous waste per annum. In addition to this, there are seven general waste transfer stations accepting approximately 99 374 tonnes per annum and 10 garden refuse transfer stations accepting approximately 66 072 tonnes per annum. Recycling rates are estimated at 119 607 tonnes per annum of paper and 784 018 tonnes per annum of cans (eThekwini Municipality, 2004).

A later study (SIVEST, 2004) described a total of five transfer stations accepting a total of 4 784 tons of domestic waste generated per month. A further ten garden refuse sites accept a total of 1 191 tons of garden refuse per month. The same study (SIVEST, 2004) found that commercial waste disposal is handled by the landfills.

The 2008 eThekwini Municipality State of the Environment Report (eThekwini Municipality, 2008) explains that The Cleansing and Solid Waste Department (DSW) of the eThekwini Municipality manages the city's four landfill sites and the two hazardous rated landfill sites are privately owned. La Mercy landfill site has reached its capacity and is closed but remains under the management of DSW (eThekwini Municipality, 2008). The later statistics (eThekwini Municipality, 2008) showed that approximately 1.8 million tons of waste are generated within the eThekwini Municipal area per annum, 95.2% of waste generated is disposed of safely, the city's recycling efforts have been successful and number of organisations initiated waste minimisation projects has increased (Table 4.1).

Table 4.1 eThekwini Municipality solid waste indicators (adapted from eThekwini Municipality, 2008)

Indicator	**2003/4**	**2004/5**	**2005/6**	**2006/7**	**2007/8**
Quantity of waste generated within Durban per annum	1.5 million tons	1.6 million tons	1.65 million tons	1.65 million tons	1.8 million tons

Indicator	2003/4	2004/5	2005/6	2006/7	2007/8
Remaining capacity of existing land fills	7 million m^3 (Bisasar Road only)	13 million m^3 (Bisasar Road, Marianhill and La Mercy)	62 million m^3 (Bisasar Road, Marianhill and Buffelsdraai)	62 million m^3 (Bisasar Road, Buffelsdraai, Marianhill and La Mercy)	58.6 million m^3 (Bisasar Road, Buffelsdraai, Marianhill)
Quantity of waste collected annually by Municipality	433 366 tons (Bisasar Road only)	528 821 tons (Bisasar Road, La Mercy and Marianhill)	558 054 tons (Bisasar Road, La Mercy and Marianhill)	570 000 tons (Bisasar Road, Marianhill and Buffelsdraai)	550 142 tons (Bisasar Road, Marianhill and Buffelsdraai)
Quantity of waste under management of eThekwini Municipality per annum	981 000 tons	1.2 million tons	1.28 million tons	1.24 million tons	1.41 million tons
Quantity of low hazardous waste landfilled per annum by private companies	136 770 tons per annum	85 539 tons per annum	83 011 tons per annum at Shongweni 73 780 tons per annum at Bulbul Drive	114 843.3 tons per annum at Shongweni 126 036 tons per annum at Bulbul Drive	164 232 tons per annum at Shongweni 139 316 tons per annum at Bulbul Drive
Percentage waste generate and safely disposed	88.4%	80.3%	87.5%	89.8%	95.2%
Quantity of recycled waste managed by the municipality from their premises (tons per annum)	Batteries: 7 Cans: 52 Glass: 775 Metal: 2 276 Oil: 6 460 Paper: 920 Plastic: 119 TOTAL: 10 609	Cans: 65 Glass: 400 Metal: 1 536 Oil: 6 925 Paper: 1 628 Plastic: 352 TOTAL: 10 906	Batteries:20 Cans: 120 Glass: 936 Metal: 2 568 Oil: 7 230 Paper: 2 352 Plastic: 888 TOTAL: 14 114	Batteries: 37.94 Cardboard: 608 Glass: 230.13 Metal (various including radiators and cable): 1 324.9 Oil: 7.9 Paper: 414.11 Plastic: 258.27 TOTAL: 2 899.25	Cans: 182 Cardboard: 2 925 Glass: 433 Metal (various): Oil: 35 Paper: 666 Plastic: 438 TOTAL: 3 956
Number of organisations with waste minimisation projects	635	Schools: 280 Businesses: 250 Communities: 190	Schools: 280 Businesses: 250 Communities: 190	Schools: 320 Businesses: 480 Communities: 190	Schools: 320 Businesses: 480 Communities: 190

The 2008 eThekwini Municipality State of the Environment Report (eThekwini Municipality, 2008) provides detail of the city's solid waste indicators for the period 2003 to 2008. More recent landfill and recycling statistics were provided by Durban Solid Waste (Mgingqizana, 2013, pers. comm), (Table 4.2). Landfill volumes are from Bisasar Road, Marianhill and Buffelsdraai landfill sites. Recycling volumes are from the city's six buy back centres (Escom Road, Isipingo, Lorne/Brook Street, North Coast Road, Queensmead, Westmead) and drop off centres (Hillcrest, Kloof, Westville and garden refuse sites).

The public are remunerated for recyclables at buy-back centres, and can leave their recyclables at drop-off centres at no charge. These volumes exclude the kerbside collections where an additional 6 131.29 tons were collected during 2009, 10 511.00 tons during 2010, 12 294.76 tons during 2011 and 11 418.14 tons during 2012.

Table 4.2 Durban Solid Waste landfill and recycling volumes (Mgingqizana, 2013, pers. comm). All volumes in tons.

		2009	**2010**	**2011**	**2012**
Quantity of waste accepted by landfill				707 527.14 (Bisasar Road, Marianhill and Buffelsdraai)	778 128.77 (Bisasar Road, Marianhill and Buffelsdraai)
Quantity of recycled waste managed by the municipality from their premises (tons per annum)	Aluminium	34.84	33.71	6.49	17.12
	Batteries	3.89	-	-	-
	Brass	328.31	20.17	4.88	22.76
	Cans	47.82	37.31	45.45	120.77
	Cardboard	1 494.10	2 794.45	3 039.31	3 225.48
	Copper	26.14	68.61	14.58	48.29
	Glass	352.22	709.28	358.49	784.28
	Lead	415.14	4.20	7.54	4.12
	Non-ferrous metals	12.76	9.67	2.32	4.42
	Oil	19.10	31.20	7.76	18.50
	Paper	632.12	731.07	642.25	795.66
	Plastic	303.16	429.92	513.18	671.43
	R/bottle	27.87	15.31	6.12	15.50
	Radiators/ motors	385.23	2.67	21.21	13.97
	Stainless steel	464.04	178.75	73.07	196.46
	Steel	973.05	694.52	304.31	1 207.19
	Subgrade	115.90	132.61	89.21	144.69
	Zinc/cable	15.09	2.24	2.60	23.43

The KwaZulu-Natal Policy on Waste Managements (KZNDEA, 2003) ultimate vision for KwaZulu-Natal is one of zero waste. However, the interim, short term goal is the generation

of as little waste as possible with the minimum of negative impacts on the environment. The vision of the KwaZulu-Natal Policy on Waste Management (KZNDEA, 2003) is underpinned by a number of principles, and strategic goals and objectives. Amongst others, the principles include; the avoidance of waste; the setting, and achievement, of waste reduction targets; facilitating the marketability of recycled materials; the establishment of a recycling infrastructure; the active involvement of all communities and workers in waste management processes and the implementation of clean production processes. The overarching goal of the Policy is: "*To establish an equitable, just, integrated and holistic system of waste management, involving all stakeholders in waste education, avoidance, minimisation, re-use, reduction, recycling, elimination where possible, and safe disposal of unavoidable waste*" (KZNDEA, 2003;9).

Despite this noteworthy drive towards waste minimisation, 87% of municipalities in South Africa do not have the capacity or infrastructure to pursue waste minimisation as opposed to the core functions (DEAT, 2007). Those municipalities, that have initiating recycling activities, are struggling to gain momentum due to lack of capacity (DEAT, 2007). Approximately 7% of the total staff, or 3 752 people within KwaZulu-Natal Municipal structures are employed in solid waste management.

4.3 Research approach and design

When considering research design, the researcher has many tools available, and research design should try to match the best tool to the research objectives (Zikmund *et al*, 2010). The research aimed to evaluate the role that SMEs play in extended producer responsibility from an environmental responsibility perspective, in waste management and recycling. This was achieved through applying qualitative methods, using exploratory and descriptive elements, and multiple case study methodology. The main applied data collection method was the use of questionnaires in structured qualitative research interviews. The interviews were conducted during July to December 2012.

4.3.1 Qualitative data collection

Quantitative research is based on the measurement of quantity and involves counting and measuring. It is applicable to phenomena that can be expressed in terms of quantity and can be analysed using statistics, for example to identify statistically significant relationships between variables (Gillham, 2000; Kothari ,2006; Barbour, 2008; Kumar, 2008). Qualitative

research, on the other hand, is essentially descriptive and inferential in character and is concerned with phenomenon relating to, or involving, quality or kind (Gillham, 2000; Kumar, 2008). Stake (1995) identifies three major differences between qualitative and quantitative research:

1. The distinction between explanation and understanding as the purpose of inquiry. Qualitative researchers seek understanding of the complex interrelationships whilst quantitative researchers seek explanation and control.
2. The distinction between a personal and impersonal role of the researcher.
3. The distinction between knowledge discovered and knowledge constructed.

Despite these differences, there is much overlap between, synergy and potential for integration of the two methods. Thus, these methodological approaches should not be viewed at diametrical opposites (Marvasti, 2004). It is important to note that there are no right or wrong methods, there are only methods that are appropriate to the research topic and model with which the study is working (Silverman, 2010). In fact, quantitative and qualitative methods should be seen as complementary methods (Flick, 2009).

Qualitative research methods provide detailed descriptions of situations and an in-depth understanding of the actors involved, and the interaction among them (Gagnon, 2010). Their great strength is that one can discover new insights or emerging concepts, and reveal possible explanations (Gillham, 2000; Zikmund *et al*, 2010; Yin, 2011). Qualitative research is appropriate when (Gillham, 2000; Barbour, 2008; Myers, 2009; Zikmund *et al*, 2010):

- The particular topic is new and there is little previously published research on that topic i.e. it is good for exploratory research and developing new concepts.
- The researcher wishes to study a particular subject in-depth and uncover complexities.
- The research objective is to learn how a phenomena occurs in its natural setting or is content dependent.
- The perspectives of those involved in the study is important. Capturing the views of participants may be a major purpose of a qualitative study. The explanations and accounts provided by those involved can reveal and unravel mechanisms which link particular variables.
- The research process leading the results is the focus of the study methodology, rather that the significance of the results themselves.

There is long history and sometimes controversial debate, regarding qualitative approaches (Flick, 2009; Cronholm and Hjalmarsson, 2011; Yin, 2011) and qualitative methods certainly have their limitations. A major disadvantage of qualitative research is that it relies primarily on subjective assessments and researcher bias, which is built-in and unavoidable (Gillham, 2000; Barbour, 2008; Myers, 2009; Zikmund *et al*, 2010). Other limitations of qualitative methods include (Gillham, 2000; Barbour, 2008; Myers, 2009; Zikmund *et al*, 2010):

- Qualitative methods require effort, are time consuming and it can be difficult to organise and implement, and analyse the data gathered.
- The intensive and time consuming nature of data collection necessitates the use of small sample units which limits extrapolation to the general population.
- The relative lack of formal theoretical and operational guidelines with qualitative methods, can result in limited respectability afforded by its methods amongst the scientific community. This can limit replicability of the methods used.
- There is much debate amongst the literature regarding the validity of qualitative methods in scientific research.

Many authors (Stake, 2005; Flick, 2006; Barbour, 2008; Myers, 2009; Silverman, 2010) highlight the importance of ethics in building trustworthiness and credibility in qualitative research. Areas of concern include the interest of those participating in the research, manipulation of data, confidentiality of the findings. Yin (2011) outline three objectives for building trustworthiness and credibility in qualitative research. First, research procedures should be transparent, that is, the research procedures must be documented and described so that others can review them. Second, the research must be methodical. The research must follow an orderly set of research procedures and avoid bias and/or deliberate distortion. Cross checking or validation of the research procedures and data is necessary. Last, the research must be based on an explicit set of evidence. Qualitative research is based on either single or multiple perspectives and data analysis involves making sense of each perspective and testing the evidence for consistency across different sources.

There are many different approaches and methods that can be used for qualitative data collection. Yin (2011) describes ten approaches to qualitative research however other authors (Miles and Huberman, 1994; Barbour, 2008; Silverman, 2010 Rubin and Babbie, 2010) tend to focus on four or five of these approaches:

1. Narrative Research.

Narrative research explores the life of one or more individuals by the telling of stories or individual experiences. The outcome is a rendition, a single or a series of event/s and or

action/s for example, a narrative of one's life events or an autobiography. Data are gathered using interviews and documents.

2. Phenomenological Research

Phenomenological Research is the study of phenomena for example, events, situations, experiences or concepts and provide understanding the essence of the experience. Data are collected from persons who have experienced the phenomenon, then reducing individual experiences with a phenomenon to a description of the universal essence. Data is gathered by conducting interviews with individuals, though documents and observation may be necessary.

3. Grounded Theory Research

The main feature of grounded theory research is the development of new knowledge and new theories through the collection and analysis of data from the field. This approach assumes that the natural occurrence of social behaviour within real world contexts is best analysed by deriving bottom-up grounded categories and concepts. Various data collection techniques are used, particularly interviews and observation although literature review and relevant documentary analysis.

4. Ethnographic Research

Ethnography has a background in anthropology and it is a methodology for descriptive studies of cultures and peoples. Ethnographic studies involve field based study, lengthly enough to reveal peoples' everyday norms, rituals and routines in details. Data collection includes interviewing, often repeated interviewing and observation.

5. Case Study Research

Case study research studies a phenomenon (a 'case') in its real-world context. Case study research is used to develop an in-depth description and understanding of a case or multiple cases. A 'case' may be an entity for example, an individual, an organisation or an institution. Methods commonly used in case study research in interviews, observations and documents. Multiple sources are often used.

The different approaches and data collection methods do not group into orderly categories and there can be overlap; the researcher does not necessarily have to choose among the approaches and methods (Yin, 2011). There is a set of common features amongst these approaches that reveal the nature of qualitative research; qualitative research is characterised by field work and relies on, amongst other methods, interviews and observations (Miles and Huberman, 1994). Reflection and interpretation on the part of the research is required. These methods require the sorting and sifting through the materials

collected to identify similar phrases, relationships between variables, patterns, themes, distinct differences between subgroups and common sequences. Patterns, processes, commonalities and differences can then be identified. This gradually leads to elaborating upon a small set of generalisations that cover the consistencies discerned in the data and the development of constructs and theories (Miles and Huberman, 1994).

4.3.2 Qualitative data collection in context

Using qualitative methods was deemed to be the most suitable way of achieving the aim and objectives of the research. Internationally there is a growing body of literature (Tilley, 1999; Luetkenhorst, 2004; Raynard and Forstater, 2002; Fox, 2005 and Hillary, 2002) describing the environmental impacts and practices, predominantly in the context of corporate social responsibility. Despite this, the total environmental impact of SMEs is unknown (Hillary, 2000). In the South African context, little attention has been offered to environmental responsibility in SMEs and South African studies in this arena focus on business social responsibility and business ethics for example, Dzansi (2008; 2011), Dzansi and Pretorius (2009) and Painter-Morland and Spence (2009). The literature review undertaken for the purpose of the research, found only six studies by these three authors relevant to SMEs and business social responsibility. No studies were found relating to environmental responsibility and SMEs in the South African context. Environmental responsibility in SMEs is a relatively unexplored subject internationally, and has not received much attention in the South African context; consequently this research purposed to explore environmental responsibility in SMEs in the waste sector and their role in environmental and extended producer responsibility in waste management and recycling of larger business. This meant that the nature of this research would be exploratory and descriptive, rather than numeric, and qualitative methods would be appropriate. Furthermore, the goal of the research was depth rather than breadth in data collection. Exploratory research is used when a study is undertaken were the objective is either to explore an area in which little is known and poorly understood, and new insights are sought and can generate ideas and hypotheses for future research (Robson, 2000; Kumar, 2005). The purpose of descriptive research is to portray accurate profiles of persons, events or situations and attempts to describe systematically a situation, problem, phenomenon, service or programme, or describes attitudes towards an issue (Robson, 2000; Kumar, 2005). The research is descriptive as it describes environmental accountability between larger business and SMEs with respect to waste management, and SMEs understanding of, and commitment to,

environmental responsibly and their environmentally responsible practices. Both the exploratory and descriptive nature of the research yield depth of data, rather than breadth.

4.3.3 Case study approach

Goddard and Melville (2007) use the terms 'descriptive research' and 'case study research' interchangeably. They describe the concept as "research in which a specific situation is studied either to see if it gives rise to any general theories, or to see if existing general theories are borne out by a specific situation" (Goddard and Melville, 2007; 9). Put simply, case studies refer to the recorded history of a particular person, group, organisation or event. For example, the case study may describe the events of a specific company as it faces an important decision or situation. In such a case, interviews of managers, employees or customers can represent a case study (Zikmund *et al*, 2010).

Case study research is a common way to undertake qualitative inquiry. Though qualitative methods are primary when using case study method, the researcher must pull all evidence together and quantitative data collection may be employed (Gillham, 2000; Stake, 1995). As a form of research, the case study approach is defined by interest in an individual case, not by the methods of inquiry used and different methods can be used. Case study is not a methodological choice but a choice of what is to be studied (Stake, 1995). A case study seeks a range of different kinds of evidence and no one kind or source of information is likely to be sufficient on its own (Gillham, 2000). It gains creditability by thoroughly triangulating and cross examining the descriptions and interpretations, not just a single step but continuously throughout the period of the study (Stake, 1995; Flick, 2009).

Case study research is appropriate when the object of the research is complex (Goddard and Melville, 2007) and when the research addresses either a descriptive question, or an explanatory question (Yin, 2012). The main advantage of case study research is that it can produce an in-depth analysis of phenomena in context, rather than relying on derived data, supporting the development of historical perspectives and guarantee high level validity. For example, an entire organisation can be investigated in-depth with meticulous attention to detail (Gagnon, 2010; Zikmund *et al*, 2010; Yin, 2012). This highly focused attention enables the researcher to concentrate on identifying the relationships amongst functions, individuals or entities (Zikmund *et al*, 2010). Case studies can be analysed for important themes. Themes are identified by the frequency by which the same term or synonym arises in the

narrative description and may be useful in discovering variables that are relevant to potential explanations (Gagnon, 2010; Zikmund *et al*, 2010). For this reason, case studies are suited to both theory building and validating existing theory (Gagnon, 2010).

Stake (1995) identifies three types of case studies:

1. The intrinsic case study: to learn about a unique phenomenon which the study focuses.
2. The instrumental case study: to provide a general understanding of a particular phenomenon using a particular case.
3. The collective case study: where a number of cases are studied to investigate some general phenomenon.

The singular case study (intrinsic and instrumental) are appropriate when the case is unique, for testing a well formulated theory and/or in the case of an exploratory or pilot study (Christie *et al,* 2000; Stake, 2005). Multiple case studies provide a purposive sample and the potential for generalizability of findings. Due to the triangulation of evidence, multiple case studies provide a rigorous approach and the sampling of different research sites and data sources allow for theory generation and verification. The rigorous methodology utilised with multiple case studies allows for replicability (Christie *et al,* 2000; Stake, 2005).

Case study research can also be classified according their purpose; exploratory, descriptive and explanatory (Yin, 1994). Explanatory case studies are suitable for causal investigations and when the research problem has not been clearly defined. Descriptive case studies aim to present a complete description of a subject within its context and are used when knowledge about the subject exists. This type of case study focuses on investigating a few aspects of a broader subject. Explanatory case studies examine the data in great detail to identify cause-effect relationships and to explain how events occur.

When using case study methodology, one must bear in mind that, as with all qualitative methods, it is subject to controversy and suffers from limitations (Gagnon, 2010). A major shortcoming of the case study method is the generalizability of the results. The degree to which a general position can be extrapolated to an entire is often limited. This can be attributed to the uniqueness of the data collection techniques, and the data itself, to each case, and the fact that only a singular or a few units are studied. Due to this uniqueness, there is the possibility that the case could be atypical (Gagnon, 2010; Kumar, 2008).

External validation and verification of the results is problematic predominantly due to limited scope for replicability. Case study method is quite unsystematic in the absence of any control upon the informant or the researcher (Gagnon, 2010; Kumar, 2008). The personal and subjective nature of case studies may result in improper interpretation of the data. Lastly, case study method is intensive and therefore time consuming for researcher and participants (Gagnon, 2010; Kumar, 2008). Gagnon (2010) argues that these limitations are inherent to case study research and it must be accepted that this method is selected for the purpose of building theory related to a particular phenomenon or a specific process. Yin (2012) reiterates stating that the use of case study for evaluations is now widely recognised and used as the methods have applicability in studying many relevant real-world situations and addressing important research questions.

Case study method relies on multiple data sources and therefore requires more than one data collection method. Interviews, observations and documents are common data collection methods used (Johnston *et al*, 1999; Gillham, 2000). Interviews involve an interaction between an interviewer and a participant and can range from structured, to semi-structured open-ended question and answer dialogs, to unstructured interviews. Interviews focus directly on the case study topic and provide perceived causal inferences (Johnston *et al*, 1999; Yin, 2011). Observing can be an invaluable way of collecting data as it provides a first–hand account of events and the context of those events and an in–depth understanding. Observing can be either via participation, where the researcher personally emerges into the phenomenon of interest to gain a first-hand account; or detached, where the researcher is an unobtrusive observer (Johnston *et al*, 1999; Yin, 2011). Documentary evidence tends to be used less than interviews and observations in case study research but can be useful simply by the nature of the detail they contain. Document evidence has the added advantage of providing a formal framework to which you may have to relate the informal reality. Examples of document evidence include letters, research reports and records (Johnston *et al*, 1999; Yin, 2011). Throughout the study, triangulation should be applied, confirmation from the different sources of data collection, to strengthen the validity of the study (Yin, 2011).

4.3.4 Case study approach in context

Packaging waste is a growing and important waste stream accounting for a significant portion of municipal solid waste in different countries (OECD, 2011) yet it is largely made up

of recyclable materials (Brisson, 1993). According to the Packaging Council of South Africa (PCSA website) during 2009 South Africans consumed an estimated 2,5 million tons of packaging (paper, plastic, metal and glass) and the average real growth rate for the last ten years in the SA Packaging Industry has been approximately 2,5%. Recycling activities in South Africa are mostly private sector initiatives run by packaging manufacturers (Karani and Jewasikiewitz, 2007). As the packaging sector is responsible for the generation and recycling of a large portion of South Africa's waste, the study focused on the packaging sector and the downstream associated waste contractors, primarily SMEs.

The case study methodology was deemed appropriate for this research for a number of reasons. This study applies waste management to the packaging industry and the environmentally responsible relationship between packaging companies and their waste contractors; trend of continued outsourcing have caused organizations to function on a supply chain level and organizations are being held responsible for the environmental and social performance of their suppliers and partners (Kovács, 2008; Seuring *et al*, 2008). According to Yin (1994) a case study combines data collected from different sources, reveals relationships between the different factors and allows for multiple facets of the phenomenon to be revealed and understood. In this research, data were collected from different sources, packaging companies, their waste contractors and the SME subcontractors, to identify the environmentally responsible relationship and accountability between them and environmentally responsibility within each organisation. It was therefore, deemed necessary to include the findings of the packaging industry (larger organisations) in the results along with their SMEs waste contractors. Second, case study method is suitable when the research aims to improve understanding of a phenomenon (Stake, 2005). The nature of this research is exploratory and aims to better understand environmental responsibility amongst the waste industry and SMEs. Last, the case allows for several data collection methods rendering it suitable for this research as questionnaires, interviews, observation and written sources were appropriate and the methods of data collection used. Using multiple data collection methods has the advantage of building the integrity of the study though triangulation of the data (Flick, 2009).

Multiple case study method contains more than a single case, for example a phenomenon may be investigated at different sites and each site is a case, yet the study as a whole has used a multiple case design (Yin, 1994). Multiple case study method was deemed appropriate for this research as the same phenomenon, environmental responsibility, was

investigated at multiple sites, in this study a total of 20 different organisations. Multiple case studies allow for comparison across cases and can reveal common findings (Rule and John, 2011). The 20 cases were considered to identify commonalities and dissonances among the cases. Common findings can lead to tentative generalisations and theory building (Rule and John, 2011).

It is notable that according to Myers (2009) case study research is the most popular qualitative research method used in business research, rendering the case study method particularly useful for this research as it focuses on environmental responsibility in business. Case study method is commonly used in business disciplines as it presents complex and hard to grasp business issues in an accessible, vivid and personal and down-to-earth format (Eriksson and Kovalainen, 2011). The resultant practicality of the research offers a better understanding of business practices in their social contexts and often appeals to managers and political decision makers (Eriksson and Kovalainen, 2011). This is of importance to this research as the research is investigating businesses environmental practices and based on the outcomes of the research, seeks to form the foundation of guidelines for environmental responsibility in SMEs.

4.3.5 Selection of cases

Case study organisations were selected based on certain criteria (Figure 4.1). The first criterion was that the companies had to be located in the eThekwini area. Thereafter, the company had to manufacture packaging, any variation of packaging was considered. The third criterion was that the company had to be willing to disclose the contact details of their waste contractor/s for the purpose of the waste contractor/s also participating in the research. Moreover, in relation to time resources and the scope of the thesis, it was decided to focus on three case studies.

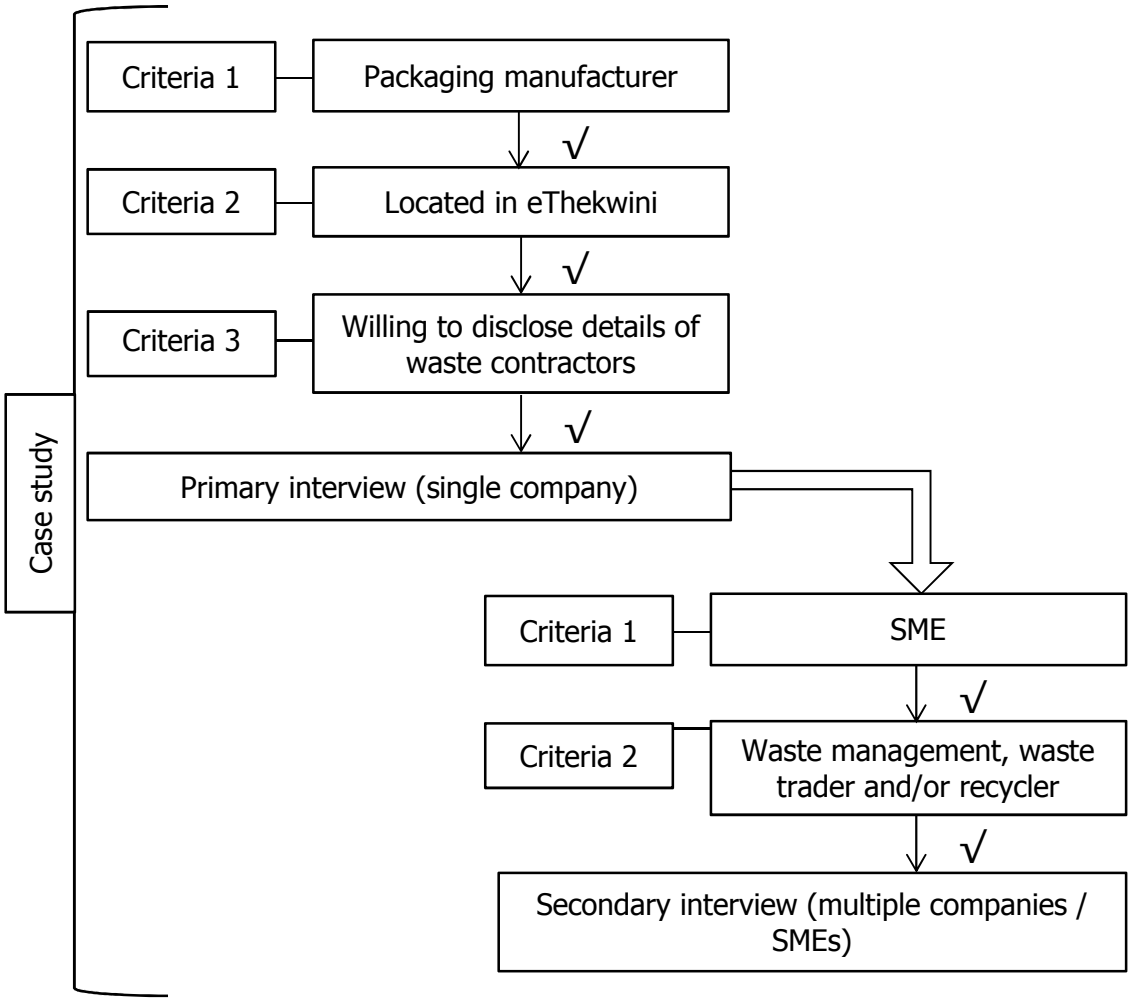

Figure 4.1 Selection of companies for a singular case study

On disclosure of the packaging company's waste contactor/s, the waste contractors were approached to participate in the research and to disclose the contact details of their waste subcontractor/s. Again, selecting of organisations for interview followed certain criteria (Figure 4.1); first the companies had to be SMEs (as defined for the purpose of this thesis), and second the SMEs core business had to be to waste management, recycling and/or trading recyclables.

A pilot was initiated to test the methodology and a number of large packaging manufactures in the eThekwini area were approached. Afripak were willing to participate in the study as per the required criterion. Afripak's waste contractors, RE-, E-Mode, Green Office and Natal Solvent Recovery fulfilled the requirements of the study (SMEs in the waste sector) and all participated in the interview (Figure 4.4). Unfortunately, RE- were not willing to disclose the details of their sub-contractors and the research process could not continue as envisaged.

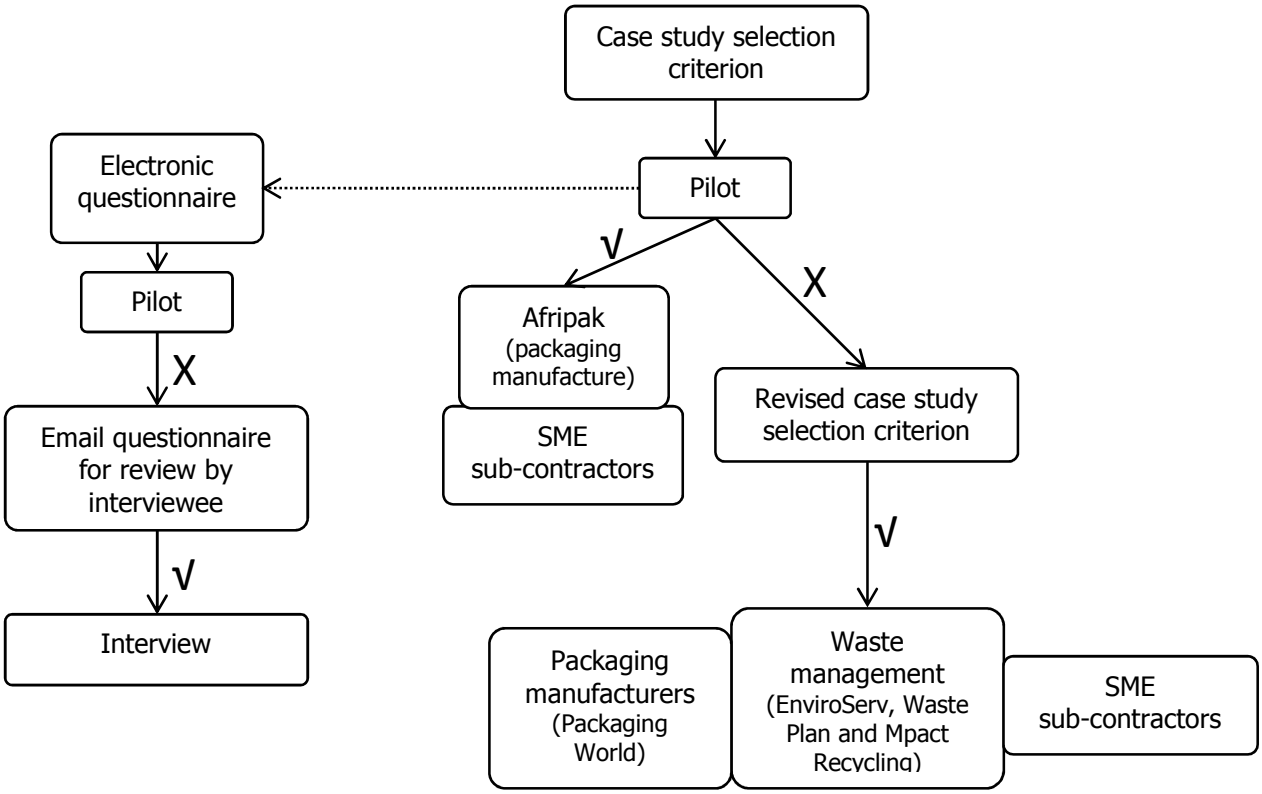

Figure 4.2 Overview of methodology revisions

At the same time a number of packaging companies in the eThekwini area were approached to participate in the study, all of whom declined. Waste contactors too, were not necessarily SME as required by case selection criterion. The waste contractor could be a large company that utilised the services of SME sub-contractors (Figure 4.2). An alternative approach was required. Silverman (2010) notes that one of the strengths of qualitative research design is that it often allows for flexibility and the sample can be changed during the research. Such flexibility is appropriate when new factors emerge, when the researcher wishes to focus on a small part of the sample in the early stages then using the wider sample for later, or when unexpected generalizations in the course of the data analysis lead to new deviant cases (Silverman, 2010). A new strategy was devised based on the findings and limitations of the pilot (Figure 4.2); the researcher then contacted waste management companies in the

eThekwini area to participate in the research. The process of selecting case study organisations was in stages that followed certain criteria; first the companies had to be a waste management company offering a waste management service, second, the company had to be located in the eThekwini area. The third criterion was that the company had to be willing to disclose the contact details of their waste contractor/s and a customer that manufactured packaging, as the customer and the waste contractor/s were also required to participate in the research (Table 4.3).

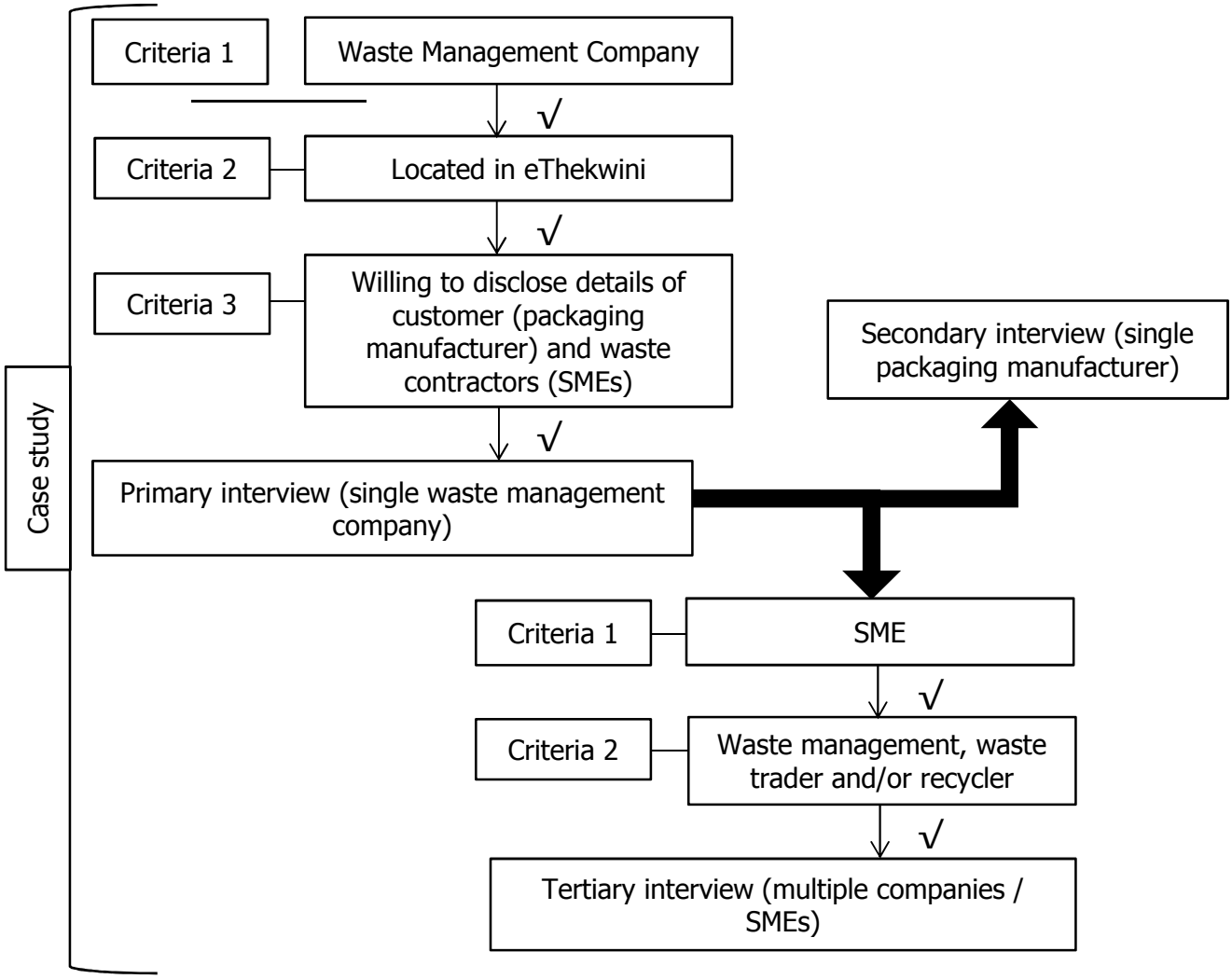

Figure 4.3 Revised approach, selection of companies for a singular case study

At this point it was found that the participants were too busy to fill in the electronic questionnaire and meet for an interview (Figure 4.2) and the questionnaire strategy was revised (see section 4.3.6.1 Interviewing). Waste Plan and EnviroServ both agreed to participate as did their customers, Packaging World and ABI. According to Stake (2005) a

case is a bounded system. It was found that there is a definite link, with environmental responsible accountability requirements between ABI, EnviroServ, Afripak and their SME subcontractors. ABI utilise the waste management services of EnviroServ and acquire packaging (flexible labels) for their product (soft drinks) from Afripak. ABI, Afripak, EnviroServ and their SME subcontractors constituted one case study (Figure 4.4) – a bounded and defined system. Similarly, it was found that there was a link, with environmental responsible accountability requirements between Packaging World, Waste Plan and their SME subcontractors, producing a second case study (Figure 4.4). During the investigation it was found that the paper recovery services of Mpact Recycling are utilised by both Waste Plan and EnviroServ. Mpact Recycling was of interest for a number of reasons. First, the Mpact Recycling paper recovery model relies heavily on the services of SME subcontractor's. It is notable that these SMEs were established by Mpact Recycling. Second, packaging is produced using four primary materials of which paper makes up the largest portion by volume (Packaging Council of South Africa, nd). The Mpact situation aligned with the aim of the research and there is a clear link between the other two case studies. Mpact Recycling, met the criteria of the research constituted the third case study (Figure 4.4).

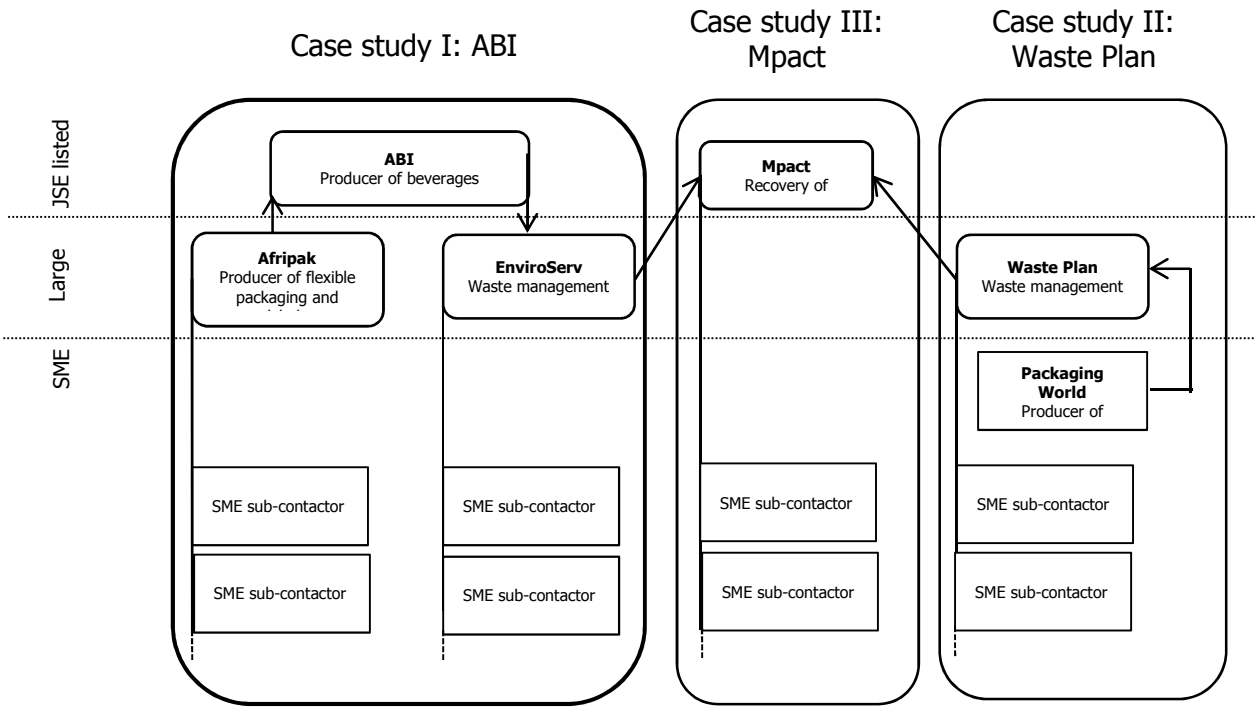

Figure 4.4 Case studies selected for this research

4.3.6 Qualitative interviews

One of the most important and essential sources of case study information is the interview (Yin, 1994). The interview method of collecting data involves an interaction between an interviewer and a participant. Interviews can take many forms (Yin, 2011) and the type of interview method to be used depends upon the nature of the problem being investigated and the type of information wanted (Kumar, 2008, Robson, 2002). According to Robson (2002) commonly used typology distinguishes among unstructured, semi-structured and structured interviews:

- Unstructured interviews

Unstructured interviews are informal, open and narrative in nature (Eriksson and Kovalainen, 2008). The interviewer has a general area of interest and concern, but allows the conversation to develop within this area. In an unstructured interview, the interviewer is allowed greater freedom to ask, in case of need, supplementary questions or at time one may omit certain questions if the situation so requires (Robson, 2002; Kothari, 2006).

- Structured

Such interviews involve the use of a set of predetermined questions with fixed wording, usually in a pre-set order. These types of interviews are appropriate when it is important to be able compare information provided by the participants in a systematic manner (Robson, 2002; Kothari, 2006; Eriksson and Kovalainen, 2008).

- Semi-structured

Semi-structured interviews have a set of pre-determined questions that usually ask for short descriptive answers. The questions would be divided into sections, typically within each section the opening question would be followed by some probing questions that allow for further discussion (Zikmund *et al*, 2010; Rule and John, 2011). During the interview, the order of the questions can be modified, explanations given, questions that seem inappropriate can be omitted, or additional ones included (Robson, 2002). Advantages of this approach include flexibility during data collection, which allows the interviewer to pursue lines on inquiry stimulated by the interview and address more specific issues (Zikmund *et al*, 2010; Rule and John, 2011), According to Rule and John (2011) the semi-structured interview is particularly suited to case study research as the case study attempts to capture the uniqueness and complexity of the case and some level of flexibility is desired during data collection.

Structured and semi-structured interviews employ the use of a questionnaire which is fundamental in the survey process and should be carefully constructed (Kothari, 2006; Panneerselvam, 2006). A questionnaire should contain a set of well formulated questions to probe and obtain a response from respondents, with consideration given to the sequence of, and the wording, the questions (Kothari, 2006; Panneerselvam, 2006). Time and effort should be dedicated to developing interview questions that are related to, but not equal to, the research questions and provide material that will help answer the research questions through careful analysis (Eriksson and Kovalainen. 2008). Questions can be either unstructured (open-ended) or structured (closed-ended); structured questions are questions with designated multiple answers or dichotomous, and unstructured questions the participate answers in their own words and the interviewer writes the answer to the question verbatim (Robson, 2002; Panneerselvam, 2006). The type of questions used will depend on the type of interview (Eriksson and Kovalainen, 2008).

Before using the questionnaire, a 'pilot study' should be conducted for testing the questionnaire. The pilot survey is a rehearsal of the questionnaire intended to obtain information about the weakness of the questionnaire and the investigation technique. From the experience gained in this way, improvement to the content, format and sequence of the questionnaire can be made (Kothari, 2006; Panneerselvam, 2006; Robson, 2002).

Interviewing is appropriate for gaining new knowledge and/or for intensive investigations (Kothari, 2006; Kumar, 2008). It is suitable for where a study focuses on the meaning of a particular phenomenon to the participants; where individual perceptions of a process within a social unit for example, an organisation are to be studied prospectively; or where individual historical accounts are required of how a particular phenomenon developed (Rule and John, 2011). One of the major advantages of the interview methods is that it allows greater control and flexibility during the questioning process. The opportunity to clarify and restore questions, and to probe for more detail is always there (Kothari, 2006; Kumar, 2008). Other advantages of using the interview method include (Kothari, 2006; Kumar, 2008):

- Interview method is simple to use
- In depth, detailed information can be obtained
- Other methods for example, observation method can be applied at the time of the interview and supplementary information gathered, which can be of value in interpreting the information

- The interviewer can usually control which person will answer the questions
- The interview situation often yields spontaneous reactions from the interviewee which can be of value in interpreting the information

On the other hand, this flexibility implies a lack of standardisation which raises concern regarding the reliability of the data (Rule and John, 2011). Furthermore, there remains the possibility of bias of the interviewer and the respondent (Kothari, 2006; Rule and John, 2011), this method is relatively time consuming (Kothari, 2006; Robson, 2002), and interviews are intrusive and can potentially change the situation and influence the interviewee (Myers, 2009). A very difficult requirement of interviewing is the proper rapport with respondents that would facilitate free and honest responses (Kothari, 2006).

4.3.6.1 Interviewing

The main research tool used in this research was semi-structured interviews conducted with key executive representatives from the participating organisations (Table 4.3). This method was deemed most suitable, not only due to the exploratory nature of the study, but interviewing is one of the most important data gathering techniques for qualitative researchers in business management (Myers, 2009). Individuals selected for the interview were either senior personnel in the organisation, or personnel responsible for environmental issues for example, Safety, Health, Environment and Quality Manager. According to Stake (1995), the researcher must make use of the best person, place and occasions to understand the case. Myers (2009) adds that when investigating an organisation, the level of the person in the organisation is an important consideration to obtain the correct information for example, a senior manager. Therefore, the person in the organisation responsible for environmental issues was targeted for the interview. It was found that, in the case of many of the SMEs, such a position does not exist. In such cases, the business owner or a senior manager was selected. It is noted that it was not always possible to interview the desired personnel, as there were no personnel directly responsible for environmental issues and the Business Owners were not available. In both cases the Operations Managers were interviewed, as per the instruction of the business owner. In some cases, the primary person interviewed were not able to provide the level of detail required and the researcher requested a further interview with personal that would be able to assist.

Subjectivity of the researcher may result in bias being introduced in the research. Examples of researcher subjectivity include the selection of data that fit the researcher's existing theory or preconceptions, and the selection of data that stand out to the researcher. Understanding and disclosing research bias, builds validity of the research (Miles and Huberman, 1994). The researcher is employed in the waste sector and is acquainted with some the organisations that participated in the research. The researcher was employed by Green Office during the research. To avoid bias, the researcher focused on interviewing the correct personnel in the organisation (as described above) and used the data collection methods described in this chapter.

Table 4.3 List of interviewees and their respective organisations

Company	Size	Type of business	Role of executive interviewed	Date of interview
Amalgamated Beverages Industries	Large	Producer of beverages	Risk Manager	12-Dec-12
Afripak	Large	Producer of flexible packaging	Group Sustainability Manager	10-Jul-12
RE-	SME	Waste management	Safety, Health, Environment and Quality Consultant	02-Aug-12
Natal Solvent Recovery	SME	Recycle solvents	Environmental Manager	07-Aug-12
E-Mode	SME	Recycle solvents	Business owner	n/a
Green Office	SME	Remanufacture and recycle printer cartridges	Director and Sustainability Leader	12-Sep-12
EnviroServ	Large	Waste management	Regional Recycling Manager	02-Oct-12
Cyclocor	SME	Recycle plastic	Business owner	29-Oct-12
Industrial Plastic Recyclers	SME	Recycle plastic	Business owner	03-Oct-12
MFI Moulders	SME	Recycle polystyrene	General Manager	02-Oct-12
Anchor Pail and Drum	SME	Refurbish drums	SHEQ/Operations Manager	08-Oct-12
Group Wreck	SME	Recovery of scrap metal	Business owner	25-Oct-12
Mpact Recycling	Large	Recover paper	Business Development Manager and SHEQ Manager	11-Sep-12
Neowood	SME	Recycle plastic	Business owner	21-Sep-12

Company	Size	Type of business	Role of executive interviewed	Date of interview
Babs Waste	SME	Recover paper	Operations Manager	26-Sep-12
Premier Waste	SME	Recover paper	Operations Manager	02-Oct-12
Central Waste	SME	Recover recyclables	Business owner	30-Oct-12
Waste Plan	Large	Waste management	Environmental Scientist	21-Aug-12
Packaging World	SME	Producer of flexible packaging	Quality Control Manager	27-Nov-12
CHM	SME	Recover plastic	Business owner	24-Oct-12

The questionnaires were constructed based on the findings from the literature review, and environmental criteria used in the ISO 14001, as this environmental certification is relevant to the business case and is the most prevalent certification scheme in South Africa (Bezuidenhout, 2007). The objective of the questionnaire was to investigate the organisations understanding of, and commitment to, environmental responsibly and examine their environmentally responsible practices (as the environmentally responsible practices infer understanding of, and commitment to, environmental responsibly) (APPENDIX A: QUESTIONNAIRE LARGE BUSINESS and APPENDIX B: QUESTIONNAIRE SMEs). SMEs were investigated to understand their successes and failures, opportunities and constraints in environmental responsibility; the perceptions of SMEs regarding these elements was an important foci of the research. For this purpose, two questionnaires were developed; one for large business (non-SME) and the same interview only extended to include questions relating to successes and failures, opportunities and constraints in environmental responsibility included, for SMEs. Open-ended and closed-ended (dichotomous) questions were employed in the questionnaire. Using both types of questions can be beneficial where the outcomes of both data mutually confirm, and support the same conclusion resulting in validation of the data (Flick, 2009).

Semi-structured interviews were deemed to be the most appropriate for this research, as they offer the opportunity of exploring knowledge and opinions of the interviewees while still offering a certain degree of standardization and comparability between the conducted interviews (Stake, 1995; Zikmund *et al*, 2010). The research intended to compare environmental responsibility amongst SMEs, and between larger organisations and their SME waste management and/or recycling subcontractors. The key advantage of this method of data acquisition is the gaining of extensive information, in-depth understanding and open

discussion of key issues, it also allows for detailed examples and rich narratives (Hoggart *et al,* 2002). It is also notable that interviews have been used extensively and have a long history in business research (Johnson *et al,* 1999; Cassell, 2009).

A pilot was initiated and the questionnaire was presented in an electronic format using Google documents (https://docs.google.com/). Opening a Gmail account (https://mail.google.com/) allows one access to Google Documents at no cost. Google documents 'form' function, allows the construction of a survey that can be filled-in by participants on-line. The data is automatically captured into a spread sheet for analysis. A pilot was initiated and the questionnaire was presented in electronic format, using the 'form' function in Google Documents. The questionnaire is accessed via link provided by Google Documents. The questionnaire for larger organisations can be view at https://docs.google.com/spreadsheet/viewform?formkey=dFNKbjZiZUV5aEE1eDZxN1BvcWJJeHc6MA and the questionnaire for SMEs can be viewed at https://docs.google.com/spreadsheet/viewform?formkey=dGhaWUlGN256SHVJNnJvZEg5dDVEZnc6MQ.

Presenting the questionnaire prior to the interview allowed the respondents to complete the questionnaire in their own words and time. As the questionnaire is in-depth and most of the questions are open-ended, this format allowed the respondent time to deliberate their responses. It was envisaged that thereafter, the researcher would have time to review the response and identify areas for clarification and possible in-depth inquiry. This method resulted in a zero response rate. This is attributed to business executives being busy and not having time to complete the questionnaire during work hours. Again, a new strategy was required (Figure 4.2). It was decided to telephonically introduce the study to the appropriate personnel in the business, and follow up with e-mail confirmation of the study and the questionnaire for the respondents review prior to a face-to-face interview. The setting up of interviews required some effort on the part of the researcher. Many executives did not respond to email requests for an interview, and it was found that telephonic contact with the perspective interviewee resulted in a better response rate. It is noted that approaching senior personnel in the organisation, who in turn requested the employee responsible for environmental responsibility proceed with the interview, was more successful than contacting the employee responsible for environmental responsibility initially. Executives are busy personnel, and constant follow up was required to secure an interview date.

Interviews were conducted at the business premises and were recorded using a digital voice recorder. Recording the interview can provide an accurate rendition, it allows for systematic transcribing and later reflection (Yin, 1994).

4.3.6.2 Observing

Data from direct observation can contrast with, and complement, information obtained by other techniques. It is not uncommon, when interview and questionnaire method are used, for discrepancies between interviewee responses and data attained from other methods (Robson, 2002). Interviews were conducted at each participating businesses premises, this presented the opportunity for direct observation of environmentally responsible activities. On completion of each interview, the researcher requested a tour of the business to observe the environmentally responsible activities discussed in the interview. Four of the twenty businesses that participated in the study declined (Table 4.4). Observed data was used to expand on and cross-examine the information provided in the interview.

Table 4.4 List participating organisations and their willingness to allow a tour of their premises

Large organisations	Type of business	Tour of premises permitted		SMEs	Type of business	Tour of premises permitted
Amalgamated Beverages Industries	Producer of beverages	√		RE-	Waste management	X
Afripak	Producer of flexible packaging	√		Natal Solvent Recovery	Recycle solvents	√
EnviroServ	Waste management	√		E-Mode	Recycle solvents	X
Waste Plan	Waste management	n/a		Green Office	Remanufacture and recycle printer cartridges	√
Mpact Recycling	Recover paper	√		Cyclocor	Recycle plastic	√
				Industrial Plastic Recyclers	Recycle plastic	X
				MFI Moulders	Recycle polystyrene	√
				Anchor Pail and Drum	Refurbish drums	√
				Group Wreck	Recovery of scrap metal	√
				Neowood	Recycle plastic	X
				Babs Waste	Recover paper	√

Large organisations	Type of business	Tour of premises permitted	SMEs	Type of business	Tour of premises permitted
			Premier Waste	Recover paper	√
			Central Waste	Recover recyclables	√
			Packaging World	Producer of flexible packaging	X
			CHM	Recover plastic	n/a

4.3.6.3 Documents (written sources)

Where possible, the researcher viewed the organisations website to gain insight into the organisation. Some of the organisation's websites included information pertaining to their environmental responsibility; this information was used to cross-examine the information provided in the interview. The larger businesses, ABI, Mpact and EnviroServ, publish annual sustainability reports, again, this information was used to cross-examine the information provided in the interview. During the interview, and where applicable, the researcher requested to view the organisations environmental policy, environmental management system, applicable licences/permits and independent reports. This information was used to verify the information provided in the interview.

4.3.7 Ethics in business research

Ethical issues and concerns are key aspects in qualitative research (Rule and John, 2011). Research ethics is the application of moral principles in planning, conducting and reporting on the results of research studies (Myers, 2009). Conducting research in an ethically sound manner enhances the quality of the research and contributes to its trustworthiness (Rule and John, 2011). The basic principles of ethically sound research, particularly applicable to business research, include (Kvale and Brinkmann, 2009; Flick, 2009; Myers 2009; Eriksson and Kovalainen, 2011):

- Voluntary participation and informed consent.

The basic information of the study should be available to the participants and include basic facts such as the purpose of the study, its procedures and the role and identity of the researcher. Participation in research must be voluntary and participants must be informed of this and their right to withdraw from the study at their discretion (Kvale and Brinkmann, 2009; Eriksson and Kovalainen, 2011). Prospective participants were informed of the study telephonically, then a follow up email that detailed the purpose of the study and intended

outcomes. The questionnaire (APPENDIX B: QUESTIONNAIRE SMEs) accompanied the email, again outlining the objectives of the study and confirming confidentiality. Having time before the interview deliberate the questionnaire permitted the participant time to review the questions and omit questions of concern.

- Confidentiality.

The participants' privacy should be respected and confidentiality should be guaranteed and maintained (Flick, 2009; Eriksson and Kovalainen, 2011). Due to the sensitive nature of the information sought from organisations confidentially was a significant concern. Prior to the interview, organisations were sent a letter confirming the research, guaranteeing confidentiality and offering solutions for disclosure in reporting on results (APPENDIX C: PARTICIPANT LETTER). Options for confidentiality were also presented in the letter. Each participant was re-informed of this before the interview commenced. Permission was sought to record each interview. Many of the organisations preferred confidentiality and non-disclosure, as such, it was decided that the contents of this thesis are to remain confidential and are not to be circulated for a period of five years.

4.4 Data analysis

After the data is collected, proper tools and techniques should be used for classification and analysis of data (Panneerselvam, 2006). Yin (1994) describes data analysis as consisting of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of the study. Yin (1994) describes two general analytical strategies; relying on theoretical proposition, the preferred strategy, is to follow theoretical propositions that led to the case study and can be useful where the theoretical proposition was about causal relations. The second general analytical strategy is to develop a descriptive framework for organising the case study. The descriptive framework organises the case study analysis and may help identify causal links to be analysed. Farquhar (2012) states that the researcher has two options for data analysis in case study research; deductive or inductive. Deductive analysis is concerned with the testing of a theory, whilst inductive analysis looks for emergent theoretical constructs or insights.

Miles and Huberman (1994) describe data analysis as consisting of three concurrent flows of activity; data reduction, data display and conclusions drawing/verification. Data reduction or data condensation refers to the process of selecting, focusing, simplifying, abstracting and transforming the data that appear in the field notes for transcription. For this research the

researcher transcribed the data from each recorded interview (5 CASE STUDIES) into a detailed description of each organisation interviewed.

The second major flow of data analysis described by Miles and Huberman (1994) is data display. This is the organised, compressed assembly of information that permits conclusion drawing and action. The most frequent form of display for qualitative data is extended text. In case study research, the typical format is to provide detailed description of each case (Stake, 1995). The findings for each organisation was presented in the same format drawing from the major themes that were outlined in the questionnaire; company overview, understanding of environmental responsibility, commitment to environmental responsibility, commitment to improving environmental performance, identifications of impacts on the environment, environmental responsibility activities. SME were investigated in more detail and further themes presented in the transcription; stakeholder engagement, social responsibility, opportunities, benefits and limitation of environmental responsibility. The findings from each organisation were summarised in tabular and graphical formats to assist with the next phase of data analysis.

The third major flow of data analysis described by Miles and Huberman (1994) is conclusion drawing and verification. Data verifications refers to the researcher's decision of what things mean and is done through noting regularities, patterns, explanations, possible configurations, causal flows and propositions. Through the detailed description of each organisation (5 CASE STUDIES), and the tabular and graphical summation of the data, deductive analysis of the data was possible. Patterns were identifiable and themes emerged and were drawn out from data across the transcriptions. The individual organisations were analysed and compared and then grouped with organisations that exhibited similar patterns. With respect to environmental responsibility, three themes resulted from this analysis; environmental responsibility in large organisations, in SMEs with environmental certification, and in SMEs without environmental certification. The next level of data analysis was the summation of questionnaire themes (described above) by the three groups of organisation identified.

According to Stake (1995) when multiple cases are used, a typical format is to provide detailed description of each case (within case analysis) followed by thematic analysis across cases (cross-case analysis). The data analysis process followed allowed for both within-case and cross-case analysis.

4.5 Limitations

The meanings emerging from the data have to be tested for their plausibility, their sturdiness, their conformability, this is, their reliability and validity (Miles and Huberman, 1994). Validity pertains to whether a method investigates what it purports to investigate (Kvale and Brinkmann, 2009) and can be analysed for example by looking for confounding influences (internal validity) or for transferability to situations beyond the current research situation (external validity) (Flick, 2007). Reliability pertains to the consistency and trustworthiness of the research finding; it is often treated in relation to the issue of whether the findings is reproducible another time by other researchers (Kvale and Brinkmann, 2009). Reliability can be measured for example by repeating a testing and assessing whether the results are the same in two or more cases (Flick, 2007). Yin (1994) describes four validity tests that are common to all qualitative methods;

1. Construct validity: establishing correct operational measures for the concepts being studied.
2. Internal validity: establishing causal relationships, whereby certain conditions are shown to lead to other conditions.
3. External validity: establishing the domain to which a study's findings can be generalised.
4. Reliability: demonstrating that the operations of the study for example, data collection procedures, can be repeated.

The validity of case study method has been criticised due to failure to develop a sufficient set operation measure for data collection and failure to increase construct validity; First, the use of multiple sources of evidence; second, establish a chain of evidence and last, have the draft case study reviewed by a key informant. Measures have been taken to increase construct validity in this research. Multiple methods of data collection were used and triangulated during data collection and analysis i.e. interviews, observation and document analysis. A chain of evidence has been maintained i.e. this thesis, that is, the thesis allows the reader to follow the derivation of evidence from initial research questions to ultimate case study conclusions (Yin, 1994).

Since internal validity only concerns explanatory studies, where researchers attempt to determine casual relationships (Yin, 1994), and this research is exploratory and descriptive, the internal validity as described by Yin (1994) is not applicable to this research.

A common criticism of case study method is that single case studies offer a poor basis for generalisation beyond the single case study (Yin, 1994). Yin (1994) suggests one tactic to increase external validity; use replication logic in multiple case studies i.e. the testing of theory through replication of the findings in similar surroundings. Measures have been taken to increase external validity in this research; theory has been tested in three different cases. It is not certain however, whether the findings are generalizable outside the boundaries of this study.

The goal of reliability is to minimise errors and biases in a study and ensure it replicability (Yin, 1994). Yin (1994) suggests two tactics to increase reliability; first, the use case study protocol and second, establish a case study database. Measures have been taken to increase reliability in this research, a case study protocol, as described by Yin (1994) was established. The outline of this thesis is evidence of the case study protocol and the thesis demonstration all of the requirements of the protocol; and overview of the case study project with project objectives, relevant readings and case study issues (Chapter one, two and three); filed procedures (this chapter); case study questions (Chapter one); and the case study report (the thesis). As this research investigated three case studies it was possible to establish a case study database; interview transcripts, links to online resources, documents, narratives and other notes entered into database.

The research relied heavily on the semi-structured interview technique and as such, is vulnerable to the limitations of this technique (as described in section 4.3.6 above). Measures have been taken to increase validity with the interviewing technique. The questionnaire was presented to the supervisor of this research prior to interview, to be certain that the layout and language of the questionnaire was understandable and clear. Initially, a pilot was conducted with the electronic version of the questionnaire, this resulted in a low response rate. It was found that telephonic contact and face-to-face interviews yielded an improved response rate.

A voice recorder was used during each interview. This allowed the researcher to focus on the interview, rather than the distraction of note taking, and optimised the time of the

interviewed. As has been mentioned, business executive are busy and time optimisation was an important factor in securing an interview. The recording allowed the researcher to reflect on the interview, multiple times, if necessary, after the interview. Follow up questions and/or clarification could then be requested, usually by email or telephonically. The voice recording optimised accuracy during transcription. One aspect that may have affected the validity is the fact that the questionnaire was sent to the respondents a few days prior to the interviews, which might have biased the respondents. Furthermore, transcripts were not sent to key informants for evaluation as suggested by Yin (1994), this can increase the validity. Due the scope of the research and the number of company's interviews, this was not deemed plausible.

Another area of concern is the questionnaire itself. Due the length and volume of information covered in the questionnaire, the interview itself, and transcribing was time consuming and cumbersome. There was difficulty in using the questionnaire for non-environmentally certified SMEs. It was found that these SMEs had very little knowledge of environmental responsibility and some respondents did not understand the concepts presented in the questionnaire. The researcher conducted the interview and explaining concepts and probing to information that may be relevant. A notable constraint is the fact that the study relied solely on the larger company, the packaging or waste management company, to refer SMEs to participate in the study. Many companies were not willing to disclose this information and the research strategy had to be amended. This may affect the replicability of the study.

4.6 Summary

Using qualitative research methods was deemed the most suitable way of achieving the aim and objectives of this research as the subject of environmental responsibility in SMEs, particularly in the South African context is underexplored. Qualitative methods taking an exploratory, descriptive approach to a multiple case study methodology were employed; the multiple case study approach allows for the same phenomenon to be investigated at different sites, and this research is exploring environmental responsibility in different organisations. It is notable that case study research is the most popular qualitative method used in business research (Myers, 2009) and this research investigates environmental responsibility in business. Literature review, semi-structured interviews, observation and document analysis were the primary data collection techniques.

In case study research, the typical format is to provide a detailed description of each case (Stake, 1995). Each case study will be described in the next chapter, findings for each organisation is presented in the same format; company overview, understanding of environmental responsibility, commitment to environmental responsibility, commitment to improving environmental performance, identification of impacts on the environment, environmental responsibility activities and in the case of SMEs the limitations, opportunities and benefits of environmental responsibility.

CHAPTER FIVE
CASE STUDIES

5.1 Introduction

This chapter outlines empirical data from three case studies; Amalgamated Beverage Industries, Packaging World and Mpact Recycling. Information about each case was gathered from interviews, the companies' websites and additional information provided by each company. Each case starts with a brief description of the company follow by information on how environmental responsibility in understood and integrated.

The first case study depicts Amalgamated Beverage Industries, their waste management outsource, EnviroServ and a supplier, Afripak, and the SME waste management and recycling sub-contractors of these organisations. The second and third case studies describe Packaging World and Mpact Recycling, and the SME waste management and recycling sub-contractors of these organisations.

5.2 Case Study I: ABI, Afripak and EnviroServ

5.2.1 Case Study I: Amalgamated Beverage Industries (ABI)

ABI are the largest producers and distributors of The Coca-Cola Company brands in the southern Hemisphere. ABI produce flexible labels for their packaging from Afripak and outsource their waste management to EnviroServ (Figure 5.1).

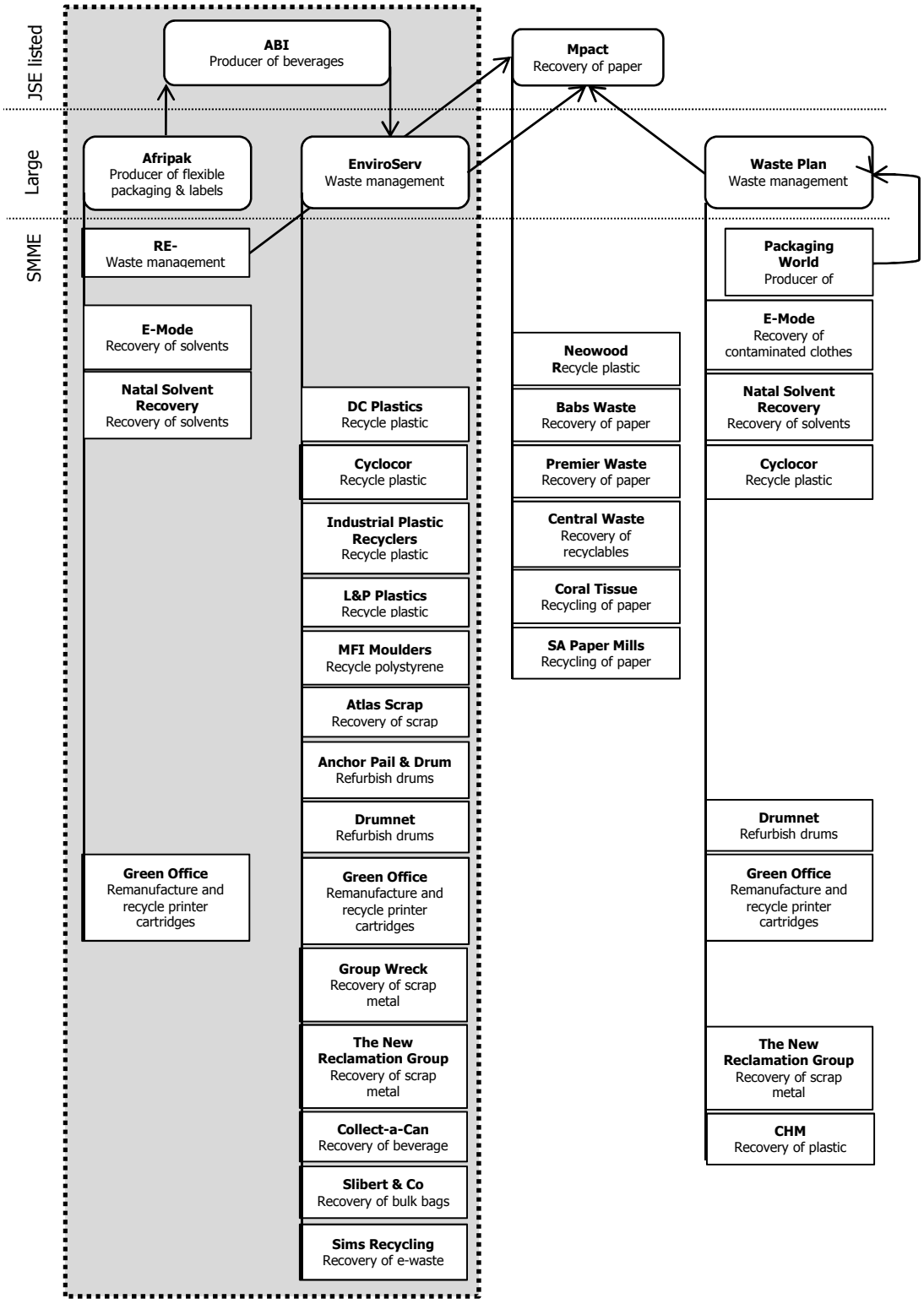

Figure 5.1 Schematic diagram of case studies

5.2.1.1 ABI: Company overview

Amalgamated Beverage Industries (ABI), the soft drink division of The South African Breweries Limited (SAB) is one of the leading soft drink businesses in the SABMiller group of companies and one of the largest producers and distributors of The Coca-Cola Company brands in the southern hemisphere (ABI, 2007). During 2004, SABMiller acquired ABI and ABI is now the South African Breweries soft drink division. ABI has a franchise agreement with The Coca-Cola Company to manufacture and distribute Coca-Cola brands. ABI has an agreement with Appletiser to distribute and sell their products. ABI was established in 1976 as a result of agreements between the Coca-Cola Export Corporation of the US, Cadbury Schweppes (SA) Ltd and SAB, became a public company in 1987 and listed on the JSE in 1989. It delisted from the JSE Securities Exchange in 2004 (ABI, 2007).

ABI accounts for approximately 60% of Coca Cola sales in South Africa, employ 3 700 staff and has five modern manufacturing plants located in Midrand, Pretoria, Devland and Phoenix (ABI, 2007). ABI's manufacturing and distribution operation located at Premier Place, Phoenix, KwaZulu-Natal, was interviewed for the purpose of this case study. These operations have been in business for more than ten years and employ 760 staff. The demographic profile of ABI (Premier Place, Phoenix) is 17% female, 83% male; 61% Black, 31% Indian, 6% White and 2% Coloured

5.2.1.2 ABI: Environmental responsibility

At ABI, sustainable development is considered a priority at board level and is central to the business strategy which guides daily operational decisions (SAB, 2012). Three sustainability concepts shape ABI's sustainable development framework (SAB, 2012);

- 'environmentability', energy efficiency, climate protection, smart packaging and water stewardship;
- 'recycleability', reduce, recover, and re-use and renewable packaging; and
- 'habitat and community', fostering sustainable communities through the creation of economic and social opportunities and ensuring the well-being of employees.

During the period April 2008 to March 2013 ABI invested R44 million on sustainable development projects. A further R15 million per annum has been allocated for 2013, 2014 and 2015 (SAB, 2012). All initiatives consider best practice from the Coca Cola System, and an experienced engineer has been earmarked to analyse and implement these projects. Part

of the process will be an on-going performance tracker to ensure that improvement initiatives are maintained and operated as designed (SAB, 2012).

ABI, being the soft drink division of SAB, their sustainable development framework is influenced by SAB. SAB identify ten sustainable development priorities that provide a framework, offer clarity to local operations and demonstrate commitment to shareholders and other stakeholders on issues material to the business (SABMiller, 2012). The approach is flexible allowing local operations to invest their resources in the issues most relevant to them. Twice a year, each business is required to provide data relating to each of the ten priorities through their bespoke management system, the Sustainability Assessment Matrix. Performance is assessed against five levels of performance, from a minimum standard (level one) to leading edge (level five). Businesses are required, as a minimum, to reach level one or have a plan in place to do so within a reasonable timeframe (SABMiller, 2012). Four of the ten priorities are relevant to environmental responsibly:

1. Making more beer using less water: SAB aim to use water efficiently and have set a water reduction target of a 25% reduction in water consumption by 2015 for the group.
2. Reducing energy and carbon footprint: SAB aim to halve their carbon emissions by 2020. This includes carbon associated with their value chain for example, packaging manufacture, transport and refrigeration.
3. Packaging, reuse and recycling: SAB aim to select packaging that takes into account its environmental impact from manufacture to disposal.
4. Working towards zero-waste operations: SAB aim for their operations to become zero waste operations.

ABI produce Coca-Cola soft drinks under the Coca-Cola licence and as such, ABI's sustainable development framework is influenced by Coca-Cola. Coca-Cola are guided by a framework built on the three pillars of economic, social and environmental sustainability and are signatories of UN Global Compact. The UN Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption (Coca-Cola, 2012). Three of the ten principles are relevant to environmental responsibility:

1. Businesses should support a precautionary approach to environmental challenges;
2. undertake initiatives to promote greater environmental responsibility; and

3. encourage the development and diffusion of environmentally friendly technologies.

Coca-Cola have nearly 275 bottling partners worldwide and recognise that bottling partners are essential to their sustainability efforts (Coca-Cola, 2012). Coca-Cola work closely with their bottling partners to ensure that their operations are aligned with Coca-Cola's environmental policies and initiatives. Bottling partners are engaging in water stewardship, energy consumption and climate protection activities, responsible packaging and waste and waste water management; the four environmental cornerstones of the group (Coca-Cola, 2012).

To ensure consistency and reliability across the group (from production to bottling and distribution) the Coca-Cola system is governed by the Coca-Cola Operating Requirements (KORE). KORE is an integrated quality management program which holds all Coca-Cola operations to the same standards for the production and distribution of Coca-Cola beverages. KORE guarantees the highest standards in product safety and quality, occupational safety and health and environmental standards across the entire Coca-Cola system by outlining clear requirements for the policies, specifications and programs that guide operations (Coca-Cola, 2012). KORE integrates business and quality objectives and aligns them with consistent metrics to monitor performance; integrates preventive action as a management tool with more rigorous demands when introducing new products and services; incorporates Hazard Analysis and Critical Control Points into the system standards; manages risk within Coca-Cola, bottling operations and across the entire supply chain; and defines problem-solving methods and tools to drive consistent quality with improvements (Coca-Cola, 2012).

5.2.1.3 ABI: KwaZulu-Natal

ABI's Risk Manager (and appointed Environmental Management Representative) reports that ABI are familiar with the term 'environmental responsibility' and describe the concept as "*protecting both our working environment in which we conduct our business as well as the external environment to the extent that we will not cause any detrimental impact to the environment*". ABI's Risk Manager has 20 years environmental experience and an industry related diploma. Furthermore, the group employ a Sustainability Manager, a Risk Manager and a team of 3 SHEQ Controller's to oversee SHEQ issues. One of the SHEQ Controllers focuses solely on environmental responsibility. ABI have learned about environmentally

responsible practices through their ISO 14001 certification and through stringent corporate standards.

ABI are ISO14001 certified, have an active environmental management system and an environmental policy. The environmental policy, which demonstrates commitment from the company's leadership, is communicated to staff via notices board and during induction training. To ensure continual improvement of their environmental performance (as per ISO 14001 requirements) ABI set environmental targets to reduce their environmental impact, these targets are set and reviewed annually. ABI capture environmental metrics on a monthly basis to monitor their environmental performance, and maintain an environmental legislation register which is outsourced to environmental lawyers and is updated on an annual basis. ABI allocate a budget for environmental projects and to guarantee continued improvement of environmental performance.

In terms of environmental responsibility, and in addition to their ISO 14001 certification, ABI are governed by ABI's corporate environmental standards, SAB's SHEQ requirements and Coca-Cola's KORE requirements. ISO 14001 re-certification is subject to an annual audit, internal SHEQ audits are conducted by corporate annually and Coca-Cola KORE audits are conducted once every three years.

5.2.1.4 ABI: Environmental responsibility activities

ABI identify water and electricity consumption as their major environmental impacts. Water is used in the washing of glass bottles recovered from trade, prior to re-fill with beverage for release back into market. Hygiene is another factor, bottling equipment is washed to ensure it is kept clean at all times to meet food hygiene standards. Furthermore, water is the principal ingredient in their product, soft drinks. ABI estimate the 2.5 litres of water is used to produce 1.25 litres of soft drink. Electricity consumption is also significant. The ABI bottling plant is largely automated utilising large machinery, and a boiler to generate steam for the sanitising of beverage bottles recovered from trade, operation of this large equipment is electricity intensive.

As is a requirement of their ISO 14001 and corporate standards, ABI participate in numerous environmentally responsible activities, measure environmental metrics, set objectives and targets that are monitored from both a plant and corporate level (Table 5.1).

For the purpose of this study, a brief overview of environmentally responsible activities is discussed.

Table 5.1 A summary of ABI's environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	ABI have implemented a comprehensive waste management system for waste recycling and disposal (5.2.1.4.1). This service is outsourced to EnviroServ. Targets are set and monitored to ensure minimisation of waste generated.
2	Extended producer responsibility	√	ABI have take-back schemes for beverage packaging; glass and PET bottles and beverage cans (5.2.1.4.2).
3	Pollution control and effluent emissions	√	The discharge of trade effluent into the municipal sewer system is regulated by the eThekwini Municipality in terms of Sewage Disposal Bylaws (5.2.1.4.3).
4	Reducing water consumption	√	Annual water consumption reduction objectives and targets are set and monitored from both a plant as well as corporate level. Targets are achieved through a number of process refinements (5.2.1.4.4).
5	Energy management	√	Annual energy consumption reduction objectives and targets are set and monitored from both a plant as well as corporate level. Targets are achieved through a number of process refinements (5.2.1.4.5).
6	Carbon emissions management	√	Annual carbon emissions reduction objectives and targets are set and monitored from both a plant as well as corporate level.
7	Transport, travel and fuel consumption	√	Distribution trucks are maintained (on a maintenance schedule) and diesel vehicle emissions are monitored by an independent consultancy bi-annually to ensure that emissions are within acceptable limits.
8	Minimising use of raw materials and conservations of natural resources	√	Packaging optimisation has resulted in the minimisation of the use of raw materials (5.2.1.4.6).
9	Air emissions management	√	National Environmental Management: Air Quality Act (No 39 of 2004) provides for the regulation of ambient air quality for example, the control of dust, noise, offensive odours and combustion installations and operations. The Act requires listed activities to apply for an Air Emissions License (AEL) which is licensed and monitored through the eThekwini Metropolitan Municipality. ABI's oil fuelled boiler, for the purpose of cleaning of glass bottles, is subject to an AEL. The AEL is subject to regular testing by the local authorities and annual renewal.
10	Environmental reporting	√	Environmental metrics are recorded, annual reduction objectives and targets are set and monitored from both a plant as well as corporate level.
11	Staff engagement	√	Training sessions and awareness campaigns are continuous, to raise awareness and to gain ownership by employees for example, staff are encourage to bring recyclables waste from home
12	Green procurement	√	ABI only procure the services of environmentally legally compliant waste contractors, including landfill. All waste contractors are audited for SHEQ legal compliance on an annual basis.

Environmental responsible activity		Yes / no	Description
13	Green design / green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	√	On-going research and improvement in chemical use is a requirement from both and environmental and food safety perspective.
15	Investment in green technology and or innovation	√	Investment in technology and process refinement has resulted in environmental savings.
16	Other	√	Continual improvement of environmental performance is a requirement at a corporate level, new projects are always in development.
Number of relevant environmentally responsible activities investigated		16	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green building/design 14. Reduction in use of harmful chemicals and or hazardous materials 15. Investment in green technology and or innovation
Number of ABI environmentally responsible activities		15	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Reduction in use of harmful chemicals and or hazardous materials 14. Investment in green technology and or innovation 15. Continued improvement of environmental performance

5.2.1.4.1 Waste management

ABI outsource their waste management (recycling and landfill) to EnviroServ, a large national management company. ABI generate approximately 458 tonnes of recyclables per month and make a profit on the recyclables (Table 5.2). For example, during November

2012 a profit of R85 777.72 was made on the sale of their recyclable materials to EnviroServ. ABI achieve an overall average recycling rate of 95%. Glass recycling amounts to an additional approximately 419 tonnes per month and approximately R174 000 profit from sale of glass for recycling.

Pallets and crates are re-used and broken pallets and crates are recycled. The suppliers of the wooden pallets, take back broken pallets for repair. Damaged crates are processed on site, through an industrial grinder and the ground plastic is sold directly to a recycler; approximately 20 tonnes per month of plastic grind.

Table 5.2 ABI's (Premier Place, Phoenix) monthly waste profile for November 2012

Solid waste type	**Waste/recyclable type**	**Approximate volume per month (tons)**
Non-recyclable	General waste	16.6
	Hazardous waste (used filters, empty chemical containers, printer cartridges, fluorescent tubes)	Small amounts, infrequently
	Ash (from boiler)	Small amounts, infrequently
Recyclable	Cardboard (for recycling)	3 620
	Cardboard (for re-use)	2 881
	Office paper	100
	Common mixed waste	120
	Supermix	600
	LD clear	797
	LD colour	47
	Shrink wrap	1 234
	Strapping	199
	HD	24
	Closures (glass bottle caps)	19 182
	PET	927
	Cans	662
	Drums	1 706
	TOTAL recyclables	**31 657**

ABI have invested in a staff awareness campaign to educate staff about the importance of recycling, encourage responsible behaviour and improve their waste management performance.

5.2.1.4.2 Extended producer responsibility

Various EPR take-back mechanisms for packaging waste are in place:

- Expired product is recalled from retailers (at ABI's cost), liquid beverage treated and released as trade effluent (under permit conditions) and beverage bottles re-used or recycled.
- All beverage packaged in glass is done so in returnable glass bottles. These bottles can be taken back to the retail outlet where they were purchased from to get back their 'returns deposit'.
- More recently, ABI supported by the PET Recycling Company (PETCO) piloted a National Schools Recycling Competition. The competition aimed to create awareness about the importance of recycling and schools were rewarded for volume of recyclables collected.
- Collect-a-Can's national and regional schools competitions are supported by ABI. Schools are remunerated by Collect-a-Can for the beverage cans collected and ABI sponsors prizes for schools that collect the most volume.

5.2.1.4.3 Pollution control and effluent emissions

The discharge of industrial effluents into the municipal sewer system is regulated by the eThekwini Municipality in terms of Sewage Disposal Bylaws. ABI's effluent emissions, residual soft drink from the bottle washing process, are subject to permitting under local bylaws (trade effluent permit). The permit is renewed annually, on submissions of an effluent monitoring report conducted by an independent consultancy and subject to random testing by the local authorities.

In case of an accidental spill en route, ABI outsource the service of an emergency spill response sub-contractor.

5.2.1.4.4 Reducing water consumption

ABI have implemented a number of water reduction strategies, examples of these include:

- Behavioural changes to prevent wasteful practices (such as over-washing and taps left running) through training.
- Improved maintenance practices for the early detection and rectification of water leaks, and optimisation of cooling tower water utilisation.
- Process modifications such as changing from wet to dry lubrication of bottling lines, rinse water recovery for re-use and conversion of the water treatment plant to membrane filtration systems.

- Other projects such as the implementation of low flow shower heads.

5.2.1.4.5 Energy management

ABI have implemented a number of electricity consumption reduction strategies, examples of these include:

- Process modifications such as compressed air management and blow moulder air recovery i.e. optimisation of process and ventilation flows and pressures.
- Shutting down of coal fired boilers through the use of recovered process heat
- Energy efficient technology installations.
- Other projects such as the installation of occupancy sensors, air conditioner timers, security lighting rationalisation and the replacement of geysers with heat pumps.

5.2.1.4.6 Minimising use of raw materials and conservations of natural resources

In terms of their PET bottles, ABI aimed to achieve a reduction in plastic produced of 9 500 tons per annum over a three year period. A substantial budget was invested in research, development and testing of PET bottles with a reduced plastic requirement. The resultant lightweighted PET bottle reduced power consumption during production of the bottle (SAB, 2012). Optimisation of the 500ml and 1 000ml bottle geometry resulted in the optimisation of pallet density, reducing the distribution environmental impacts (SAB, 2012). Down gauging of bottle labels resulted in a reduction in label usage across the board (SAB, 2012).

5.2.1.5 ABI: Observations

ABI demonstrate an understanding of, and a commitment to, environmental responsibility. Environmental impacts and aspects have been identified and mitigation measures are in place. Several environmental responsibility projects have been implemented, reduction targets have been set (and are reviewed annually), and monthly monitoring and evaluation is conducted to ensure continual improvement of their environmental performance. These activities are required at a corporate level.

5.2.1.6 ABI: Discussion and linkages

ABI have had an active and successful waste management strategy that ensures the recycling of the bulk of their waste, ABI have mechanisms in place to collect post-consumer waste. ABI outsource their waste management to EnviroServ, a large waste management

company, who in turn procure the service of sub-contractors, many of whom are SMEs. ABI procure flexible labels from Afripak (DLC) (Figure 5.2).

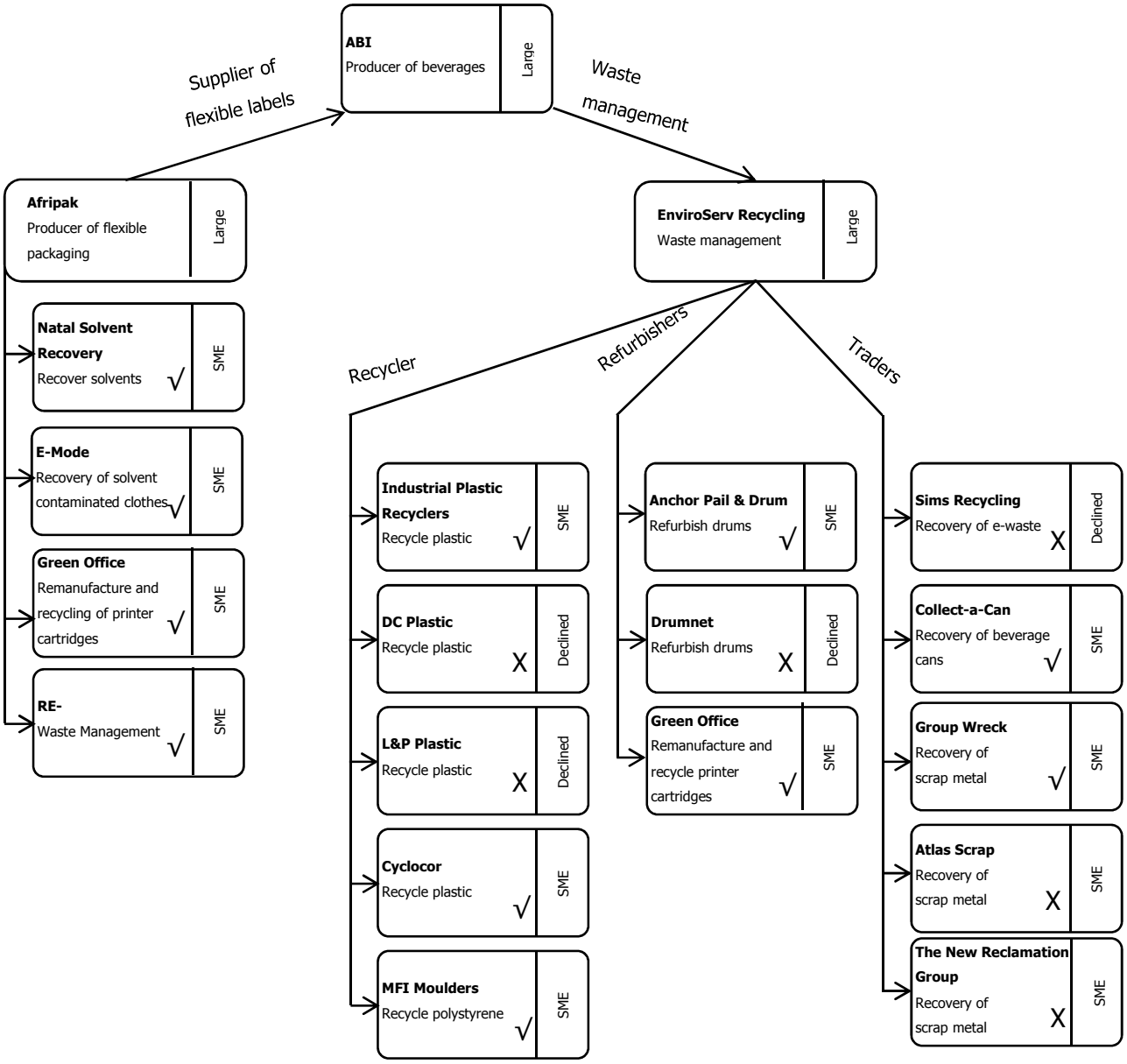

Figure 5.2 Diagram of ABI's waste management outsourcing (where √ denotes the organisations that participated in the research and X denotes those that did not)

5.2.2 Case Study I: Afripak

Afripak are a large national company that manufacture flexible packaging and labels. Afripak are a supplier of flexible labels to ABI and outsource their waste management to four local SME's; RE-, E-Mode, Natal Solvent Recovery and Green Office (Figure 5.3).

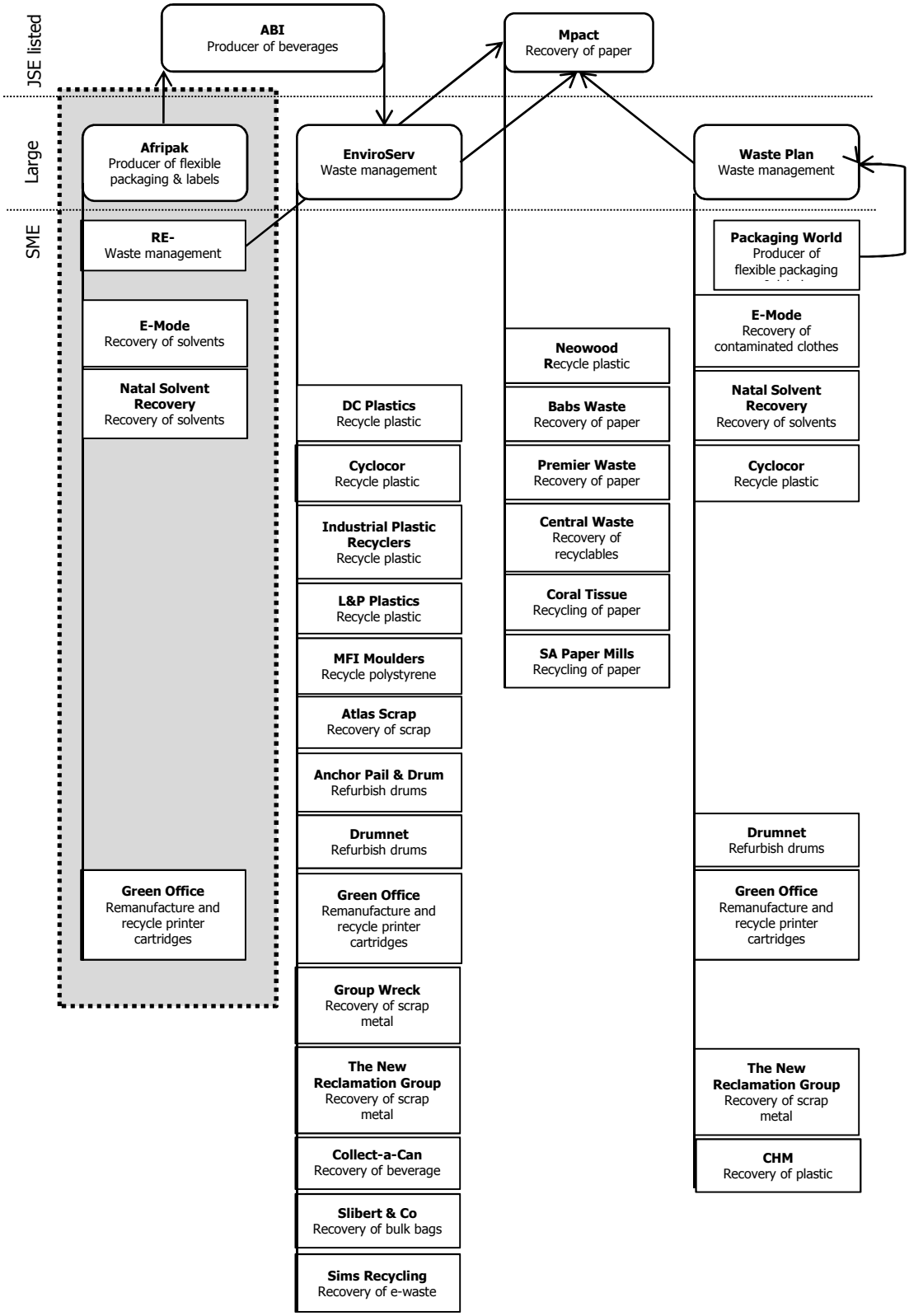

Figure 5.3 Schematic diagram of case studies

5.2.2.1 Afripak: Company overview

Afripak was founded in 1933 and has existed in its current form since 1995, they consider themselves to be widely regarded as the industry leader in the South African paper-sack and flexible packaging market (Afripak 2009). Afripak Industrial Flexibles (AIF) supply multi-wall paper-sacks, bags and flexographic printed and extrusion coated (laminated) products and paper based flexographic printed products are their primary product, supplied to the paper industry in the form of specialised paper coated and laminated products. They are a significant contributor of hoods/shrink-wrap and pallets for the cement industry as complimentary products to cement sacks (Afripak, 2009). Afripak Consumer Flexibles (ACF) is the converter and distributor of specialist mono- and composite- films for the packaging and labelling of confectionery, general food, pet food, beverages, pharmaceutical and personal care products. Afripak manufacture, import and distribute high-tech polyethylene stretch labels, PVC shrink labels and wrap-around polypropylene labels for leading brands in the beverage and food industries and are the producer of narrow web flexible packaging (Afripak, 2009).

Afripak have a national footprint with production facilities in Durban, Paarl and Johannesburg, and extend into Mauritius. Afripak has long term exclusive supply agreements with several blue chip companies in the construction, chemical and food industries and aim to add sustainable value to all stakeholders by providing superior flexible packaging solutions (Afripak, 2009).

Afripak Labels: Diverse Labelling Consultants (DLC) a regional branch of Afripak based in Westmead, KwaZulu-Natal was the subject of this case study. DLC has been in operation since 1990 but was acquired by the Afripak group in 2009, and at a branch level have an annual turnover of approximately R150 million and employ 228 staff. The demographic profile of DLC is 62% female, 38% male; 58% Black, 28% Indian, 11% White and 3% Coloured.

DLC produce labels and flexible packaging products, for example potato crisp packets, chocolate wrappers and labels such as PVC shrink sleeve labels. These products are typically a foil, or PVC shrink sleeve plastic, and ink intensive, usually with 100% ink coverage. Printing is done using the flexographic process using UV and solvent-based inks, on mainly

narrow-web presses, and the labels can go through several processes before dispatch to the customer. Output ranges from 150 to 220 tons of product per month.

5.2.2.2 Afripak: Environmental Responsibility

Afripak's Group Sustainability Manager reports that Afripak are familiar with the term 'environmental responsibility' and describe the concept succinctly as "*producing goods with the understanding that this must be done with minimal impact on the environment*". Afripak's Group Sustainability Manager has 23 years environmental experience in the business domain. Reflecting on the last two decades of environmental thinking from a business perspective, he notes that there has been a transition from a philosophy of 'do not pollute' to more contemporary concepts such as corporate sustainability which he describes as "*taking a more business-like approach to managing environmental impacts*" which in turn often result in cost savings. The group have become familiar with these concepts through interaction with their suppliers and customers, training, association with peers in the waste management industry and self-learning (newsletters, memberships, and other media).

Afripak are not JSE listed (therefore there is no formal reporting to external stakeholders) nor does DLC have an environmental certification thus, all environmental responsibility activities are undertaken voluntarily. There is a group environmental policy, which demonstrates commitment from the company's leadership and is communicated to staff via an intranet system and notice board, and to external stakeholders on request.

In KwaZulu-Natal, one of the Afripak's branches (Mobeni) is 1SO 14001 certified, has an active EMS and an environmental strategy (reviewed annually). DLC has neither an EMS nor the ISO 14001 certification. Afripak plan to roll the certification throughout the group when and as resources allow, in particular, an additional employee to oversee the implementation of the EMS. DLC are however ISO 22000 certified which covers some environmental elements. ISO 22000 is a food safety management system standard that specifies requirements for a food safety management system where an organization in the food chain needs to demonstrate its ability to control food safety hazards to ensure that food is safe at the time of human consumption (ISO website).

Afripak employ a designated Risk Manager to ensure legal compliance who is accountable for environmental (and other) compliance for the group. Risk assessments are conducted bi-

annually by an external consultant and inform Afripak's environmental impacts and aspects. Afripak make use of an independent legal advisor who conducts annual legal audits, this includes an environmental legal compliance audit.

Afripak's leadership demonstrate commitment to environmental responsibility reasoning that "*leadership have a duty to staff, stakeholders and customers to protect the environment and secure the financial future of the business*". Commitment extends to the employment of a full time Sustainability Manager for the group who is educated in the subject to the level of a post-graduate degree. Environmental issues are deliberated at a MANCO level and each branch has a 'green team' that assist with environmental projects.

There is no formal budget for environmental responsibility projects, the financial feasibility of projects are assessed on a needs basis, relating to the priority environmental targets at the time. Return on investment must to be illustrated, and is key to the decision. To ensure continual improvement of their environmental performance, Afripak set environmental targets to reduce their environmental impact. Targets are set and reviewed annually.

Afripak's Group Sustainability Manager explains that "*the problem with a lot of companies is that they see environmental responsibility as a 'nice to have' and not a 'got to have'*". He remarks that Afripak demonstrate leadership in environmental responsibility as they are implementing many environmental responsibility projects voluntarily.

5.2.2.3 Afripak: Environmental responsibility activities

Afripak identify air emissions as their most significant environmental impact due to the use of solvent-based inks which exhaust into the atmosphere as they dry. Electricity use is a significant impact, making up 97% of the groups carbon footprint, this is due the heat intense technology required to fuse ink to the packaging substrate.

Afripak participate in a number of environmentally responsible practices; waste management and recycling for which they have won several awards, they are investigating water and electricity consumption reduction opportunities and air emissions management (Table 5.3).

Table 5.3 A summary of Afripak's environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	DLC outsource waste management to RE-, donate waste to crafters and have won several awards for their waste management practices (5.2.2.3.1)
2	Extended producer responsibility	√	DLC accept bulk overruns and 'redundant stock' from customers for recycling or landfilling (whichever is most suitable) via their current, on site, outsourced, waste management system. Other than this, as the product (flexible packaging and labels) is made for specifically for the consumer market, DLC see this waste as the food producer's responsibility and do not take back any post-consumer waste.
3	Pollution control and effluent emissions	√	All hazardous waste is disposed of in accordance with standard legislation via the waste manage outsource company (RE-).
4	Reducing water consumption	√	Monitoring of water consumption and investigating rain water harvesting (5.2.2.3.2).
5	Energy management	√	Electricity consumption monitoring and use of independent consultant to investigate electricity reduction options and rebates (5.2.2.3.2).
6	Carbon emissions management	√	Afripak calculate and monitor their carbon footprint on a monthly basis.
7	Transport, travel and fuel consumption	X	Afripak are a major consumer of electricity (97% of the total carbon footprint). Flight and travel emissions are a comparatively small impact and their focus is currently in major environmental impacts.
8	Minimising use of raw materials and conservations of natural resources	√	DLC have tested and implemented strategies to reduce the use of raw materials and the amount of waste during production. An example of this include the down gauging of materials to as thin a film as possible within technical allowance. Another example is the optimisation of the width of reels of film to minimise trim waste. Afripak engage with clients, educating them about the environmental impacts of packaging and 'over packaging', encouraging them to minimise packaging and reduce packaging waste.
9	Air emissions management	√	Printing has recently been declared a listed activity and Afripak are assisting the local authorities with benchmarking stack emissions for the printing industry (5.2.2.3.4)
10	Environmental reporting	√	ABI (a key customer) require monthly reporting and continual improvement of environmental performance (5.2.2.3.5).
11	Staff engagement	√	Afripak have established 'green teams' to assist with environmentally responsible practices (5.2.2.3.6).
12	Green procurement	√	Afripak are ISO 22000 certified. The certification that all suppliers are audited and some environmental elements are covered in auditing.
13	Green design/green building	X	No current or future plans for green building.
14	Reduction in use of harmful chemicals and or hazardous materials	√	Larger clients for example, Woolworths, Nestle and PolyOak provide guidelines specifying solvents and chemicals that they require are not used in their packaging. DLC further ensure that their suppliers are aware of the requirements and insist that

Environmental responsible activity		Yes / no	Description
			they provide proof of compliance. Additionally, DLC ensure that post printing residual solvents are below the industry norms.
15	Investment in green technology and or innovation	X	Though 'green technologies' have been investigated, specifically sustainable energy options and alternative packaging films, neither have been implemented due to the high cost of these alternatives.
16	Other	√	Afripak founded and are active members of the only active industrial conservancy in South Africa, the Richmond Marianhill Conservancy The conservancy was founded during 1999. Monthly meetings facilitate discussion between industry, the local community and local government about local environmental issues.
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green building/design 14. Reduction in use of harmful chemicals and or hazardous materials 15. Investment in green technology and or innovation
Number of Afripak environmentally responsible activities		13	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Minimising use of raw materials and conservations of natural resources 8. Air emissions management 9. Environmental reporting 10. Staff engagement 11. Green procurement 12. Reduction in use of harmful chemicals and or hazardous materials 13. Industrial conservancy

5.2.2.3.1 Waste management

DLC have had a waste management strategy in place since 1997 and currently have a recycling rate of approximately 72% of their solid waste and a 46% recycling rate of their hazardous waste. An average of 35 tons of recyclable waste per month is generated (Table 5.4). In addition to recycling, overruns of film are donated to various artwork trusts and a

small proportion of this waste is handcrafted into clothing items such as waist coats, bags and hats, which are sold to generate an income for the trust.

DLC outsource their waste management (recycling and landfill) to RE-, a waste management SME. A service level agreement with RE- specifies which materials RE- collect and how they are managed and processed and specifies landfill sites for disposal. DLC make a profit every month on recyclables for example, during June 2012 a profit of R24 000 was made on the sale of their recyclable to Re-Ethical (the profit is not used for environmental projects). DLC employ one full time person and an additional three full time staff via the Re-Ethical outsource for the purpose of sorting, packing waste for collection.

Table 5.4 DLC's monthly waste profile

Solid waste type	Waste/recyclable type	Volume per month (tons)
Non-recyclable	PET film	3
	PVC film	3
	Mixed general waste for example, mixed plastics, laminates	10
	Rags, tins, plastic and cardboard contaminated with ink and solvents	4
Recyclable	Polypropylene	20
	Polyethylene	12
	Paper cores	2.5
	Cardboard	2.5
	Metal	0.8
	Miscellaneous (bottles, strapping, shrinkwrap, plastic end boards)	0.8
	Office paper	0.1
	TOTAL	**58.7**

RE- were subject to an environmental compliance audit prior to the acquisition of their service and an annual audit thereafter. Afripak do not audit further downstream as RE- is ISO 14001 certified which requires that RE- audit their downstream waste contractors for environmental compliance. Findings of audits are discussed at the level of the 'green teams' and at a MANCO level.

DLC have won the below listed awards for excellence in waste management:

- 1998: KwaZulu-Natal Waste Management Awards; Best Non- Chemical Manufacturing Company

- 1999: Durban Metro Mayors Awards; Excellence in Big Business (supporting clean environment initiatives)
- 2002 and 2004: KwaZulu-Natal Waste Management Awards; Merit Certificate
- 2006: Durban Solid Waste Trophy; Waste Management and Environmental Initiatives
- 2009: Gold Pack; Recognition medal for functional art from waste
- 2010: FIMA award; Innovative use of polypropylene film (in clothing)
- 2011: Gold Pack; Gold medal for environmental initiatives with Coca-Cola product labelling

5.2.2.3.2 Reducing water consumption

DLC have implemented a water consumption reduction strategy. Sub-meters have been fitted throughout the premises to monitor water use on a daily basis, facilitate the timeous identification and rectification of water leaks thereby reducing water wastage, and facilitate the identification of high water use areas. Additional sub-meters have been installed at high water use areas to assist with pinpointing specific high water use activities. Continual monitoring and improvement to the water monitoring system enables the identification of priority areas for mitigation measures to be implemented and the setting of realistic water consumption reduction targets, the quantification of the success of mitigation measures, tracking of performance against reduction targets and benchmarking between different sites. DLC have set water consumption reductions targets for water use per tonne of product which are monitored and reported on monthly.

At the time of the survey, DLC were investigating rain water harvesting as an option for reducing water consumption. DLC have engaged with Carbon Global Exchange (an environmental consultancy) to assist with a water strategy and water footprinting for DLC. The Group Sustainability Manager noted that using a consultant can often help sway management decision on projects such as these, as management perceive that the consultant has superior expertise and experience and consultancy is a paid for service, taking their advice is additionally perceived as a return on investment. The success of the current water reduction strategy at DLC with determine roll out at other branches.

5.2.2.3.3 Energy management

Afripak have identified that air emissions and electricity use are their significant environmental impacts. DLC consumes an average of 300 MWh of electricity per month. For

the group, energy use makes up 97% of the carbon footprint and 99% of DLC's carbon footprint. The business is energy intensive due to the use of industrial heat presses that fuse the ink to the packaging substrate.

The only mitigation measure in place is the monthly energy use measurement and monitoring. Energy use per ton of material is monitored monthly and compared with a target set at the beginning of each year.

An energy audit has been conducted by WSP Environmental Consultants and submitted to Eskom for approval of a rebate. The energy audit showed that significant energy savings can be made with various technical interventions with a reasonable return on investment. At the time of the interview, Eskom was offering several funding and rebate options for business energy efficiency projects (Eskom, 2010). DLC outsourced the investigation of The Standard Product via the ESCo Model to WSP Energy Consultants. Eskom's Standard Product offer was developed to create capacity to implement small and medium-sized energy efficiency projects. Through this programme, businesses were able to replace most commonly-used inefficient technologies with their energy efficient equivalents for example, the replacement of incandescent bulbs with CFLs and/or the installation of energy efficient shower heads (Eskom, 2010). Energy Service Companies (ESCos) who are accredited by Eskom, such as WSP Energy Consultants, operate by establishing a three-way partnership between themselves, Eskom and the customer i.e. DLC. The ESCo use their knowledge of energy efficient technologies and programmes to determine the best way of obtaining electricity savings at customer premises. To participate in the funding programme, the ESCo submits a proposal on potential savings which Eskom reviews on its technical and financial merits, as well as, energy savings potential. Once a contract has been signed, the ESCo is given the go-ahead to implement the project. Eskom supports ESCo projects by funding up to 100% of the financial benchmark value for viable energy efficiency projects (Eskom, 2010).

5.2.2.3.4 Air emissions management

As per DLC's bi-annual risk assessments, air emissions have been identified as their most significant environmental impact. Occupational hygiene surveys are conducted bi-annually for indoor air emission monitoring; this is a requirement of the Occupational Health and Safety Act (85 of 1993). Printing has recently been declared a listed activity, prior 2012

printing emissions were neither monitored nor declared with the exception of a stack emission reading at one plant during 2009. DEA are proposing the use of UK stack emission regulations for the South Africa context and Afripak were engaging with the Department to assist with benchmarking stack emissions for a South African context as the UK regulations are stringent and as per the 2009 reading, Afripak realised that that extreme measures would be required to comply. At the time of the interview, DEA were taking stack emission readings at one of their KwaZulu-Natal plants for this purpose. It is envisaged that a decision on air emissions thresholds will be made by the DEA in the very near future and that DLC will have 5 years to meet these limitations on emissions. The regulations will require that Afripak are licensed and annual stack emissions monitoring will be mandatory.

Prior to 2012, the only mitigation for air emission taken by Afripak was the conversion of two of their presses from solvent to UV based ink. They have a further four solvent based presses that cannot be converted to water based ink as it is not a suitable application for the substrate (foil) used at this time. Some testing of ink reduction with current technology has been explored without success. Regulation of the printing industry could potentially result in a reduction in the amount of ink on packaging due to the high cost of the technology required to reduce solvent emissions from printing.

5.2.2.3.5 Environmental reporting

At the time of the survey, there was no legal requirement for Afripak to report on environmental performance (as they are not listed on the JSE). However, one of their key customers, Amalgamated Beverage Industries (owned by SAB), have, since April 2012, required monthly environmental reporting. Reporting is done using a template provided by ABI and includes the following data:

- Water consumption and savings
- Electricity consumption and savings
- Waste volumes, recycling volumes and waste reduction (per waste stream)
- Reduction in landfill disposal

A further requirement is the setting of reduction targets, related to tonnage of product output, which are set annually and a description of activities to achieve reduction targets provided. This information is supplied to ABI via email on a monthly basis and quarterly presentation. The same information is reported internally to 'green teams' and at MANCO level.

5.2.2.3.6 Staff engagement

Afripak have established 'green teams' at each of their five plants in KwaZulu-Natal. Teams are voluntary and made up of between two and five people. They are responsible for data capture of environmental metrics for example, water and electricity consumption and reporting these to the Group Sustainability Manager. To keep the 'green teams' motivated, informed and create awareness regular email communications relevant to topical environmental issues are sent.

The environmental data is summarised and the results shared with the 'green teams' and presented at MANCO level. This allows for the company to understand their performance against reduction targets. The data is used for benchmarking amongst the five KwaZulu-Natal sites.

5.2.2.3.7 Other

DLC contribute articles to industry related publications, and attend meetings and workshops where they share their experiences in implementing environmental responsibility projects, the packaging industry's response to climate change and give advice to peers on request. DLC present to customers, educating them about the environmental impacts of packaging, and encouraging them to choose flexible packaging with a lower environmental impact for example, a product with minimised ink coverage.

5.2.2.4 Afripak: Observations

DLC demonstrate an understanding of, and a commitment to, environmental responsibility. Environmental impacts and aspects have been identified and mitigation measures are in place. Several environmental responsibility projects have been implemented, reduction targets have been set (and are reviewed annually), and monthly monitoring and evaluation is conducted to ensure continual improvement of their environmental performance. Environmental responsibility extends beyond DLC itself; there is some engagement with, and educational activities, with stakeholders.

DLC do not, however, have an environmental certification nor has a formal EMS been implemented. Voluntary environmental reporting was put in place during April 2010, when

ABI (a key customer of DLC) required disclosure of, and evidence of improvement of environmental performance.

Although air emissions and energy consumption have been identified as DLC's major environmental impacts, no major interventions have been taken to mitigate these impacts. Printing has recently been listed as a regulated activity and DLC are engaging with DEA to assist with benchmarking. DLC recognise that air emission regulations would require the implementation of costly technology to comply. Similarly, energy efficiency technologies and Eskom rebates have been investigated, and the implementation is dependant of the return on investment of the project. Also, water consumption has not been identified as a major environmental impact of DLC, but mitigation measures are in place. This is a requirement of ABI.

5.2.2.5 Afripak: Discussion and linkages

DLC have had an active and successful waste management strategy since 1997 (pre-legislative and ABI requirements) and have won several industry awards. At the time of the survey, DLC outsourced the bulk of their waste management to RE-, hazardous waste recycling was outsourced to E-Mode and Natal Solvent Recovery, and printer cartridge refurbishment outsourced to Green Office. All four waste service providers are SMEs (within the definition of a SME for the purposes of this thesis) and all four were willing to participate in the study (Figure 5.4). Unfortunately, RE- were not willing to disclose any information relating to their subcontractors, further SME's that recycle, refurbish or trade recyclable waste.

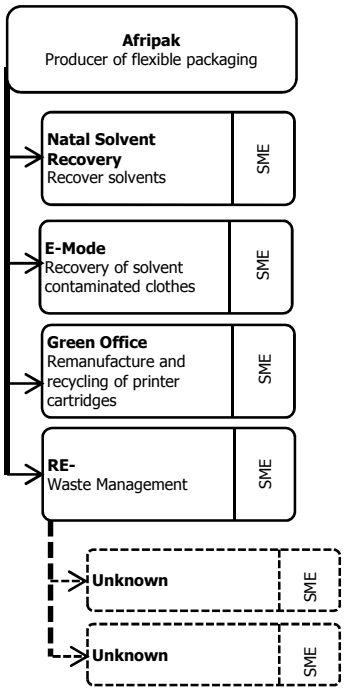

Figure 5.4 Diagram of DLC's waste management outsourcing to SME's

5.2.2.6 E-Mode: Company overview

E-Mode's business is the recovery of solvents from solvent contaminated clothes. The clean clothes are sold back to the customer for re-use and solvent waste disposed of. No further details are available. E-Mode participated in the study by completing the questionnaire over e-mail and did not complete the questionnaire. E-Mode were not willing to allow the researcher to conduct a site visit or divulge any further information (than that supplied in the incomplete questionnaire).

E-Mode, located in Phoenix, KwaZulu-Natal has been in business for more than one year, and E-Mode fall within the National Small Business Amendment Act of 2003's definition of an SME, having an approximate annual turnover of between R0.2 to R5 million, and employing 16 staff. The demographic profile of E-Mode is 94% male, 6% female; 75% Black and 25% Indian.

5.2.2.7 E-Mode: Environmental responsibility

E-Mode report that they are familiar with the term 'environmental responsibility' but did not offer a definition of the concept. E-Mode perceive that they are environmentally responsible, as stated by the Director of the company "*we have invested only in the top of the range and*

environmentally friendly machinery manufactured in Europe. We have a re-use and recycle culture".

There is no environmental policy, staff are not trained in environmental issues and there is no system in place to ensure compliance with environmental legislation. E-Mode does not plan to pursue environmental certification or implement environmentally responsible practices.

5.2.2.8 E-Mode: Environmental responsibility activities

E-Mode did not specify the impact of their operations on the environment but do participate in some of the environmental responsibility activities investigated for the purpose of this study (Table 5.5).

Table 5.5 A description of E-Mode environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Metal, paper and cardboard waste are sold to recyclers. Hazardous waste is disposed of in an environmentally responsible manner.
2	Extended producer responsibility	√	E-Mode perceive that they are offering an EPR service, as they collect dirty solvent form the customer, clean it and supply it back to them.
3	Pollution control and effluent emissions	n/a	No emissions or effluent.
4	Reducing water consumption	√	Equipment is imported and fitted with water reticulation and cleaning systems, thereby extending the use of the water in the solvent recycling process reducing water consumption. No measures have been taken to reduce domestic water consumption.
5	Energy management	√	E-Mode have invested in fitting energy motors to equipment to identify high energy users.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	√	Delivery routes are planned in advance to reduce the consumption of fuel.
8	Minimising use of raw materials and conservations of natural resources	√	Re-use wooden pallets and plastic bags to pack product.
9	Air emissions management	X	
10	Environmental reporting	X	

Environmental responsible activity		Yes / no	Description
11	Staff engagement	X	
12	Green procurement	X	
13	Green design / green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	X	
15	Investment in green technology and or innovation	X	
16	Other	√	Sludge waste is generated during the solvent recovery process. E-Mode are investigating the viability of incinerating the sludge waste to power cement kilms.
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Reducing water consumption 4. Energy management 5. Carbon emissions management 6. Transport, travel and fuel consumption 7. Minimising use of raw materials and conservations of natural resources 8. Air emissions management 9. Environmental reporting 10. Staff engagement 11. Green procurement 12. Green building/design 13. Reduction in use of harmful chemicals and or hazardous materials 14. Investment in green technology and or innovation
Number of E-Mode environmentally responsible activities		7	1. Waste management 2. Extended producer responsibility 3. Reducing water consumption 4. Energy management 5. Transport, travel and fuel consumption 6. Minimising use of raw materials and conservations of natural resources 7. Investigating alternate power sources utilising waste
17	Social responsibility activities	?	Not known.

5.2.2.9 E-Mode: Limitations, opportunities and benefits

E-Mode demonstrate limited understanding of, and commitment to, environmental responsibility. It is therefore difficult to establish possible limitations and benefits that E-Mode may experience from environmentally responsible practices. E-Mode perceived that due to the service they offer, they are an environmentally responsible business, there is a demand for their service and the business is growing.

E-Mode note that there are competitors in the market that are not legally complaint and as such, can offer the same service at a reduced cost. E-Mode state that it has been their experience that companies, national and locally private owned, value cost saving over compliance and knowingly support non-compliant competitor. E-Mode suggest that formalisation of the recycling industry could mitigate this problem. They believe that government support in the form of policy and policing thereof, could further assist and E-Mode suggest that, in terms of extended use responsibility, the manufacturers of solvents should pay a fee to assist with the development of small businesses, that ultimately, clean up their waste.

E-mode express a desire to further improve their environmental performance and credentials, but are limited by a lack of financial resources.

5.2.2.10 E-Mode: Observations

E-Mode were not willing to meet for an interview and submitted the uncompleted questionnaire via email. They also declined requests for a site visit, stating that they are a small operation with limited staff and do not have the resources to accommodate a site visit.

5.2.2.11 E-Mode: Summary of findings

In summary, E-Mode demonstrate limited understanding of environmental responsibility, limited commitment to environmental responsibility, and participate in some environmental responsibility activities (Figure 5.5).

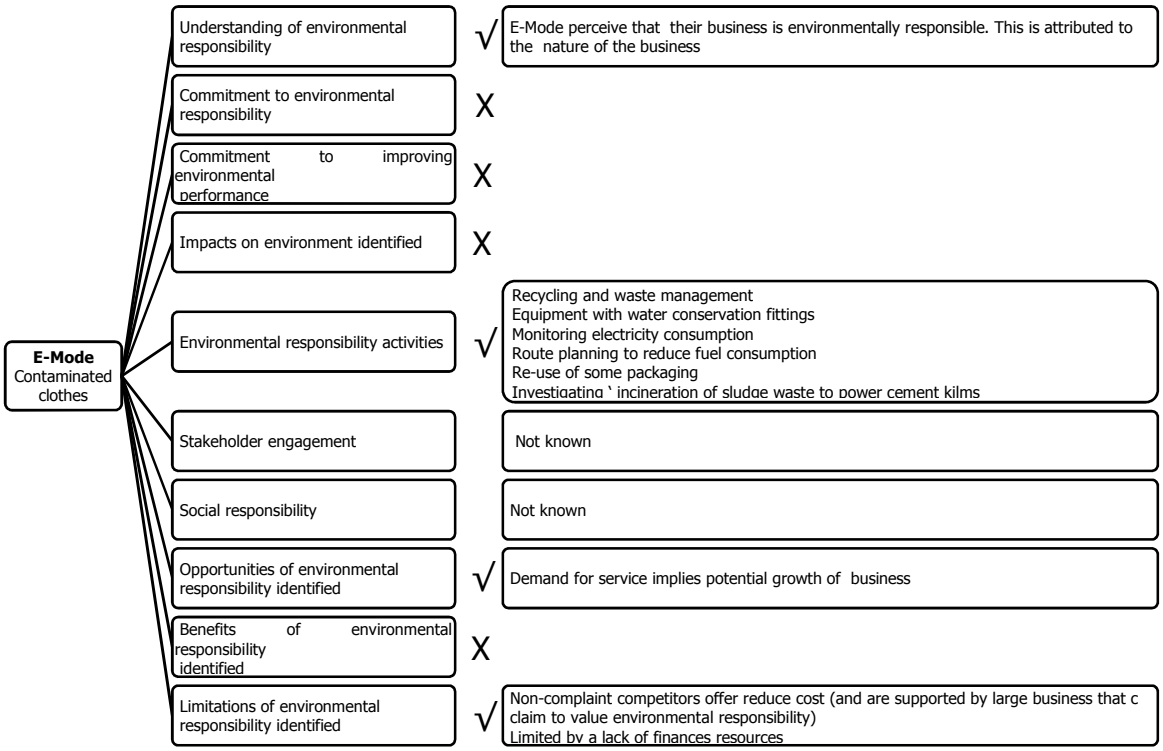

Figure 5.5 Summary of findings for E-Mode

5.2.2.12 NSR: Company overview

Natal Solvent Recovery (NSR) specializes in the recycling and purifying of solvents and work with the paint industry to 'purify' contaminated solvents through a distillation process (Figure 5.6). Between the manufacture of different batches of paint, paint producing machinery is washed out with solvents, typically thinners, so that the machine is clean for the production of the next batch of paint. NSR 'purify' the 'dirty' solvent and sell it back to the customer to be used for the same purpose again. NSR's recovery rate on the solvent is between 60 and 90%, and purity is approximately 98%.

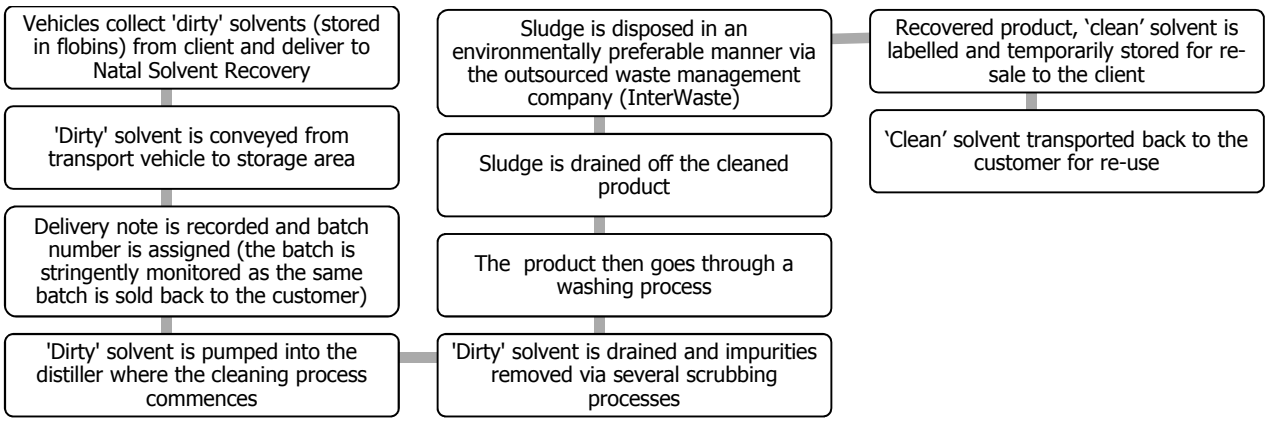

Figure 5.6 Summary of Natal Solvent Recovery's process flow (adapted from Natal Solvent Recovery, 2010)

NSR, located in Pinetown, KwaZulu-Natal is a family owned and run business that has been in operation for more than ten years and are classed as a micro to very small sized business (in the manufacturing sector) as they employ 14 staff and have an annual turnover of between R5 to R13 million. The demographic profile of NSR is 79% male, 21% female; 71% Black and 29% White.

5.2.2.13 NSR: Environmental responsibility

NSR are familiar with the term environmental responsibility and describe it succinctly as "*taking care of our environment for those of our future*". The nature of the business is recycling, which benefits the environment, and as such NSR believe that they have responsibility, beyond their core business to protect the environment. NSR have become familiar with these concepts through interaction with their suppliers and customers, training, association with peers in the waste management industry and self-learning (newsletters, memberships, and other media).

NSR are ISO 14001 certified and as such have an environmental management system and environmental policy, which demonstrates commitment from the company's leadership and is communicated to staff through the staff notice board and internal training. NSR were encouraged by a customer to pursue ISO14001 certification as the customer was pursuing the certification themselves and paradoxically, NSR gained their ISO14001 certification prior to the customer receiving theirs.

NSR's environmental committee comprises the CEO, Environmental Manager and three Shift Supervisors, committee meetings are held bi-annually where the Shift Supervisors are

trained internally and externally in environmental responsibility for example, hazardous waste handling and health and safety. NSR is a family owned business and environmental responsibility is driven by the family and as NSR is a small company all staff are involved in environmental responsibility discussions.

Commitment extends to employment of an Environmental Manager who is responsible for maintaining the ISO 14001 system. The Environmental Manager was trained on ISO 14001, ISO 14001 auditing and basic environmental law through the South African Bureau of Standards (SABS) – the national institution for the promotion and maintenance of standardization and quality in connection with commodities and the rendering of services. Budget for environmental responsibility projects is permitted on a needs basis, such projects are discussed and approved at an environmental committee level.

As part of NSRs ISO14001 system, environmental metrics are recorded monthly and environmental targets are set and reviewed annually. Priority areas are identified informally at environmental committee meetings. Legal audits are outsourced to an environmental lawyer and are reviewed bi-annually.

NSR are ISO 9001 certified and are in the processes of applying for ISO18001 certification. ISO 9001 is a quality management system and ISO 18001 is an occupational health and safety management system (ISO website).

5.2.2.14 NSR: Environmental responsibility activities

NSR identify hazardous waste to landfill as their most significant environmental impact due to the hazardous by-product of the distillation process being produced daily (essentially concentrated enamel paint that has a 'toffee' consistency). Electricity use is a significant impact, this is due the heat intense distiller that runs seven days a week, 24 hours a day. NSR participate in a number of environmentally responsible activities (Table 5.6).

Table 5.6 A description of NSR environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	NSR are a small company and internal waste management and recycling is not seen as a priority area for environmental

Environmental responsible activity		Yes / no	Description
			performance improvement. However, NSR do donate all their scrap paper (paper printed in one side) to a local school. Hazardous waste management is a key environmental concern. NSR produce approximately 35 to 30 tons of hazardous waste per month. Hazardous waste management is outsourced to InterWaste and is sent to Shongweni landfill (owned by EnviroServ) for safe disposal. It is noted that hazardous waste disposal is the principal expense of the business, up to R180,000.00 per month.
2	Extended producer responsibility	√	NSR perceive that they are offering an EPR service, as they collect dirty solvent form the customer, clean it and supply it back to them.
3	Pollution control and effluent emissions	√	NSR outsource their ventilation surveys, stack emission surveys, hazardous chemical substance surveys, diesel vehicles and risk assessment to an independent consultancy. This is done bi-annually as per legislative requirements.
4	Reducing water consumption	X	Water use is domestic type and since they are a small staff compliment, this is not seen has a major environmental impact. No measures have been taken to reduce water use.
5	Energy management	√	Electricity usage is monitored on a monthly basis and measures are being taken to reduce electricity consumption (5.2.2.14.1).
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	X	Diesel vehicle emissions are monitored by an independent consultancy bi-annually. This is a regulative requirement for vehicles transporting hazardous waste.
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	√	Stack emissions are monitored bi-annually an independent consultancy.
10	Environmental reporting	√	NSR are subject to an annual environmental management system audit by the SABS in order to re-qualify for ISO14001 certification. Some of NSRs larger customers Plascon, Dulux and Afripak, also audit annually. It is noted that smaller businesses do not audit NSR.
11	Staff engagement	√	Environmental issues are discussed at management meetings, induction training and in toolbox talks.
12	Green procurement	X	
13	Green design / green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	X	
15	Investment in green technology and or innovation	√	NSR are investigating alternative technologies to reduce electricity consumption (5.2.2.14.1).
16	Other	√	As per the requirement of their ISO 14001 EMS, NSR seek too

Environmental responsible activity		Yes / no	Description
			continually improve their environmental performance and new projects are being identified.
Number of relevant environmentally responsible activities investigated		15	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green building / design 14. Reduction in use of harmful chemicals and or hazardous materials 15. Investment in green technology and or innovation
Number of Babs Waste environmentally responsible activities		9	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Energy management 5. Air emissions management 6. Environmental reporting 7. Staff engagement 8. Investment in green technology and or innovation 9. Continued improvement of environmental performance
17	Social responsibility activities	√	Support non-profit organisations on an *ad hoc* basis

5.2.2.14.1 Investment in green technology and/or innovation

NSR are a full-time operation running an electricity intensive distiller which relies on a closed system of heated oil to evaporate the solvent out of the paint. Electricity consumption has been identified as a significant cost and environmental impact of the business, costing an average of R30 000.00 to R40 000.00 per month, the second most significant cost to the business. To reduce their reliance on electricity, NSR are in the process of acquiring an oil burner (a new technology) that will burn waste solvent to heat the oil that keeps the distiller hot. The system will allow for the desiccation of the sludge waste, to a 'powder' rather than a 'sludge' consistency reducing the volumes of waste to hazardous landfill, reducing landfill costs and the environmental impact. The project is currently awaiting approval by the Department of Environmental Affairs.

5.2.2.15 NSR: Limitations, opportunities and benefits

NSR believe that their ISO 14001 certification has played a significant role in appealing to new customers and securing business. The certification has meant that ISO 14001 certified customers have preferred to use NSR, as they too are ISO14001 certified as the ISO 14001 system encourages that certified business prefer the use of certified suppliers. It is noted however that running the ISO14001 system is costly, especially for a small business with a limited budget.

NSR waste licence took seven years to obtain, and the assistance of three different environmental consultancies and an environmental lawyer. This is attributed to high staff turnover and inefficiencies within the government department for example, the department repeatedly misplacing their application, every time a new staff member takes over the application they have to start the process from scratch. It is noted that the uniqueness of the business may have played a part in the lengthy process. This same perceived 'apathy' and inefficiency from the department is preventing the growth of the business (as re-application for the waste licence is required if the business increases it capacity) and the implementation of new a technology described in section 5.2.2.14.1. The cost of re-application is a further major factor preventing the business from growing.

5.2.2.16 NSR: Stakeholder engagement

NSR ISO 14001 certification is subject to annual renewal by the certification body, NSR use the services of environmental consultants and lawyers and DEA for the purpose of their waste licence and expansion of the business.

5.2.2.17 NSR: Summary of findings

NSR demonstrate an understanding of, and a commitment to, environmental responsibility and partake in a number of environmentally responsible activities (Figure 5.7).

Figure 5.7 Summary of findings for NSR

5.2.2.18 Green Office: Company Overview

The business was founded on the collection of empty printer cartridges for remanufacture and re-sale or export. Empty printer cartridges are rebuilt and refilled to meet the original equipment manufacturer's performance specifications, and sold back into the market for re-use. Green Office's remanufactured printer cartridges are STMC certified which is a universally accepted standard of testing cartridge performance in the remanufacturing industry.

Green Office has a national empty printer cartridge collection programme (Figure 5.8). As empty printer cartridges have a monetary value, customers are remunerated for the value of the empty printer cartridge collected. Many clients opt to donate the value of the cartridges to a charity and Green Office facilitates this process. Empty cartridges are collected through six mechanisms:

1. Corporate collections: collection boxes are placed in corporate clients and collected when full.

2. Brokers: small black owned businesses, typically sole proprietorships, collect independently of Green Office and sell bulk volume to Green Office on a bi-weekly basis.
3. Courier 'take-back' system: Each Green Office remanufactured printer cartridge sold into market is supplied with a return sticker. When the printer cartridge is empty, it can be return to Green Office by the courier at Green Office's cost.
4. Community partners: Green Office partners with several charities that drive collections through their membership and funders. Instead of these stakeholders donating funds, they collect empty printer cartridges on behalf of the charity. More than R200,000 was donated to charity during the 2011 financial year via this mechanism.
5. Schools: Branded 'greenSCHOOL', cartridge collections are driven through schools and proceeds from the collections raise funds for the school. This programme has an educational element and the greenSCHOOL mascot, Captain Cartridge visits schools, educating scholars about the environmental benefits of recycling and other environmental issues.
6. Agents: Branded 'greenAGENTs', spinal cord injured persons who are home bound due to the severity of their mobility impairment are set up as home based call centre agents for Green Office. Under Green Office guidance and mentorship, greenAGENTs develop their own client base and earn an income through empty printer cartridge collections.

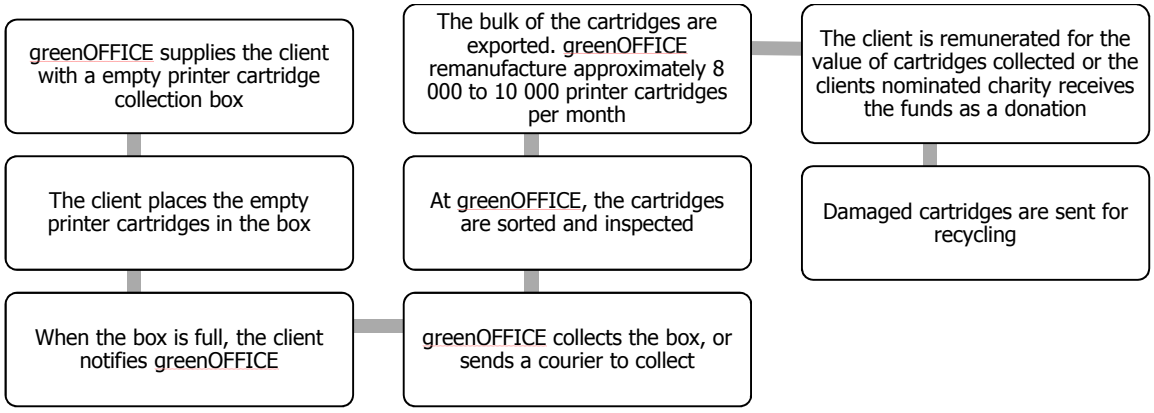

Figure 5.8 An overview of the Green Office empty printer cartridge collection process

During 2006, Green Office observed that the industry was transforming and that the businesses real strength would lie in offering a service to clients, in addition to the high

quality compatible printer cartridge. Currently, the core offering of the business is a Managed Print Service (MPS). This is effectively the outsourcing of the document process within an organisation, whereby Green Office ensures that the document devices (printers, copiers, faxes scanners) are optimized as are the workflows of the staff.

Offices are based in Durban (head office), Johannesburg and Cape Town. All branches collect empty printer cartridges, only the Durban branch export and remanufacture. Green Office is ISO 14001 and 9001 certified and they are members of the Institute of Waste Management South Africa and The E-Waste Association of South Africa.

Green Office has been in business for more than ten years and their head office, based in New Germany, KwaZulu-Natal was the subject of this interview. Green Office fall outside the National Small Business Amendment Act of 2003's definition of a SME (transport, storage and communications), though they employ less than 200 staff, their annual turnover is more than R51 million. The demographic profile of Green Office is 29% female, 371 male; 58% Black, 20% Coloured, 17% Indian and 5% White.

5.2.2.19 Green Office: Environmental responsibility

Green Office's Sustainability Leader reports that they are familiar with the term 'environmental responsibility' and describe the concept as "*creating a business that can grow and continue into the future (thereby contributing the economy and job creation) whilst continually improving their environmental performance*". Green Office's Sustainability Leader has ten years environmental experience and a post-graduate degree in the natural sciences. The group have become familiar with these concepts through interaction with their stakeholders, formal training and self-learning.

Green Office has been ISO14001 certified since 2010 and Green Office adopted an environmental policy during the development of the ISO14001 environmental management system. The environmental policy, which demonstrates commitment from the company's leadership, is communicated to staff via notices board and during induction training. The policy is not communicated externally.

Green Office's leadership demonstrate commitment to environmental responsibility; the Sustainability Leader reports directly to the Director who is actively involved in

environmental decisions and monitoring. This is achieved through monthly meetings with the Director. The Director and key management sit on the management review committee where environmental performance is reviewed annually, and sets targets for the next year. Green Office capture environmental metrics on a monthly basis to monitor their environmental performance. The environmental department does not have a budget, nor is there a budget for environmental projects; budget for environmental projects is approved on a needs basis.

Commitment extends to the employment of a full time Sustainability Leader and Sustainability Assistant. The Sustainability leaders role has existed for three years and includes (but is not limited to) the management, implementation and improvement of the ISO 14001 environmental management system, environmental compliance, and internal and external environmental education and training and management of all corporate social investment projects.

Green Office maintain a legislation register as part of their ISO 14001 environmental management system and keeps up-to-date with legislative requirements through email newsletter subscriptions (EnviroBrief Legal) and the Sustainability Leader sits on the Durban Chamber of Commerce and Industry Environmental Committee who meet bi-monthly and is attended by an environmental lawyer who provides environmental legislative updates. At the time of the interview, Green Office were working with an environmental lawyer to formalise an environmental legal opinion for the company.

5.2.2.20 Green Office: Environmental responsibility activities

Green Office identify hazardous waste to landfill and electricity consumption as their major environmental impacts. Empty printer cartridges are deemed hazardous due to the residual toner that remains in the drum chamber after the cartridge has stopped functioning. This is removed during the remanufacturing process and disposed of in a low hazardous rated landfill. Toner dust that is released during the printer cartridge remanufacture process is greenOFFICE's largest risk as the toner dust is hazardous and flammable. Significant environmental impacts were determined and are monitored through the quantification of environmental metrics and carbon footprint calculation.

Green Office participate in almost all of the environmental responsibility activities investigated for the purpose of this study, and social responsibility activities are a function of their core business i.e. collecting empty printer cartridge to raise funds for non-profit organisations (Table 5.7).

Table 5.7 A description of Green Office's environmental responsibility activities

Environmental responsible activity		**Yes / no**	**Description**
1	Waste management	√	Green Office have implemented a full waste management system outsourced to EnviroServ (5.2.2.20.1).
2	Extended producer responsibility	√	Green Office participates in a number of EPR activities (5.2.2.20.2)
3	Pollution control and effluent emissions	√	An empty printer cartridge has some residual toner left in the chamber, this is removed with compressed air when the cartridge is cleaned. This is the first stage of the remanufacture process. This toner waste is deemed hazardous and requires disposal in a low hazardous landfill. Hazardous waste is stored and transported in a leak proof skip and sealed 250ml drum to ensure pollution prevention. Effluent emissions are not applicable.
4	Reducing water consumption	√	Water consumption is domestic type and water is not used in any operational processes. For the purpose of reducing water consumption, flow restrictors have been fitted to all taps throughout the building, 'brick' have been placed in toilet cisterns to reduce flush volume and all flow urinals were retrofitted to flush urinals. This resulted in a 40% reduction in water consumption over the 2011 financial year period.
5	Energy management	√	Energy monitoring is not accurate as the property is rented and the electricity meter is shared with 3 other businesses on the premises. Electricity is billed pro-rata, based on m^2 rented. An independent electricity sub-meter has been investigated but budget was not approved due to the high cost of installation. Green Office have outsourced an energy audit to an independent consultant to identify high energy use areas. At the time of the interview, the results of the energy audit were pending. It was envisaged that the results would inform energy reducing strategies that could be implemented for example, energy efficient lighting.
6	Carbon emissions management	√	Green Office calculate their carbon footprint on a monthly basis. This data is presented to management annually.
7	Transport, travel and fuel consumption	√	All vehicles are tracked by satellite for maximum efficiency and traceability, though daily route planning and the monitoring of driver behaviour. Employee commute is noted as a high environmental impact of the business. This is attributed to number single occupancy vehicles commuting to and back from work. Carpooling is encouraged, with little success.

Environmental responsible activity		Yes / no	Description
			Staff flights are another high impact area. Remote conferencing has been investigated but not implemented due the high cost of such a system and lack of buy in from management.
8	Minimising use of raw materials and conservations of natural resources	√	Other than internal paper saving initiatives such as duplex printing, no minimising use of raw materials or conserving natural resources projects have been implemented.
9	Air emissions management	n/a	
10	Environmental reporting	√	Green Office provide clients with a report per collection that notes the number of cartridges collected and quantifies the environmental benefit of that collection for example, number of cartridges diverted from landfill, landfill space saving, carbon footprint saving
11	Staff engagement	√	Staff are introduced to the environmental policy and ISO 14001 environmental management system during induction training. At this time they are trained in basic environmental responsibility in the work place for example, recycle waste, conserve water and electricity saving tips. There is a follow up training every 6 months by means of the company's intranet system, where staff are required to read a 'greening' checklist and respond on completion. A follow multiple choice quiz is administered to monitor the success of the training. Green Office also celebrate several environmental days during the year for example, tree planting on Arbour Day and local clean up during recycling week, and hold staff competitions for example, an environmental quiz with a monetary prize for the winner, to encourage staff engagement.
12	Green procurement	X	
13	Green design / green building	n/a	Not applicable as all premises are rented.
14	Reduction in use of harmful chemicals and or hazardous materials	√	Green Office has phased out the use of ammonia based cleaners for office cleaning and use a 'green' alternative. Small amounts of solvents are used in the remanufacture process and alternative have been investigated with no success.
15	Investment in green technology and or innovation	√	Green Office consider the initiation of the greenABLE, a non-profit company, to be a green innovation (5.2.2.20.3)
16	Other	√	New environmental responsibility projects are constantly being identified and investigated and the expansion and success of current projects reviewed.

Environmental responsible activity		Yes / no	Description
Number of relevant environmentally responsible activities investigated		13	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Environmental reporting 10. Staff engagement 11. Green procurement 12. Reduction in use of harmful chemicals and or hazardous materials 13. Investment in green technology and or innovation
Number of Green Office environmentally responsible activities		13	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Environmental reporting 10. Staff engagement 11. Reduction in use of harmful chemicals and or hazardous materials 12. Investment in green technology and or innovation 13. Continued improvement of environmental performance
17	Social responsibility activities	√	Green Office assist non-profit organisation, schools and spinal cord injured persons raise funds through empty printer cartridge collections. Green Office has an active staff volunteer Programme that assists with on event annually for example, painting a school, planting community vegetable gardens.

5.2.2.20.1 Waste management

Green Office's core business is the collection of empty printer cartridges for remanufacture and recycling. Green Office collect an average of 52 225 printer cartridges per month, this equates to approximately 41 780 tonnes of printer cartridge waste diverted from landfill per month (Table 5.8).

Table 5.8 Total empty printer cartridges collected by Green Office from January 2011 to August 2012

	Total collected	**Recycled**	**Remanufactured**
Jan-11	35 082	3 192	31 890
Feb-11	39 052	2 855	36 197
Mar-11	67 602	5 704	61 898
Apr-11	35 478	3 729	31 749
May-11	49 599	4 358	45 241
Jun-11	49 788	3 674	46 114
Jul-11	43 431	6 274	37 157
Aug-11	51 973	6 000	45 973
Sep-11	47 749	7 900	39 849
Oct-11	47 353	10 237	37 116
Nov-11	56 442	11 006	45 436
Dec-11	34 321	4 928	29 393
Jan-12	39 386	4 400	34 986
Feb-12	58 209	9 063	49 146
Mar-12	61 158	9 100	52 058
Apr-12	54 351	8 127	46 224
May-12	76 736	10 928	65 808
Jun-12	69 494	9 840	59 654
Jul-12	57 153	11 083	46 070
Aug-12	70 139	9 508	60 631
Average collected per month	**52 225**	**7 095**	**45 130**

During June 2010, Green Office implemented a full waste management system. All internal waste is recycled and hazardous waste disposed of in accordance with current environmental regulations. This system was outsourced to EnviroServ and approximately 2 762.79 kg of waste is recycled per month and 1 837.50 kg is disposed per month (Table 5.9). Staff are encourage to bring recyclables from home to increase volumes. It is noted that organic waste is not composted and this is an area for improvement.

Table 5.9 Green Office's national monthly waste profile

Solid waste type	**Waste/recyclable type**	**Volume per month (kg)**
Non-recyclable	General waste	1 000.00
	Hazardous waste	837.50
Recyclable	Cardboard	1 600.00
	Glass	53.50
	Metal (cans)	29.13
	Paper – common mix waste	91.23
	Paper – office	109.91

Solid waste type	Waste/recyclable type	Volume per month (kg)
	Plastic – Bubble wrap	32.42
	Plastic – HD	31.79
	Plastic – LD	61.61
	Plastic – PET	32.11
	Plastic – PP	37.90
	Plastic – PS	14.00
	Plastic – Strapping	12.00
	TOTAL	**4 000.29**

5.2.2.20.2 Extended producer responsibility

Green Office take back all printer cartridges and printers, and associated packaging, from customers for recycling. This is achieved through their schools collection programme, corporate collections and courier take back system.

As part of their ISO 14001 environmental management system, Green Office undertakes environmental audits on their waste contractors and is audited by some of their clients. Green Office has an active schools programme and a full-time staff member to oversee this programme. The Green Office mascot, Captain Cartridge, visits schools educating scholars about recycling and other environmental issues, encouraging schools to collect empty printer cartridges. This is an educational programme intended to increase the volume of cartridges collected and reach the home user i.e. the parents.

During June 2011, Green Office initiated the Durban Business Sustainability Forum, a quarterly gathering of sustainability professionals from Durban business for the purpose of information sharing, networking and collaboration. The forum offers a learning and networking platform for Durban business, with a focus on environmental challenges that business face.

5.2.2.20.3 Investment in green technology and/or innovation

Green Office are the first and only in Africa to have a recycling solution for printer cartridge waste (those that are damaged and cannot be remanufactured). They founded a Non-Profit Company, greenABLE, for this purpose. greenABLE is registered as a separate legal entity with Green Office as the custodians a funder of the new organisation. It is envisaged that other funders will be secured in time to assist with the development of greenABLE.

greenABLE employs previously disadvantaged individuals with disabilities for the purpose of cleaning, dismantling and sorting of printer cartridge waste into their recyclable components. The recyclable components, plastic, scrap metal and aluminium are sold to recyclers for recycling and to generate an income for the project.

It is envisaged that greenABLE will be a development 'incubator' for previously disadvantaged individuals with disabilities. As the work is relatively inexpert, greenABLE are able to employ persons with minimal educational qualifications and no previous work experience. greenABLE provides skills development opportunities for example, Adult Education Training and leanerships for employees. This will facilitate the development of staff into more skilled and better remunerated positions, within greenABLE, Green Office or other employers.

5.2.2.21 Green Office: Limitations, opportunities and benefits

Green Office state two overriding motives for establishing environmentally responsible practices. First, it was envisaged that being environmentally responsible would result in the competitive advantage for the company, especially since the company offer an environmentally responsible service; the remanufacture and recycling of empty printer cartridges. The second motive was that of ethics and a moral sense of duty the environment. Benefits of environmentally responsible practices have been two fold. First, the company is perceived to be ethical by staff and this has helped with morale within the business, and attracting prospective employees. Second, Green Office have been able to improve the business environmental performance and reduce their impact on the environment.

Being environmentally responsible has presented two major opportunities for the business. The initiation of greenABLE has allowed the business to diversify into recycling, the first and only printer cartridge recycling facility in Africa. The Durban Business Sustainability Forum was also the first of its kind in KwaZulu-Natal and has resulted in visibility for the business and association with many beneficial stakeholders.

It is noted that the primary challenge of environmentally responsible practices is that in the company's experience, 'green' is perceived to come at a premium, a higher cost. This can be detrimental to a prospective sale. Even with a competitive price, many prospective clients

are apathetic about, or do not understand environmental issues. There is a need to educate the client which is time consuming and does not always pay off. Competitive cost is an important factor in the sale and keeping the client.

It is noted that being the size of the company has been advantageous and limitations in relation to environmentally responsible practices. Being small allows the company to make and act on environmental decisions and projects in a short time span and the company has made significant environmental progress in a short period of time. Being small however, does mean that resources are limited and the scope of projects can be limited.

5.2.2.22 Green Office: Stakeholder engagement

Green Office is actively participating in the provincial initiative of the Electronic Waste Association of South Africa as an active member of the Recycling Portfolio Action Group, are members of the KZN Recycling Forum, and the Institute of Waste Management South Africa, and sit on the Durban Chamber of Commerce and Industry environmental committee. Green Office is working in collaboration with USE-IT: an eThekwini Municipality initiative established as the Waste Materials Recovery Industry Development Cluster and the Wildlands Conservation Trust.

It is notable that Green Office's schools collections programme has attracted the attention of large corporations and a pilot collection of other recyclables is being conducted in partnership with these large corporates.

5.2.2.23 Green Office: Summary of findings

Green Office demonstrate an understanding of, and a commitment to, environmental responsibility (ISO 14001 certification) and partake in a number of environmentally and socially responsible activities (Figure 5.9).

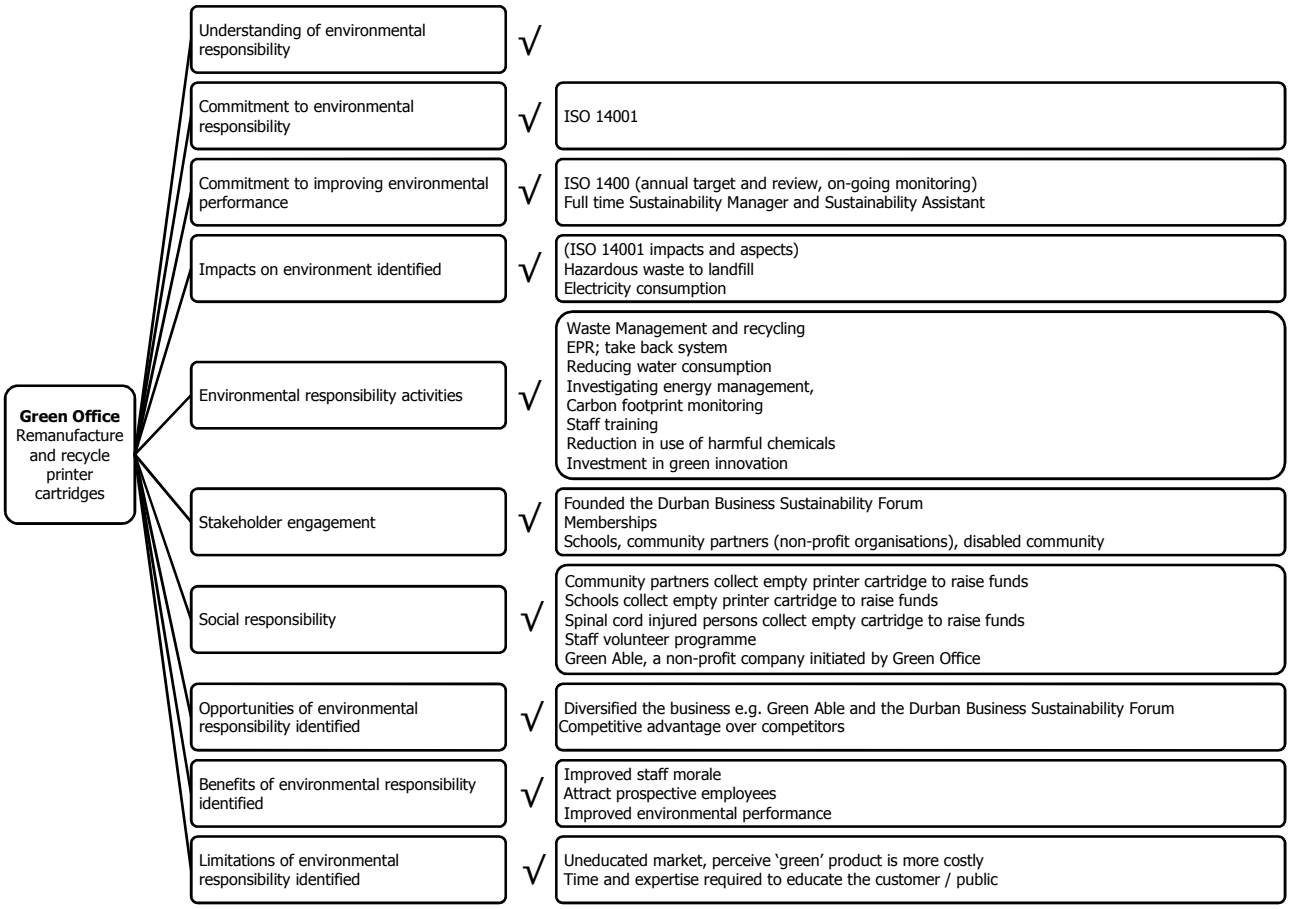

Figure 5.9 Summary of findings for Green Office

5.2.2.24 RE-: Company overview

RE- is a national environmental solutions and waste management company **(Figure 5.10**). RE- provide innovative solutions that promote environmental sustainability through the reduction, re-use, recycling and recovery of product ensuring that sound waste management practices are implemented. RE- focuses on providing sustainable solutions including the development of carbon strategies, integrated waste management and waste minimization programs to optimize recycling and has specialist divisions that trade in recycled products (RE-, 2012).

RE-'s client base includes blue chip corporates, manufacturers, commercial and retail clients, and the municipality and public sector. RE- are members of the Institute of Waste Management South Africa, the E-Waste Association of South Africa PETCO, and the South African Plastic Recycling Organization (RE-, 2012) operating in Durban, Johannesburg and Cape Town.

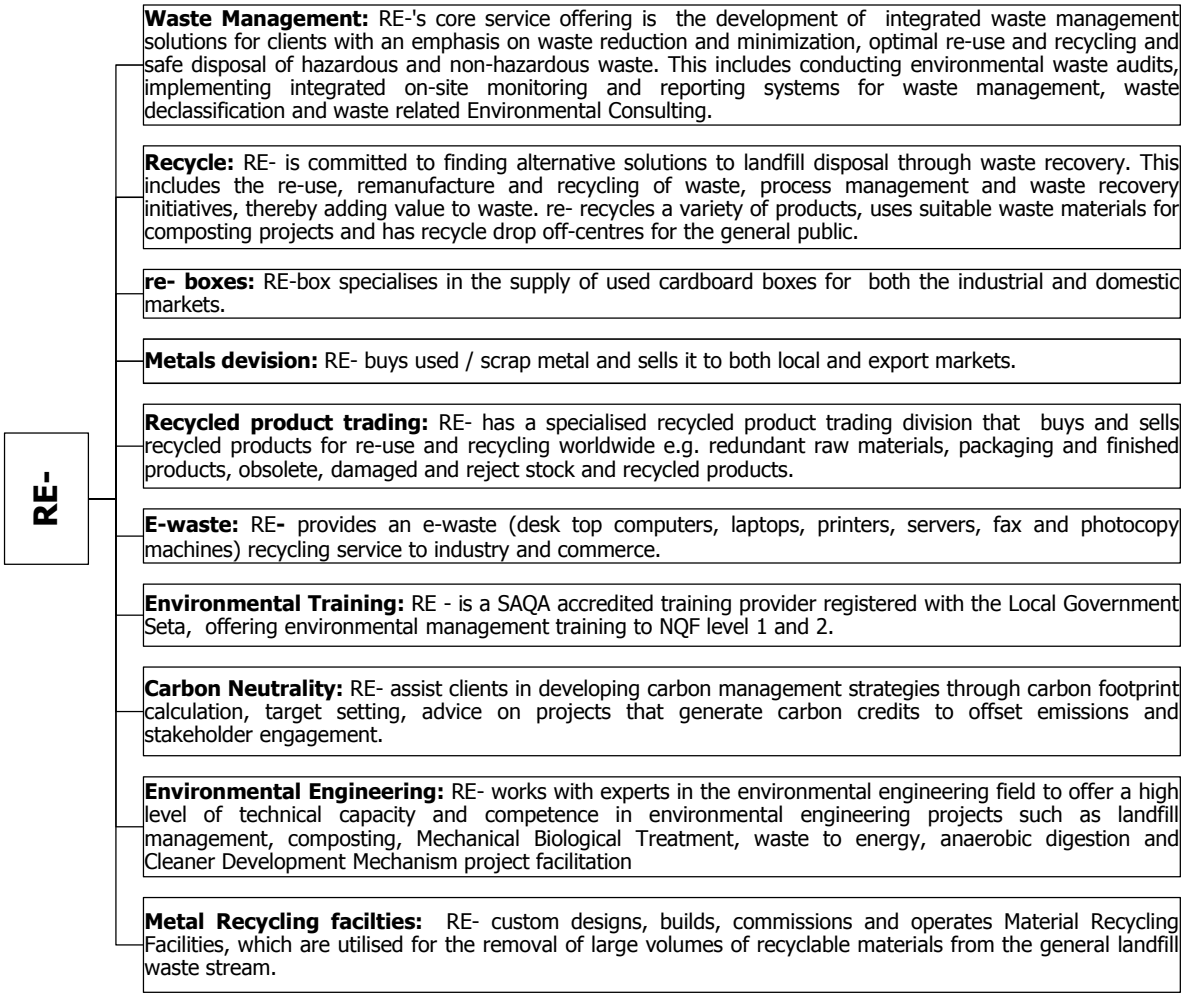

Figure 5.10 A diagrammatic overview of re-'s service offering (RE-, 2012)

RE- do not recycle the waste streams that are collected. Recyclables are collected (purchased) and transported to their central depot in Prospecton (greater Durban area, eThekwini). Here, it is sorted, then bailed, glomerated, crushed or shredded and stored in bulk. These processes render the recyclables more valuable and are then sold to recyclers for recycling.

RE-'s head office is based in Prospecton, and were the subject of the case study. RE- has been operating since 1988, have an approximate annual turnover of more than R51 million and employ a total of 149 staff. The demographic profile of RE- is 45% female, 55% males, 77% Black, 11% Coloured, 9% Indian and 2% White. RE- fall outside the National Small Business Amendment Act of 2003's definition of a SME (transport, storage and communications), though they employ less than 200 staff, their annual turnover is more than R51 million.

5.2.2.25 RE-: Environmental responsibility

RE-'s Safety, Health, Environment and Quality Consultant reports that RE- are familiar with the term 'environmental responsibility' and describes the concept as "*taking responsibility /ownership of how your business practises impact on the environment, and ensuring that negative impacts are reduced*". RE- believe that as they are a waste management company and that environmental responsibility is their core business, as an additional service they assist their clients in meeting their obligations in terms of environmental responsibility for example, reducing waste to landfill and waste environmental consulting. RE- state that the fact that they are a waste management company that does not own a landfill site sets them apart in term of environmental responsibility. The primary focus of the business is finding innovative alternatives to landfilling waste.

RE- has been ISO 14001 certified since 2003. Their ISO 14001 environmental management system includes an environmental policy, which demonstrates commitment from the company's leadership and is communicated to staff via and notice boards and during staff training.

Commitment extends to the employment of three full time Safety, Health, Environment and Quality (SHEQ) personnel, two at Durban and one at Johannesburg branch and a full-time Sustainability Manager. The SHEQ role has existed in the company for more than ten years. The current SHEQ Consultant has been with the company for more than six years, has no formal environmental qualification but has completed SHEQ short courses. The SHEQ Consultant is responsible for overseeing the ISO14001 environmental management system, ensuring legal compliance and establishing and implementing systems and procedures.

RE- initially (during 20003) used the services of an environmental lawyer to create their legal register. They subsequently rely on an email newsletter subscription (LexisNexis South Africa) and engagement with industry peers to ensure their legal register is current.

A management review committee is a requirement of the ISO 14001 environmental management system. RE-'s management review committee meet quarterly to discuss environmental performance, contractors who have been audited, clients who have audited them, legal compliance and internal and external environmental communications. The

Director of the company is a member of the management review committee and attends the quarterly meetings. Environmental targets are set annually, monitored monthly and reported on at quarterly management review committee meetings. Performance against targets are reviewed by the management review committee annually.

RE- are audited annually by external auditors to maintain their ISO 14001 certification and by some of their clients, to ensure environmental compliance. To achieve ISO 14001 re-certification annually, they are required to show improvement in environmental performance.

5.2.2.26 RE-: Environmental responsibility activities

RE- identify emissions from vehicles to be their most significant environmental impact. RE- rely on a fleet of vehicles to transport waste from the clients to their depot and from the depot to buyers of processed/bulk waste. This service is outsource and RE- argue that their business is not directly responsible for this impact. Handling and processing of hazardous waste for example, fluorescent tubes is a significant potential environmental risk. The risk of fire is notable due to the storage of large volumes of flammable material such as paper and cardboard. RE- do not consider themselves responsible for the environmental impact of waste to landfill, as they are landfilling on behalf of clients, they perceive this to be the client's environmental impact, as the client generates the waste.

RE- participate in a number of environmentally responsible activities, 12 out of the 15 activities investigated for the purpose of this study (Table 5.10).

Table 5.10 A description of RE- environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	RE- state that waste management is their core business and they are constantly investigating innovative ways of recycling and reusing waste streams, and avoiding landfilling. All staff are trained in recycling and internal waste is recycled. RE- were not willing to disclose the types or volumes of waste recycled.
2	Extended producer responsibility	X	
3	Pollution control and effluent emissions	X	
4	Reducing water consumption	√	Water use is domestic. As part of the weekly maintenance schedule, plumbing is inspected to ensure early detection of water

Environmental responsible activity		Yes / no	Description
			leaks and prevent water wastage.
5	Energy management	√	RE- have outsourced an energy audit to an independent consultant to identify high energy use areas. At the time of the interview, the results of the energy audit were pending.
6	Carbon emissions management	√	RE- calculate their carbon footprint on a monthly basis.
7	Transport, travel and fuel consumption	√	RE- outsource transport, transport logistics and materials handling to Univiron (a division of Unitrans). Univiron utilise advanced vehicle tracking and monitoring systems, provide ongoing driver training and comply with relevant legislation and safety standards (RE-, 2012). Diesel fuel (exhaust) emissions are tested annually by independent testing authority to ensure that emissions are within municipal limits.
8	Minimising use of raw materials and conservations of natural resources	n/a	RE- report that the minimising of raw materials and conservation of natural resources in not applicable to their business.
9	Air emissions management	√	Diesel fuel (exhaust) emissions are tested annually by independent testing authority to ensure that emissions are within municipal limits. All vehicles undergo diesel emissions testing to ensure compliance with municipal vehicle emission limits.
10	Environmental reporting	√	Prior to the pulmagation of the National Environmental Management Act (No. 107 of 1998), disposal of waste was prohibited unless under the authority of a permit issued in terms of section 20 of the Environment Conservation Act (Act 73 of 1989). RE- are still in possession of a Section 20 Permit, the requirements of which are annual reporting to the Department on waste volumes.
11	Staff engagement	√	All staff are trained in environmental responsibility during induction training, refresher training and frequent toolbox talks. RE- perceives that environmental responsibility is ingrained in the company culture as a result of environmental responsibility being the core focus of the business.
12	Green procurement	√	RE- only procure the services of environmentally legally compliant subcontractors. RE- conduct regular health, safety and environmental audits on their subcontractors (5.2.2.26.1)
13	Green design/green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	X	
15	Investment in green technology and or innovation	X	
16	Other	√	RE- are continuously investigating innovative options for diverting waste from landfill.
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption

Environmental responsible activity		Yes / no	Description
			5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Air emissions management 9. Environmental reporting 10. Staff engagement 11. Green procurement 12. Green design/green building 13. Reduction in use of harmful chemicals and or hazardous materials 14. Investment in green technology and or innovation
Number of RE-environmentally responsible activities		10	1. Waste management 2. Reducing water consumption 3. Energy management 4. Carbon emissions management 5. Transport, travel and fuel consumption 6. Air emissions management 7. Environmental reporting 8. Staff engagement 9. Green procurement 10. Continued research to divert waste from landfill
17	Social responsibility activities	?	Not known

5.2.2.26.1 Extended producer responsibility

Re- do not recycle waste, all recyclables are sold to recyclers (sub-contractors). RE- confirm that most of their contractors are SMEs, except for paper recyclers which are larger companies.

RE- audit their sub-contractors bi-annually to ensure environmental and health and safety compliance. They do not audit sub-contractors more regularly due to the large number of sub-contractors they outsource too, and insufficient capacity (limited number of staff with the relevant expertise). Sub-contractors are provided with a report detailing the findings of the audit and recommendations that they are required to implement by the next audit to ensure continual improvement of environmental performance in the contractors. RE- require that sub-contractors hold the relevant permits to operate (national legislation and bylaws) and enter into long-term contracts with environmentally legal compliant subcontractors.

RE- extend this service to their clients. Clients may request copies of audit reports for the sub-contractors relevant to their waste stream. As a separate service, they will audit the

clients sub-contractors to ensure the client is fulfilling their extended producer responsibility requirements.

5.2.2.27 RE-: Limitations, opportunities and benefits

RE- reason that due to the nature of their business, environmental responsibility and certification are imperative. RE- advise clients on waste management and environmental legal compliance and feel that they, themselves must demonstration environmental responsibility within their own operations and that of their sub-contractors. The benefits of this include, environmental legal compliance, protection of the environment and the continual of their environmental performance. They remark that setting high standards of environmental responsibility has had the added advantage of giving the company a positive image, which can in turn result in advantage over opposition companies.

RE- state that South African waste legislation has been a significant challenge in achieving environmental responsibility. Waste legislation and requirements are often changing and can be difficult to interpret and engaging with government officials to gain advice and understanding of the requirements is difficult, government officials often do not understand the regulations themselves and cannot assist.

RE- were the first waste management company in South Africa to own a Materials Recovery Facility (MRF) located at the Marianhill Landfill site. Municipal waste bags were received at, and process through, the MRF to recover recycled material. The MRF was successful in that large volumes of post-consumer recyclables were recovered. The MRF still stands at the Marianhill landfill site but was closed down due to 'industry politics'.

Limited financial resources prevent RE- from implementing additional environmental responsibility projects and further improving their environmental performance.

5.2.2.28 RE-: Stakeholder engagement

RE- collaborate with peers on four levels:

1. Suppliers: audit and only utilize the services of environmentally compliant sub-contractors.
2. Clients: clients are provided with reports detailing the volumes of waste recycled, assisting them to monitor and improve their environmental performance.

3. Staff: staff are trained in environmental responsibility, empowering them and their peers (family, friends and acquaintances) to make environmentally responsible decisions in everyday life.
4. Industry peers: RE- have active memberships with several industry related organisations.

5.2.2.29 RE-: Observations

RE- were not willing to reveal any information relating the types and volumes of waste they process nor the companies that they outsource their recycling. As explained by the company's director, via email "*our industry is very competitive and competitors are always eager to obtain information to better their own position. We can't divulge the information requested for obvious reasons. I trust that this is understood*".

5.2.2.30 RE-: Summary of findings

RE- demonstrate an understanding of, and a commitment to, environmental responsibility (ISO 14001 certification) and partake in a number of environmentally responsible activities (Figure 5.11).

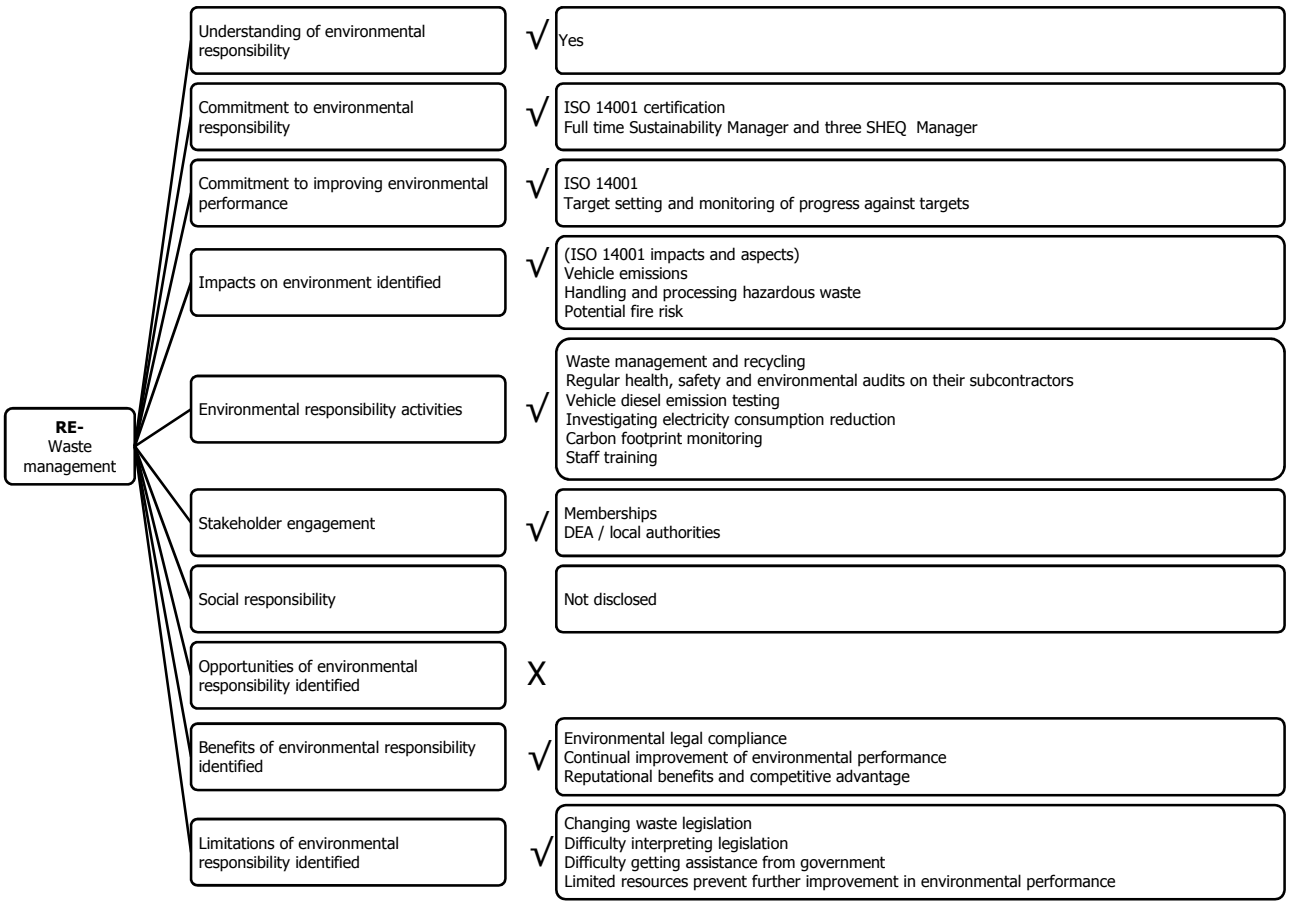

Figure 5.11 Summary of findings for RE-

5.2.3 Case Study I: Afripak: Summary of findings

Afripak show positive results for all of the environmentally responsible criteria investigated. Three of the four SMEs that Afripak outsource their waste management activities too are ISO 14001 certified and demonstrate an understanding of and a commitment to, environmental responsibility and improvement of the environmental performance. The three ISO 14001 certified SMEs participate in a number of environmentally responsible activities (Table 5.11). E-Mode does not have an environmental certification but does participate in environmentally responsible activities. The SMEs exhibit stakeholder engagement activities and all participate voluntarily in social responsible activities.

All of the SMEs report that environmental responsibility and ISO 14001 certification has benefitted the reputation of their businesses. This has resulted in the SME's having a competitive advantage over competitors and larger companies that value environmentally responsible practices, prefer to be associated with business with the same values. Other key benefits include:

- ISO 14001 certification has resulted in improved environmental performance of the business and ensure environmental legal compliance
- Improved staff morale within the company. Staff find working for an 'ethical' company inspiring.
- Attract prospective employees. Prospective staff perceive working for a responsible business as preferable.

The ISO14001 certified SME's highlighted limiting factors of certification. Two of the three SMEs note challenges with South Africa waste legislation, the legislation is dynamic and it is difficult to keep up with and interpret changes to the legislation. They highlight challenges with DEA describing difficulties in communication with the Department due to high staff turnover and limited understand of the legislation within the Department. It is significance to note the case of NSR where it took seven years and the assistance of an environmental lawyer to secure their waste licence. Other limitation described by the SMEs include:

- The high cost of maintaining ISO 14001 certification
- The high cost of consultant and lawyer fees
- An uneducated market, who do not understand environmental responsibility and perceive that 'green' products come at an inflated cost. This results in the SME investing time and expertise (which are limited in a small business) to educate the customer/public
- Limited resources are preventing further improvement of environmental performance within the SMEs

Table 5.11 Summary of environmental responsible findings for the companies that participated in the Afripak case study (where √ denotes and positive finding and X denotes a negative finding)

	Afripak (DLC)	E-Mode	Natal Solvent recovery	Green Office	RE-
	Manufacture flexible packaging	Contaminated clothes	Recover solvents	Remanufacture and recycle printer cartridges	Waste management
	Large	SME	SME	SME	SME
Approx. volumes per month	150 to 220 tonnes	X	100 000 litres	41 780 tonnes	Not willing to disclose
Understanding of environmental responsibility	√	Perceive that their business is environmentally responsible; this is attributed to the nature of the business	√	√	√
Commitment to environmental responsibility	• Environmental policy and active EMS (voluntary) • Full time Risk Manager • Full time Sustainability Manager	X	• ISO 14001 certification • Full time Environmental Manager • CEO is member of environmental committee • Environmental legal compliance outsourced to an environmental lawyer	• ISO 14001 certification • Full time Sustainability Manager • Full time Sustainability Assistant • Director involvement in environmental monitoring and decisions	• ISO 14001 certification • Full time Sustainability Manager and three full time SHEQ Managers • Director sits on environmental management review committee
Commitment to improving environmental performance	• Environmental target, progress against targets monitored • Reporting to ABI on progress against targets • Green teams	X	ISO 14001 (annual target setting and review, on-going monitoring)	ISO 14001 (annual target setting and review, on-going monitoring)	ISO 14001 (annual target setting and review, on-going monitoring)

	Afripak (DLC)	E-Mode	Natal Solvent recovery	Green Office	RE-
Impacts on the environment identified	• Risk assessments conducted by independent consultants • Air emissions • Electricity consumption	X	(ISO 14001 impacts and aspects) • Hazardous waste to landfill • Electricity consumption	(ISO 14001 impacts and aspects) • Hazardous waste to landfill • Electricity consumption	ISO 14001 impacts and aspects) • Vehicle emissions • Handling and processing hazardous waste • Potential fire risk
Environmental responsibility activities	• Waste management and recycling • Investigating electricity and water consumption reduction opportunities • Reduction in use of raw materials • Carbon footprint calculation • Environmental reporting • Staff engagement • Customer education • Reduction in use of harmful chemicals • Air emission benchmarking • Industrial conservancy	• Recycling and waste management • Offer a EPR service • Equipment with water conservation fittings • Monitoring electricity consumption • Route planning to reduce fuel consumption • Re-use of some packaging • Investigating the incineration of sludge waste to power cement kilms	• Hazardous waste management • Offer a EPR service • Stack and vehicle emissions measurement and monitoring • Investigating alternative technology to reduce electricity consumption and reduce volumes of hazardous waste by-product • Staff training	• Waste Management and recycling • EPR; printer cartridge take back system • Reducing water consumption • Investigating energy management • Carbon footprint monitoring • Route planning and GOS tracking to reduce fuel consumption • Environmental reporting for customers • Staff training and awareness activities • Reduction in use of harmful chemicals • Investment in green innovation	• Waste management and recycling • Regular health, safety and environmental compliance audits on subcontractors • Vehicle diesel emissions monitoring • Investigating electricity consumption reduction • Carbon footprint monitoring • Staff training • Environmental reporting to DEA

	Afripak (DLC)	E-Mode	Natal Solvent recovery	Green Office	RE-
Number of relevant environmentally responsible activities investigated activities	15	14	15	13	14
Number of environmentally responsible activities participated in	13	7	9	13	10
Stakeholder engagement	Not applicable for the purpose of this study	Not known	• Consultants • Lawyers • DEA	• Founded the Durban Business Sustainability Forum (industry peers) • Memberships • Schools, community partners (non-profit organisations), disabled community	• Memberships Consultants • DEA • Local authorities • Industry peers

	Afripak (DLC)	E-Mode	Natal Solvent recovery	Green Office	RE-
Social responsibility		Not known	Support non-profit organisations on an *ad hoc* basis	• Community partners collect empty printer cartridge to raise funds • Schools collect empty printer cartridge to raise funds and Green Office educate scholars about environmental issues • Spinal cord injured persons collect empty cartridge to raise funds • Staff volunteer programme • Green Able, a non-profit company initiated by Green Office	Not known
Opportunities of environmental responsibility identified	Not applicable for the purpose of this study	•Demand for service implies potential growth for the business •In terms of EPR, a suggested 'manufacturers fee' could assist with the development of small business that ultimately clean up the manufacturers waste	X	• Diversified the business for example, Green Able and the Durban Business Sustainability Forum	X

	Afripak (DLC)	E-Mode	Natal Solvent recovery	Green Office	RE-
Benefits of environmental responsibility identified	Not applicable for the purpose of this study	X	• Reputational benefits • Environmental certification plays a role in securing business with large companies	• Reputational benefits and competitive advantage • • Improved staff morale • Attract prospective employees • Improved environmental performance	• Reputational benefits and competitive advantage • Environmental legal compliance • Improved environmental performance •
Limitations of environmental responsibility identified		• Non-complaint competitors offer reduce cost (and are supported by large business that claim to value environmental responsibility) • Limited by lack of financial resources to improve environmental performance	• High cost of maintaining ISO 14001 certification • Constantly changing waste legislation • Difficulty in obtaining waste licence • Consultant and lawyer fees • Apathy from, and high staff turnover within DEA	• Uneducated market, perceive 'green' product is more costly • Time and expertise required to educate the customer/public • Limited resources prevent further improvement of environmental performance	• Changing waste legislation • Difficulty interpreting legislation • Difficulty getting assistance from government • Lack of capacity within government for example, weak understanding of the legislation • Limited resources prevent further improvement of environmental performance • Highly competitive industry and 'industry politics'

Afripak's environmental responsibility is governed by a group environmental policy and they participate in environmental responsibility voluntarily. The Risk Manager is responsible for environmental (and other) legal compliance for the group and risk assessments are conducted bi-annually by an external consultant for this purpose. Afripak are ISO 22000 certified (a food hygiene certification) that requires that suppliers are audited for legal and other compliance and some environmental elements are covered in auditing. Afripak outsource the waste management function to four SME sub-contractors, three of whom are environmentally certified. The non-environmentally certified SME sub-contractor exhibits a poor understanding of, and commitment to, environmental responsibility.

5.2.4 Case Study I: EnviroServ

ABI outsource the supply of flexible labels to Afripak and their waste management to EnviroServ, the largest waste management company in South Africa. EnviroServ's recycling division recovers recyclables for trade and recycling. Trade and recycling activities are outsourced to selected sub-contractors (Figure 5.12).

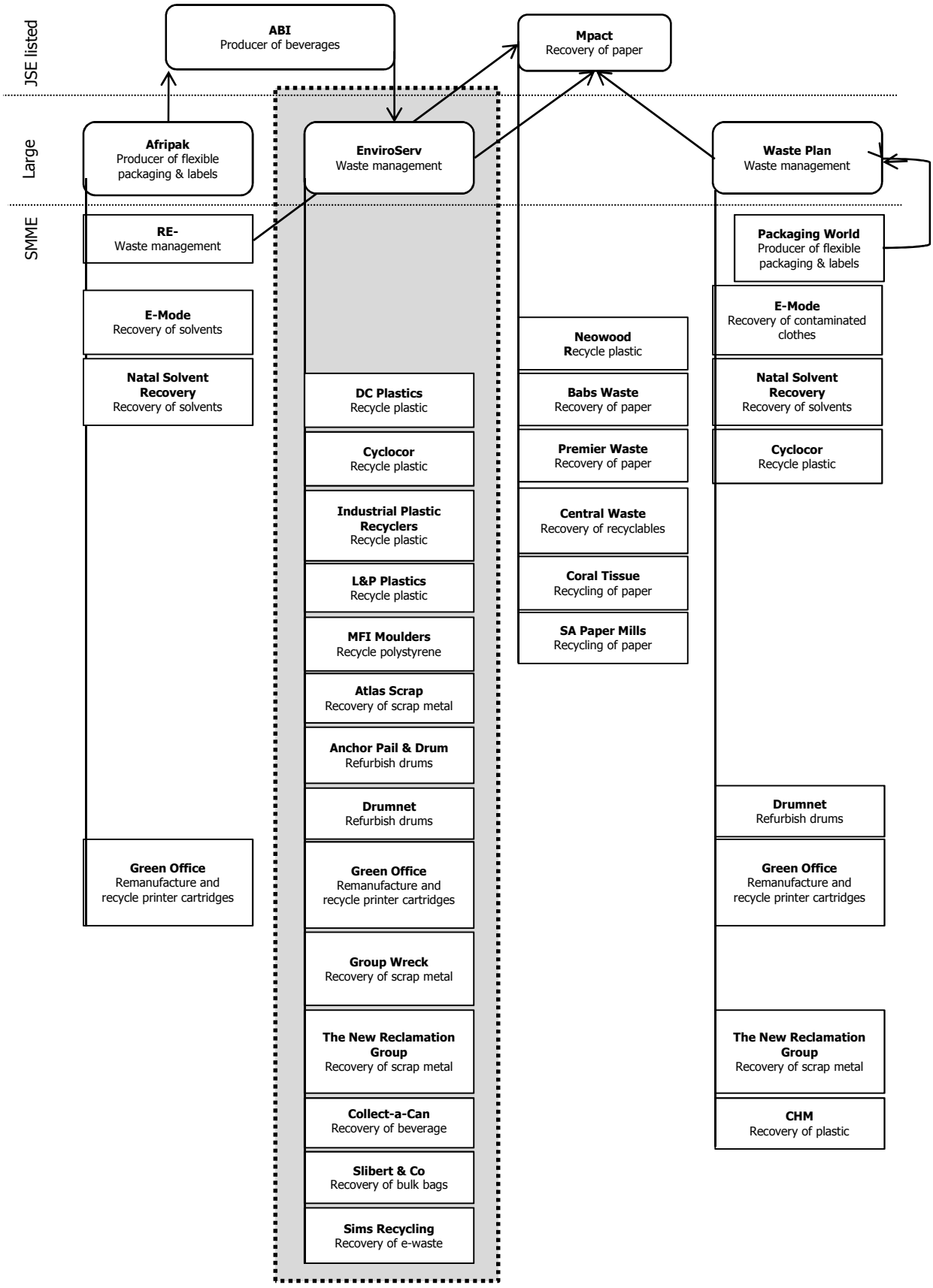

Figure 5.12 Schematic diagram of case studies

5.2.4.1 EnviroServ: Company overview

EnviroServ Waste Management (PTY) Ltd provides sustainable waste management solutions including integrated waste management, waste minimisation and beneficiation, process solutions and innovations in treatment and disposal waste. The Group operates through specialist divisions – each focusing on waste management solutions for particular customer needs (Figure 5.13). Through these divisions, EnviroServ is able to offer products and services to cover the waste management requirements of all industries (EnviroServ, 2012).

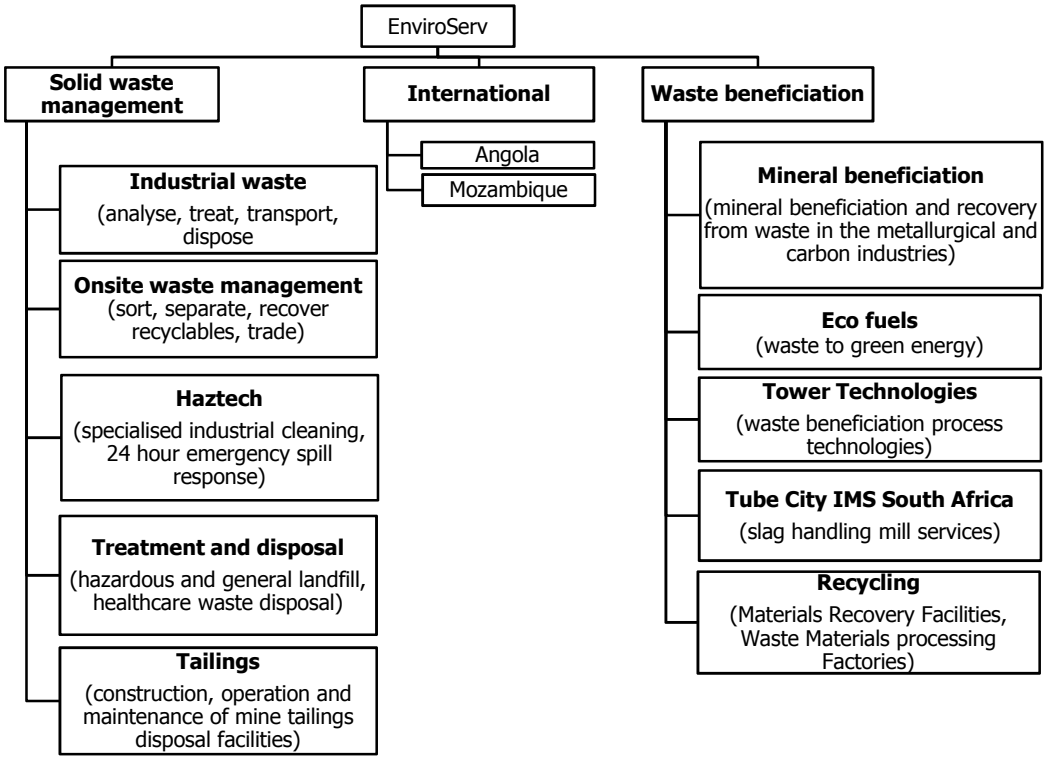

Figure 5.13 A summary of EnviroServ's specialist divisions (EnviroServ, 2012)

Services range from waste minimisation and beneficiation to collection, transportation, treatment and disposal, on-site waste management and recycling, hazardous and non-hazardous waste management, industrial vacuuming, emergency response services and the development and management of landfill operations (Figure 5.14), (EnviroServ, 2012).

EnviroServ hold a number of certifications, memberships and have won many industry awards. All of their sites are ISO 9000 certified, the majority of their sites are ISO 14001 certified and two of their sites are OHSAS 18001 certified.

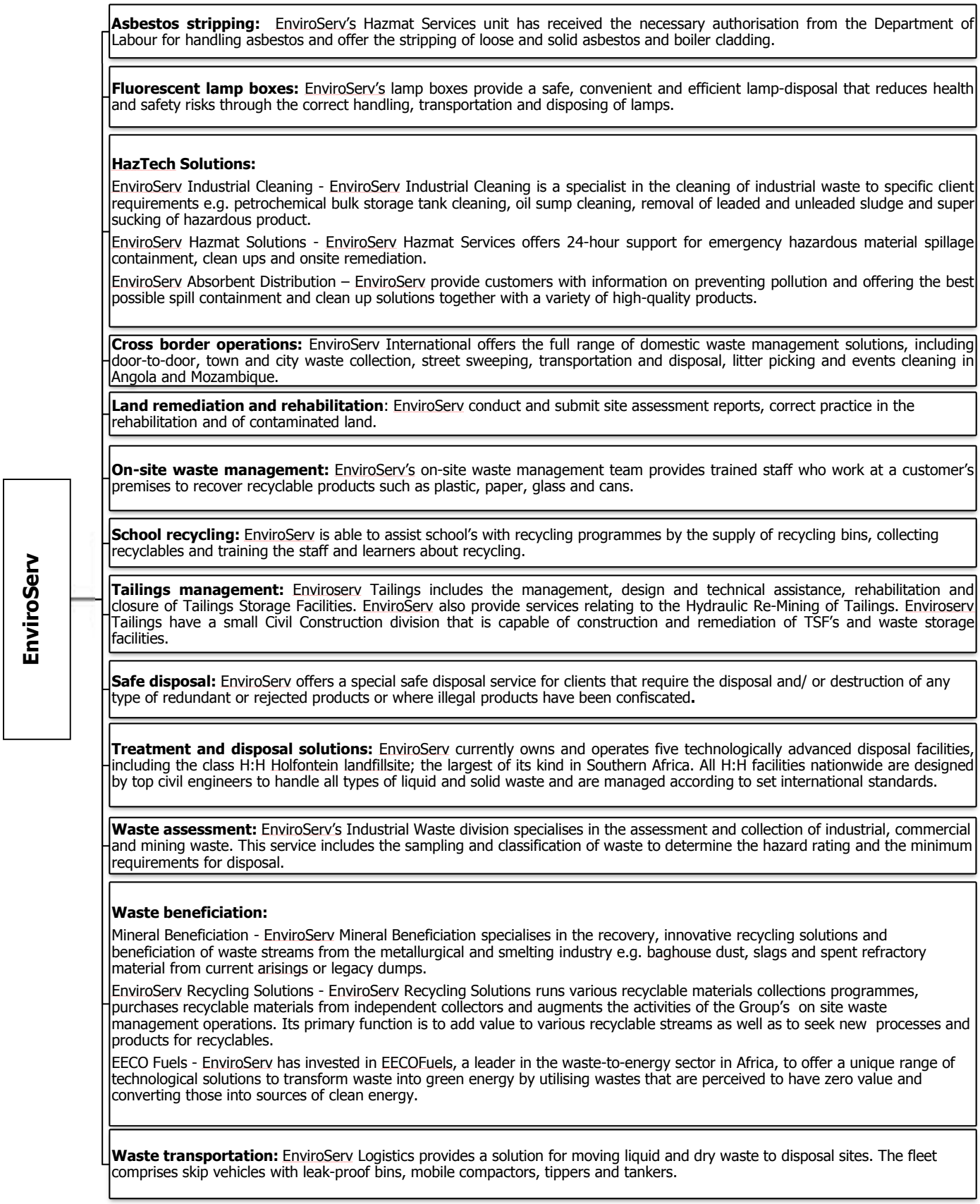

Figure 5.14 A diagrammatic overview of EnviroServ's service offering (EnviroServ, 2012)

EnviroServ Recycling Solutions run a number of recyclable materials collection programmes including recyclable collections from corporate and commercial clients who make use of the Groups on-site waste management service. The division's primary function is to source recycling solutions for recyclables and to add value to various recyclable streams. This is achieved through the bulking of a commodity by means of compaction for resale, or in the case of the various plastics, from granulation through to pelletising, and in some cases a finished product (EnviroServ, 2012). For example, EnviroServ, offers a service to the automotive industry by recycling discarded polypropylene battery casings through granulation, washing and extrusion into pellets. These pellets are then utilized in the production of new battery casings, in some instances the recycled content is 100%.

The collection and compaction of glass plays an important role in the recycling division. EnviroServ are currently engaging with local authorities in exploring new avenues for the collection and sorting of domestic waste for the purpose of increasing volumes of this waste stream for recycling.

EnviroServ Recycling Division, Durban based in Queensburgh were the subject of this investigation. The recycling division has been in operation for 5 years, achieve an approximate annual turnover of between R13 to R51 million and employ 47 staff. The demographic profile of EnviroServ Recycling Division, Durban is 79% female, 21% male; 87% Black, 9% Indian, 4% White and 0% Coloured. EnviroServ Recycling Division, Durban's core function is to add value to various recyclable streams. This is achieved though the collection of recyclables from corporate and commercial clients (including those that make use of the Groups on-site waste management service) and bulking of each commodity by means of compaction, bailing and crushing of recyclables for resale into processing plants. No recycling takes place onsite; all waste is sold to sub-contractors for recycling.

5.2.4.2 EnviroServ: Environmental responsibility

EnviroServ's Regional Recycling Manager reports that EnviroServ is familiar with the term 'environmental responsibility' and describe the concept as "*making sure the company is complaint with environmental legislation and responsible for its environmental impact*". EnviroServ is governed by a philosophy of environmental responsibility and group environmental policies, procedures and rules that are enforced through quarterly internal audits.

EnviroServ have developed a comprehensive environmental monitoring and measurement programme for their landfill sites, transport depots, offices, production plants and incineration facilities, and have been conducting environmental impact monitoring at their facilities for 15 years. The aim of the monitoring regimen is to identify and understand the environmental impact of their operations and put measures in place to either mitigate or eliminate any adverse impacts. The monitoring regimen consists of the following elements (EnviroServ Sustainability Review, 2011):

- ambient air quality monitoring
- personal monitoring
- noise
- day- and night- time illumination
- landfill gas emissions
- ground and surface water quality
- thermal stress surveys
- ventilation surveys
- hazardous Biological Agents assessments

EnviroServ have a group ISO 14001 certification however, EnviroServ Recycling Division, Durban premises, are excluded from the certification. They are however, subject to the group environmental management system and environmental policy, which demonstrates commitment from the company's leadership, and plan to peruse ISO 14001 certification as budget permits.

EnviroServ have further developed a customised and internal SHEQ management system that comprises 15 core system procedures and 53 national safety standards aligned with the Chemical and Allied Industries Association's Responsible Care management practice standards, ISO 14000, ISO 9000 and the OHSAS 18000. The compliance function ensures that the group remains aware of all relevant statutes and legal developments and advises the business units and management on compliance matters affecting the group (EnviroServ Sustainability Review, 2011).

The scope of compliance monitoring activities includes (EnviroServ Sustainability Review, 2011):

- Internal site evaluations for operational and SHEQ compliance

- External auditing as required by landfill permits, National Environmental Management Act permits and records of decision
- Inspection and auditing by the relevant authorities (Departments of Environmental Affairs, Water Affairs and Labour)
- Certification audits for ISO 9000, ISO 14000 and OHSAS 18000 (annually)
- External verification by industry associations such as Chemical and Allied Industries Association and Safety Quality Assessment Series audits
- Contractors/clients auditing facilities and EnviroServ audit all contractors' facilities (annually)
- External environmental and Occupational Health and Safety Act evaluations as required by the management systems

The group employ a team of Safety, Health, Environment Quality staff to ensure environmental and health and safety compliance, nationally. The SHEQ Manager oversees and co-ordinates and teams of SHEQ Officers. SHEQ Managers are required to possess a degree or diploma in environmental or safety management and a minimum three years environmental and safety management experience and SHEQ Officers are required to have competed relevant courses and certificates a minimum of two to five years' experience in the management and implementation of SHEQ systems and auditing. A total of three SHEQ Officers oversee SHEQ for the KwaZulu-Natal region.

EnviroServ have a well-established risk committee that reports directly to the Board. The risk committee is chaired by a non-executive Director, and further comprises the Chief Executive, risk director and national SHEQ Manager. Additionally, the Operations Director, Commercial Director and representatives from the internal auditors attend by invitation (EnviroServ Sustainability Review, 2011). The role of the risk committee is to manage and monitor risk through ensuring that risks are identified and that effective controls and strategies are in place to mitigate these risks, and to report any material breaches in controls to the board. Each risk within these categories is investigated at least annually as part of the risk audit department's on-going risk audit programme (EnviroServ Sustainability Review, 2011).

EnviroServ have set a compliance target for each facility at 80% that is adjusted annually as the SHEQ management system matures. During 2012 EnviroServ rolled out a reward and recognition programme for departments and divisions that achieve or exceed the target. A SHEQ incentive programme is being developed to build and maintain employees' focus on

safety and SHEQ performance and to motivate safe behaviour and work practices (EnviroServ Sustainability Review, 2011).

Although in South Africa non-listed companies are not required to disclose their emissions, EnviroServ voluntarily determines and monitors its emissions (for the main depot and head office in Meadowdale, Gauteng). The carbon footprint report is compiled by an independent environmental consultancy.

5.2.4.3 EnviroServ: Environmental responsibility activities

EnviroServ Recycling Durban, have identified transport as their most significant environmental impact as they rely on large diesel trucks to transport waste to their depot. It is noted the spills of hazardous materials could cause environmental harm if not prevented and treated correctly when necessary. Litter is a concern as large volumes of recyclables are stored at the depot and can easily be swept around and off-site on windy days. These impacts were identified by the EnviroServ SHEQ committees who have undertaken risk assessments for each division that includes environmental risks, potential impact on the environmental, significance of the environmental risk and remediation procedures. EnviroServ participate in some of the environmentally responsible activities investigated in this research (Table 5.12).

Table 5.12 A description of EnviroServ's environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	EnviroServ's internal waste management includes the recycling of all office waste, and staff are encourage to bring recycling from home. Targets are set to improve recyclable volumes and monthly monitoring is conducted.
2	Extended producer responsibility	n/a	
3	Pollution control and effluent emissions	√	Filters have been fitted to all storm water drains to prevent litter from entering the storm water system. Diesel is stored on site for the purpose of fuelling their front-end loader and forklifts. To prevent accidental spills, the fuel storage cans are kept in a bunded area that is locked at all times to prevent unauthorised access. Spills kits are also available in the event of an unforeseen spill, and staff trained emergency spill response.
4	Reducing water consumption	X	No measures have been taken to reduce water consumption (5.2.4.3.1).
5	Energy management	X	No energy reduction measures have been implemented at EnviroServ Recycling Division, Durban (5.2.4.3.2)
6	Carbon emissions management	X	Carbon emissions management measures have not been considered for EviroServ Recycling Division, Durban. The group

Environmental responsible activity		Yes / no	Description
			plan to calculate the carbon footprint of each division in the foreseeable future.
7	Transport, travel and fuel consumption	X	Travel and fuel consumption reduction measures have not been considered as vehicles are rented and not owned.
8	Minimising use of raw materials and conservations of natural resources	X	No measures have been taken to minimise the use of raw materials or to conserve natural resources.
9	Air emissions management	n/a	EnviroServ Recycling Division, Durban perceive that air emissions are not relevant to their operations.
10	Environmental reporting	√	The group delisted off the JSE, and are not legally required to publically report on their environmental performance. They have however, continued to produce an annual sustainability report for distribution to stakeholders. All clients are provided with monthly reports quantifying the volumes and types of recyclables recycled.
11	Staff engagement	√	Staff are trained in environmental responsibility during induction training and weekly toolbox talks. Content for toolbox talks is provided by the group SHEQ Department.
12	Green procurement	X	EnviroServ utilize the service of sub-contractors for recycling and refurbishment. Subcontractors are required to passed an audit conducted by their SHEQ department, the audit ensures environmental (as well as other) legal compliance. Sub-contractors are audited annually are expected to demonstration improvement in their environmental performance on each audit. In addition, there is no formal green procurement policy but environmental credentials are taken into account on some purchasing decisions.
13	Green design/green building	n/a	Not applicable as all premises are rented at this time.
14	Reduction in use of harmful chemicals and or hazardous materials	X	Only applicable to office cleaning products and no measures have been taken to procure environmentally preferable cleaning products.
15	Investment in green technology and or innovation	X	EnviroServ, as a group are investing in green technology and innovations (5.2.4.3.3).
16	Other	X	
Number of relevant environmentally responsible activities investigated		12	1. Waste management 2. Pollution control and effluent emissions 3. Reducing water consumption 4. Energy management 5. Carbon emissions management 6. Transport, travel and fuel consumption 7. Minimising use of raw materials and conservations of natural resources 8. Environmental reporting 9. Staff engagement 10. Green procurement 11. Reduction in use of harmful chemicals and or hazardous

Environmental responsible activity	Yes / no	Description
		materials 12. Investment in green technology and or innovation
Number of Mpact Recycling environmentally responsible activities	5	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Environmental reporting 5. Staff engagement

5.2.4.3.1 Reducing water consumption

EnviroServ captured water consumption data for all sites from utility bills. EnviroServ Recycling Division, Durban's water use is domestic type and it is notable that vehicles are not washed on site. Compared to the other EnviroServ sites, this division has the lowest water consumption in the group and the group can realise a greater water consumption reduction by focusing on larger consumers first. Therefore, no water reduction measures have been implemented at EnviroServ Recycling Division, Durban.

During 2011, the group were assembling data to establish a baseline of their water usage, the first step towards planning for water efficiency. Some of the measures they employ to reduce water consumption include employee awareness, tap flow reduction devices and grey water systems and storm/rain water harvesting. Most efforts have been focused at the Head Office/Meadowdale depot (EnviroServ Sustainability Review, 2011).

5.2.4.3.2 Energy management

EnviroServ captured electricity consumption data for all sites from utility bills. EnviroServ Recycling Division, Durban's energy use is domestic type and there is some small equipment for example, a crusher and bailer. Compared to the other EnviroServ sites, this division is the 4th lowest energy consumer in the group and the group can realise a greater energy consumption reduction by focusing on larger consumers first. Therefore, no energy reduction measures have been implemented at EnviroServ Recycling Division, Durban.

The group are actively investigating initiatives to reduce their energy consumption. These include solar water heating, energy efficient lighting, air conditioner timers, hydroboils, hot water flasks and general employee awareness. A waste-to-energy gasification plant is currently being constructed at the Meadowdale premises by the group's waste-to-energy joint venture, EECOFuels, which will generate 120kW of power. In addition to this project,

EECOFuels are constructing a 3,6mW landfill gas-to-electricity plant to utilise the methane gas extracted from the Chloorkop landfill site. Similar projects are being investigated for the Shongweni and Vissershok sites (EnviroServ Sustainability Review, 2011).

5.2.4.3.3 Investment in green technology and/or innovation

EnviroServ own a landfill gas recovery project at the Chloorkop general waste landfill site in Gauteng. The project is registered as a Clean Development Mechanism (CDM) and sells Certified Emission Reduction (ER) units to the Japan Carbon Finance Corporation. The project involved establishing a well-field which is being expanded on an on-going basis as the site fills up and which feeds extracted landfill gas into gas flares. An average of 1.8 million normal cubic metres of landfill gas is extracted and flared per month, producing approximately 12 500 CERs per month (EnviroServ Sustainability Review, 2011).

EnviroServ has commissioned its joint venture partner EcoFuels to replace the flares with gas engines to generate electricity. A similar project is underway at the Shongweni Landfill site. EnviroServ obtained environmental impact assessment approval for the project which involves the establishment of a well-field and installation of generator sets which will generate electricity. EnviroServ are planning to install gas engines at their Vissershok Landfill site in the Western Cape (EnviroServ Sustainability Review, 2011).

In the past, EnviroServ have used incinerators for the disposal of healthcare waste. The group have subsequently closed their incineration facilities in Prospecton, Port Elizabeth and Vissershok in the Western Cape and obtained licences for the installation of non-burn healthcare risk waste treatment technologies in three regions. In Gauteng the old incinerator has been replaced with a state-of-the-art incineration system which has a comprehensive dry emission gas cleaning system. The incinerator has continuous on-line emission monitoring and emissions including dioxins and furans from the incinerator comply with the stringent limits set in the new National Environmental Management Air Quality Act (EnviroServ Sustainability Review, 2011).

5.2.4.4 EnviroServ: Social Responsibility activities

The group have a dedicated corporate social responsibility budget and seek to establish socially responsible partnerships and relationships with reputable NGOs, private businesses and government departments that are mutually beneficial and sustainable (EnviroServ

Sustainability Review, 2011). Social investment programmes have included partnership with the following organisations:

- Waste Art Foundation
- Magpie Design Studio
- Mentorships for emerging artists
- The little Artists of Mautse, Free State
- Expos and exhibitions
- Garbage gallery

The charities that EnviroServ donate to include:

- Nazareth House
- St. Mary's Hospital
- Avril Elizabeth Home
- Boys and girls Town SA
- Salvation Army
- Doctors Without Borders
- Wits Foundation – Wits Paediatric Fund
- United Cerebral Palsy Association of South Africa
- Wildlands Conservation Trust

The group hold their own, annual corporate social responsibility projects for example, voluntary beach clean-ups, Comrades Race clean up and schools recycling project.

5.2.4.5 EnviroServ: Discussion and linkages

EnviroServ Recycling recover recyclables for trade with, and recycling by, approved sub-contractors. The SME's that participated in this study were referred to the researcher by EnviroServ Recycling. It is noted that these are not the sole sub-contractors to EnviroServ Recycling, but the SMEs and linkages that EnviroServ were willing to disclose, and those that fell within the definition of a SME for the purposes of this dissertation. Of the 11 SMEs approached to participate in the study, four declined and seven disclosed the required information (Figure 5.15). For the purpose of this case study, only those SME's unique to EnviroServ Recycling will be discussed (Industrial Plastic Recyclers, Cyclocor, MFI Moulders, Anchor Pail and Drum Reconditioners and Group Wreck), other SMEs have been described in earlier sections.

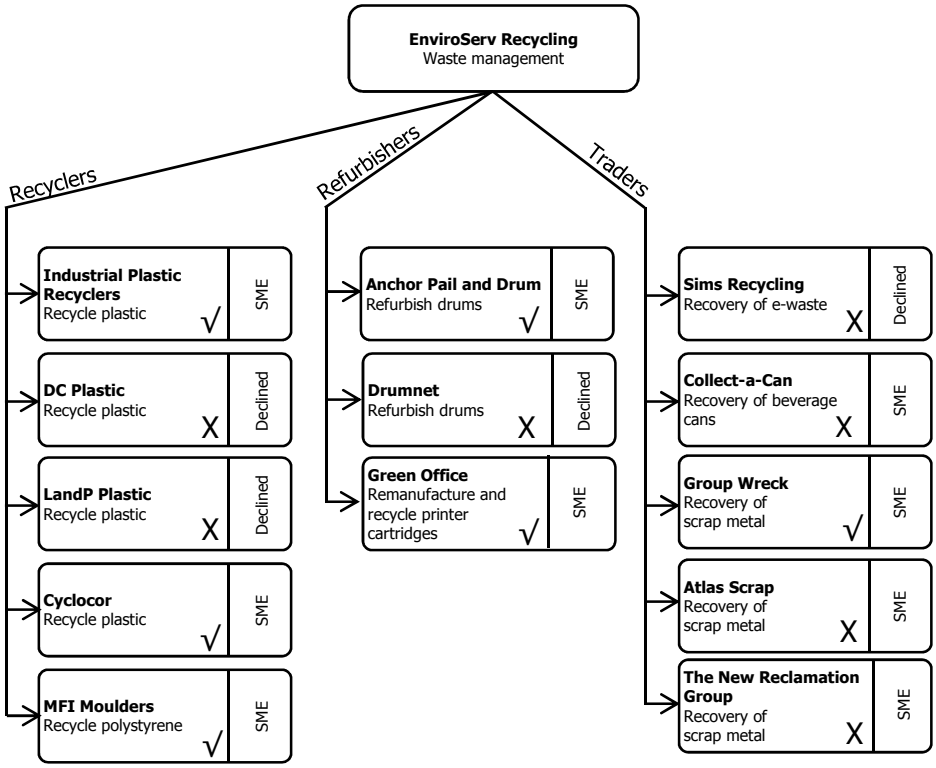

Figure 5.15 Key SMEs that EnviroServ trade with, and outsource recycling companies (where √ denotes the organisations that participated in the research and X denotes those that did not)

5.2.4.6 Industrial Plastic Recyclers (IPR): Company overview

Industrial Plastic Recyclers (IPR) are the plastic recyclers of post-industrial and post-consumer plastic, namely LD, LDPE, HDPE, PP, nylon, ABS. IPR have neither a company profile nor a company brochure and have found that advertising is unnecessary as they are supplied with post-industrial and post-consumer plastic by large waste management companies for example, EnviroServ and The Waste Group. They receive large volumes of post-consumer plastic from 'independent collectors'; one person businesses with small trucks who in turn collect from street hawkers and informal pickers. IPR recycling approximately 180 tonnes of plastics per month.

IPR are based in New Germany and operations run 24 hours a day, seven days a week. IPR has been in operation for almost 8 years, have an annual turnover of approximately R13 million, and employ 30 staff. The demographic profile of IPR is 63% male, 37% female; 90% Black, 3% Indian and 7% White. IPR fall within the National Small Business Amendment Act of 2003's definition of a SME. IPR are classed as a small sized business (in

the manufacturing sector) as they employ between 20 and 50 staff and have an annual turnover of approximately R13 million.

5.2.4.6.1 IPR: Environmental responsibility

IRP's owner reports that they are familiar with the term 'environmental responsibility' and describe the concept as "*being responsible for our actions and not dumping waste into the environment and causing pollution*". IRP perceive that they do have a responsibility to protect the environment but do not perceive themselves to be environmentally responsible. IRP state that they are a business and their primary goal is profit, they are mindful of environmental responsibility but it does not drive profit. Further, environmental responsibility is not high on the list of priorities in a small business, if the business had more resources and less daily challenges environmental responsibility could become an area of development for example, the priority is keeping operations efficient, which is a daily challenge. There is no environmental policy and no system in place to ensure compliance with environmental legislation.

It is noted that EnviroServ have audited IRP for health and safety, and environmental compliance. IRP scored low on the audit and were advised on how to improve their performance, they have been offered assistance in improving their performance. EnviroServ will audit IRP again in six months time to ensure they have made progress.

5.2.4.6.2 IPR: Environmental responsibility activities

IRP have not considered the impact of their business activities on the environment. They do participate in some environmentally responsible activities, motivated by reasons other than environmental responsibility (Table 5.13).

Table 5.13 A description of IPR's environmentally responsible activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Paper and cardboard waste from the office and production area is collected and given to street hawkers who frequent the area. It is noted that this is done to support the street hawker, a sense of social rather than environmental responsibility.
2	Extended producer responsibility	X	IPR are not familiar with the term 'extended producer responsibility'
3	Pollution control and effluent emissions	X	IRP are uncertain about whether they are causing pollution or emitting effluents and note that this is an area that needs to be investigated.

Environmental responsible activity		Yes / no	Description
4	Reducing water consumption	X	Water use is domestic and small amounts are used in the extrusion and glomeration process. No measures have been taken to reduce water consumption.
5	Energy management	√	IRP's electricity costs have escalated 300% over the past 5 years and is a significant concern for the financial sustainability of the business. At the time of the interview, the electricity costs were approximately R100 000 per month. Options for more efficient operations are being investigated.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	X	IPR do not have a transport infrastructure, all recyclables are dropped off at IRP's premises by waste management companies and independent collectors.
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	X	IRP are uncertain about whether they are responsible of any air emissions and note that this is an area that needs to be investigated.
10	Environmental reporting	X	
11	Staff engagement	X	
12	Green procurement	X	
13	Green design/green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	n/a	IRP report that they do not use any chemicals or hazardous material in their operations.
15	Investment in green technology and or innovation	√	IRP have also recently invested in a new technology that recycles plastic into a 'wood equivalent' product. At the time of the interview, they were awaiting training on the use of the machinery.
16	Other	√	At the time of the interview, IPR were in the process of constructing a wash bay. They have identified that a portion of the recyclable materials that they received are contaminated i.e. dirty or not rinsed of residual product. Cleaning the material would release volumes of good quality recyclables and improve the performance of the business.

Environmental responsible activity		Yes / no	Description
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green building/design 14. Investment in green technology and or innovation
Number of Central Waste environmentally responsible activities		4	1. Waste management 2. Energy management 3. Investment in green technology and or innovation 4. Construction of a wash bay
17	Social responsibility activities	√	IPR donate regularly (in some cases monthly) to charities such as Boys Town and CHOC, and support local charities and schools at their request.

5.2.4.6.3 IPR: Limitations, opportunities and benefits

IRP perceive that they do have a responsibility to protect the environment but do not have the resources, neither budgetary nor the expertise, to implement environmentally responsible practices. IRP further contend that budget constraints prevent them from improving their environmental performance.

IPR demonstrate limited environmental responsibility, and it is therefore difficult to establish possible limitations and benefits that IPR may experience from environmentally responsible practices. They do however highlight some of the trials experienced as a recycler of post-consumer plastic, stating that obtaining regular and sufficient volumes of recyclable materials is a major challenge for the business:

1. Reliance on 3rd parties for the collection of materials: At the time of the interview, EnviroServ staff were protesting and had not worked for a number of days. This impacted on the business as the flow of materials decreased.
2. Competition in the market: IRP state that recyclable plastics is a very competitive space and if a competitor offers a better price for the plastic, it can reduce the volumes of recyclable they receive.

3. Price fluctuations: Competition for recyclables can result in 'price wars' and the purchase price of plastic is not stable.

IRP are investigating importing post-industrial and post-consumer to ensure sustainable volumes and the growth of the business.

5.2.4.6.4 IPR: Stakeholder engagement

IRP gain advice from their memberships with the South African Plastics Recyclers Organisation and the Plastics Institute of South Africa. Though they currently do not feel pressure from stakeholders to improve their environmental performance, they admit that they are aware that this could change in the near future.

5.2.4.6.5 IPR: Summary of findings

In summary, IPR demonstrate limited understanding of, and commitment to, environmental responsibility. They do however participate in some environmental (motivated by reasons other than environmental responsibility) and social responsibility activities (Figure 5.16).

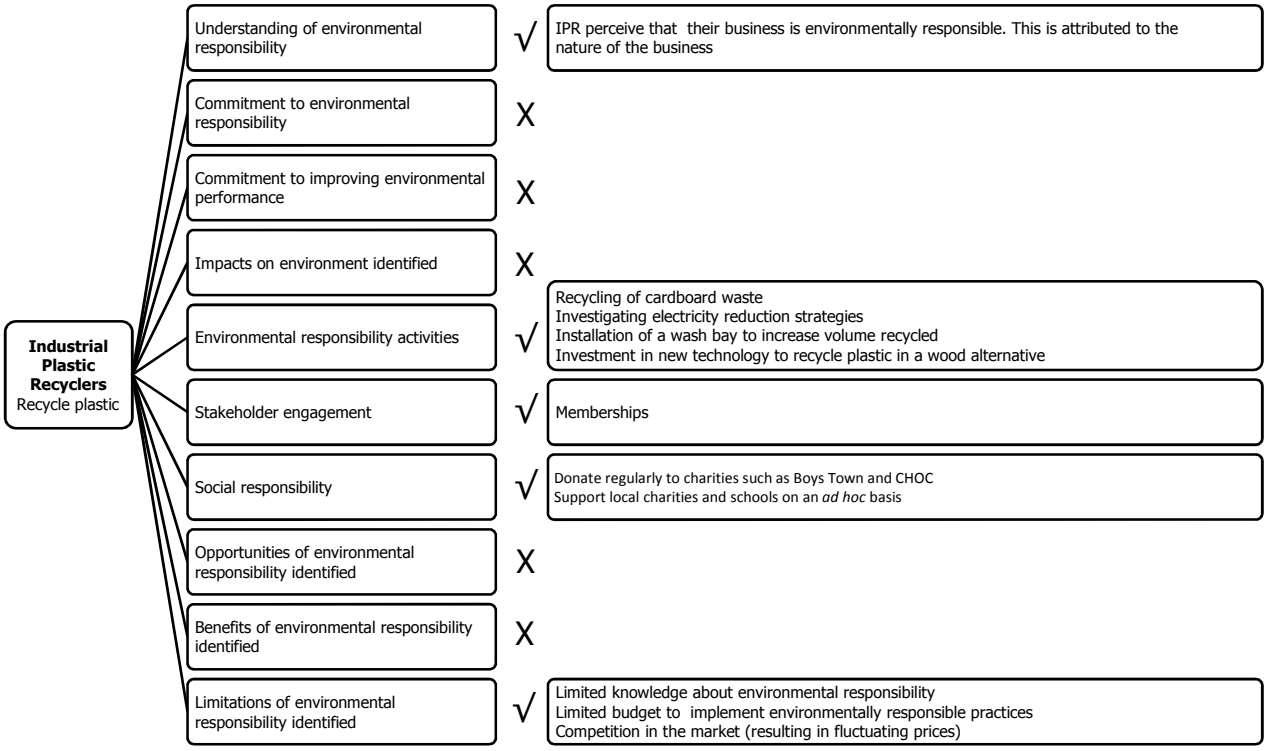

Figure 5.16 Summary of findings for IPR

5.2.4.7 DC Plastics

DC Plastics is the largest recycler in KwaZulu-Natal, recycling post-consumer LDPE (Low Density Polyethylene) and HDPE (High Density Polyethylene) into extrusion and injection grade low density pellets and blow mould and pip grade high density pellets (DC Plastics, 2010). DC Plastic offers a full collection and delivery service.

Correspondence with DC plastics was telephonic and only brief details of the study were discussed. The Director of company expressed that it is company policy not to divulge any information about the company for any reason.

5.2.4.8 Cyclocor: Company overview

Cyclocor blend a mix of post-consumer plastic waste with sand to create ultra-hardwearing, 100% recyclable building and civil engineering products, namely roof tiles and manhole covers. Their products are 30% recycled plastic and a 70% sand mixture called Cyclomix (Cyclocor website). Cyclocor are the only company is South Africa that produces roof tiles using post-consumer plastic.

Cyclocor use a variety of plastics for example, HDPE, LDPE, HIPS and PP in their products. The only plastics that Cyclocor prefer not to use are PET, PVC and nylon. Cyclocor source post-consumer and post-industrial plastic directly from industry and waste management companies for example, EnviroServ and Waste Plan. Cyclocor accept 'dirty' and contaminated material and material does not require cleaning before it is processed, this means that many other plastic recyclers supply Cyclocor with their 'plastic waste', plastic that they would not have recycle due to the level of contamination and absence of a wash bay. Cyclocor are able to recycle laminated plastic packaging, which is customarily more difficult to recycle.

Cyclocor has been in operation for more than two years, have an annual turnover of between R5 and R13 million, and employ 88 staff. The demographic profile of Cyclocor is 60% male, 40% female; 90% Black, 7% Indian and 3% White. Cyclocor fall within the National Small Business Amendment Act of 2003's definition of a SME, being classed as a small sized business (in the manufacturing sector) as they employ between more than 50 staff and have an annual turnover of between R5 and R13 million. Until recently, Cyclocor's operations were based in Waterfall, but due to the high cost of rent in the eThekwini area,

they have relocated to Ladysmith. Their administration office remains in Hillcrest. Operations run 24 hours a day, six days a week.

At the time of the interview, Cyclocor were processing an average of 750 tonnes of waste per month. Cyclocor have aggressive goals to increase this volume.

5.2.4.8.1 Cyclocor: Environmental responsibility

Cyclocor's Director reports that Cyclocor are familiar with the term 'environmental responsibility'; "*from our perspective we are interested in creating a product that has a low environmental impact, a responsible product. Creating a cradle to grave condition for our product is also important, we utilize mixed plastics – other peoples waste and our product is 100% recyclable within our process*".

Cyclocor reason that theirs is an environmentally responsible product, especially when compared to a traditional cement roof tile:

- The production of cement is energy intensive and has a high carbon footprint. Inputs for the roof tile are post-consumer and post-industrial waste plastic and sand, both have a considerably lower carbon footprint that the mining and manufacturing of cement.
- Cement roof tiles are much heavier than plastic roof tiles which results in transport inefficiencies. The plastic roof tile is much lighter and larger volumes can transported for load.

Cyclocor perceive that their business "*protects the environment by default*". They reason that the benefit of the plastic over the cement roof tile, and the amount of plastic that they divert from landfill to produce the product are environmentally responsible practices.

Cyclocor have become familiar with environmentally responsible concepts through interaction with stakeholders, notable through association with peers in the waste industry, consultants and government.

There is no environmental policy, environmental certification or system in place to ensure compliance with environmental legislation. Cyclocor do not employ a SHEQ Manager/Officer but have one Health and Safety Representative per shift. At the time of the interview,

Cyclocor were not planning to implement any environmentally responsible practices. Cyclocor is a new business and the priority is establishing sustainable business practices and growth of the business. Cyclocor are mindful of the importance of environmentally responsible practice and are interested in pursuing an environmental certification however, this was not a priority for the business.

5.2.4.8.2 Cyclocor: Environmental responsibility activities

Cyclocor state they are aware of the positive impact of their business on the environment; diverting plastic waste from landfill, providing a recycling outlet for traditionally 'problem plastics' and helping industry with their waste streams. They have not however, considered the impact of their operations on the environment. Cyclocor participate in some of the environmentally responsible activities investigated for this study, and practice some social responsibility (Table 5.14).

Cyclocor are investing the possibility of carbon credits to assist in generating income for the business. They operate in a niche market, sourcing low value plastics (R0.6 toR1 per kilogram) that other recyclers typically do not use, due to high level of contamination or lamination. As the business is growing, access to low cost waste is becoming more difficult to source and Cyclocor will have to start purchasing more expensive plastics (R1.5 to 1.7 per kilogram). A study conducted by an independent consultant showed that with the carbon credit model, Cyclocor could purchase more costly plastics (R2 to R3 per kilogram) and improve profitability of the business.

Table 5.14 A description of Cyclocor's environmental responsibility activities

Environmental responsible activity		Yes/ no	Description
1	Waste management	√	Cyclocor run a 'zero waste' operation. All plastic collected is recycled and all process waste can be recycled, as long as it is within their process.
2	Extended producer responsibility	X	Cyclocor's business, the recycling of post-consumer plastic, assists other companies in fulfilling their extended producer duties. Cyclocor note that they are audited for health and safety and environmental compliance by three larger corporates, namely Nampak Flexible, Unilever and EnviroServ. Cyclocor claim that as these three customers provide such a small portion of the plastic that they require on a monthly basis, they are not too concerned if they choose not to use Cyclocor. Cyclocor are also aware that the only alternative for traditionally problem plastics, such as the

Environmental responsible activity		Yes/ no	Description
			ones provided by these customers, is landfill.
3	Pollution control and effluent emissions	n/a	
4	Reducing water consumption	X	Water use is domestic and no measures have been taken to reduce water consumption.
5	Energy management	√	Electricity consumption is the single biggest cost of the business due to the energy intensive recycling equipment and the extended hour of operations. At the time of the interview, Cyclocor were investigating alternative technologies for power provision for example, biofuels. Their goal is to be independent Eskom for power. They are working with international consultants on this project.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	n/a	All transport and logistics is outsourced.
8	Minimising use of raw materials and conservations of natural resources	√	Cyclocor are investigating phasing out the use of sand in their roof tiles and replacing with crushed glass, both are silica based. Ultimately the roof tile will be made from post-consumer plastic and glass waste. This is the early stage of testing.
9	Air emissions management	X	
10	Environmental reporting	X	
11	Staff engagement	X	
12	Green procurement	X	
13	Green design/green building	X	Cyclocor argue that their product, recycled plastic roof tile, is a green design, and the tiles are used by architects in the construction of green buildings.
14	Reduction in use of harmful chemicals and or hazardous materials	X	
15	Investment in green technology and or innovation	√	Cyclocor believe that their product is a green innovation. They are investigating a carbon credit model to increase the profitability of their business. They are also looking for an alternative for the sand input into the product.
16	Other	√	Cyclocor are investing the possibility of carbon credits to assist in generating income for the business.

Environmental responsible activity		Yes/ no	Description
Number of relevant environmentally responsible activities investigated		13	1. Waste management 2. Extended producer responsibility 3. Reducing water consumption 4. Energy management 5. Carbon emissions management 6. Minimising use of raw materials and conservations of natural resources 7. Air emissions management 8. Environmental reporting 9. Staff engagement 10. Green procurement 11. Green building/design 12. Reduction in use of harmful chemicals and or hazardous materials 13. Investment in green technology and or innovation
Number of Cyclocor environmentally responsible activities		5	1. Waste management 2. Energy management 3. Minimising use of raw materials and conservations of natural resources 4. Investment in green technology and or innovation 5. Investigating the possibility of carbon credits
17	Social responsibility activities	√	Support non-profit organisations on an *ad hoc* basis

5.2.4.8.3 Cyclocor: Limitations, opportunities and benefits

Cyclocor demonstrate some environmental responsibility but with no environmental certification or environmental management system, it is therefore difficult to establish possible limitations and benefits that Cyclocor may experience from environmentally responsible practices. Cyclocor perceive that they sell an environmentally responsible product and that they are perceived as an environmentally responsible company. They note that this has resulted in some challenges for the business; particularly the uneducated market (public and business) and 'green' products have a stigma of being more expensive. Cyclocor do not market their product as a 'green' product, they find that it is too time consuming to educate customers about the environmental benefits of the product and the perception that the product will cost more. The Director of Cyclocor states, with frustration that "*we cannot sell our roof tiles as a green product even though it is a green product. Our product fulfils all the green objectives but cannot use this to our advantage*".

Cyclocor experienced the same challenge in collecting recyclables. Cyclocor source a waste stream that traditionally could not be recycled and have had to spend time educating

industry and waste management companies to extract plastic that they would have traditionally thrown away. The Director of Cyclocor states "*we are having to fulfil and educational function in the industry to grow our business*".

In addition to low grade plastics, Cyclocor prefer e-waste plastic for example, HIPS and ABS. Their experience has shown that e-waste plastics are difficult to source. Cyclocor have found that there are large volumes of e-waste in KwaZulu-Natal but only a small amount is being recycled.

Cyclocor are in the process of obtaining a waste licence for their Ladysmith plant and have found the waste licence application process is cumbersome and tedious. They perceive that environmental consultants are more interested in profit than giving good advice, and they have had altercations with two consultancies and have appointed a third to assist with the waste licence application.

On a positive note, Cyclocor believe that the housing sector and local government are becoming more aware of environmentally responsible practices and technologies and this will ultimately benefit their business.

5.2.4.8.4 Cyclocor: Stakeholder engagement

Cyclocor are members of the South Africa Plastic Recyclers Organisation and the Green Building Council of South Africa. They have established a relationship with the local authorities in Ladysmith who are assisting with their waste licence application, sourcing of recyclables and reduce rates. USE-IT (a section 21 company promulgated by the eThekwini Waste Materials Recovery Industry Development Programme) have played an important role in the growth and development of the business.

5.2.4.8.5 Cyclocor: Summary of findings

In summary, Cyclocor demonstrate some understanding of, and commitment to, environmental responsibility and participate in some environmental and social responsibility activities (Figure 5.17).

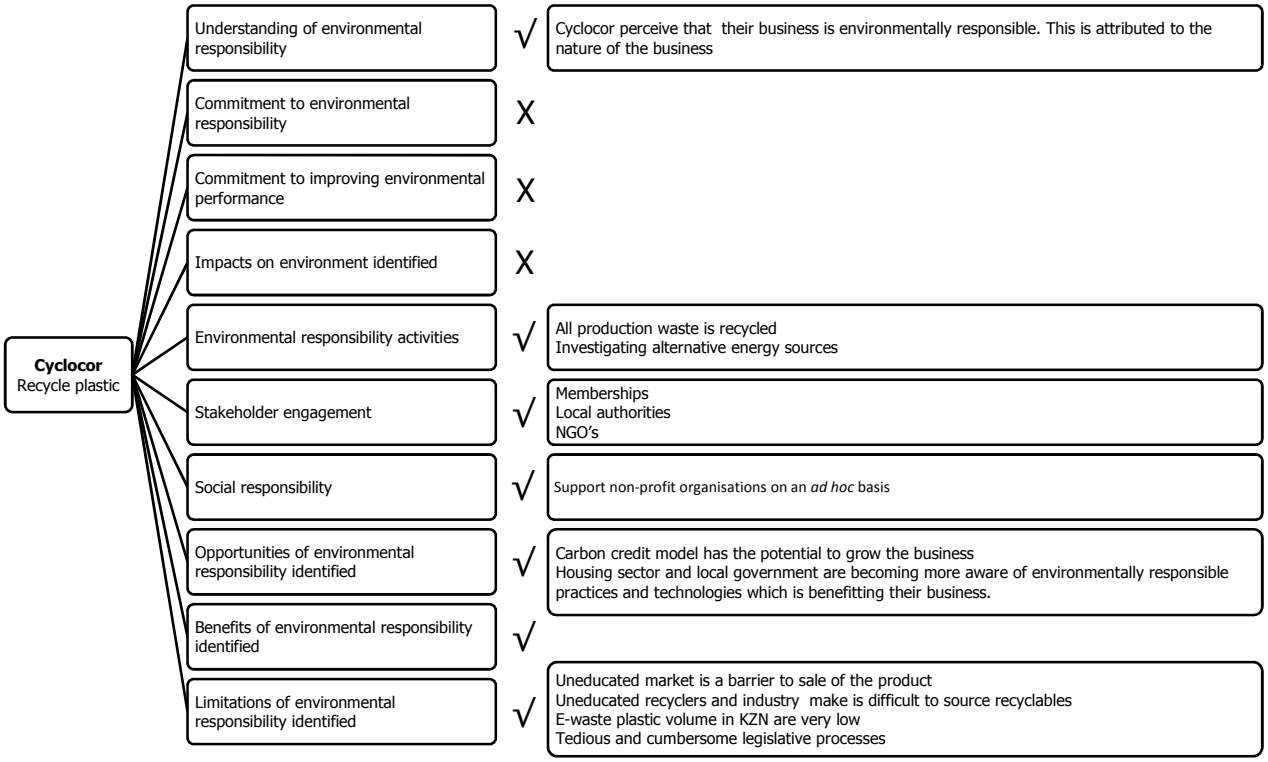

Figure 5.17 Summary of findings for Cyclocor

5.2.4.9 L and P Plastics

Correspondence with L and P Plastics was by e-mail and telephonic and the owner of the company did review the questionnaire and purpose of the study. L and P Plastics declined as they did want to reveal their annual turnover. Even after assurance they this was not a requirement to partake in the study, they still refused. They do not have a website and were not willing to share any information relating to their business.

5.2.4.10 MFI Mouldings and Frames (MFI): Company overview

MFI Mouldings and Frames (MFI) are picture frame manufacturers, importers and distributors. Their production facility extrudes polyresin mouldings from 100% recycled materials (polystyrene) and design and develop mouldings used in the interior décor industry and execute orders for independent picture framers and art galleries (MFI website). MFI work with more than 4 500 individuals and companies – from Independent Art Galleries and Picture Framing Outlets to large Blue-Chip Department and Home Décor group stores. MFI offer franchise opportunities for independent business owners, known as 'Hall of Frames' (MFI website).

MFI Mouldings and Frames, based in Durban, has been in operation for more than 40 years, have an annual turnover of approximately R51 million, and employs 208 staff. They operate 24 hours a day, seven days a week. The demographic profile of MFI Mouldings is 79% male, 21% female; 47% Black, 1% Coloured, 47% Indian and 5% White. MFI fall within the National Small Business Amendment Act of 2003's definition of a SME, being classified as a medium-sized business (in the manufacturing sector) as they employ 200 staff and have an annual turnover of approximately R51 million.

MFI recycle approximately 46 tons of post-consumer polystyrene per month (Table 5.15) and source polystyrene waste from polystyrene manufacturers (production waste) and post-consumer waste from large waste management companies for example, EnviroServ and large retail corporations.

Table 5.15 Approximate volumes of post-industrial and post-consumer polystyrene recycled by MFI Moulders per month

Month	Tons
Jan 2012	35
Feb 2012	45
Mar 2012	44
Apr 2012	40
May 2012	55
Jun 2012	51
Jul 2012	56
Aug 2012	41
Sep 2012	46
Average	**413**

5.2.4.10.1 MFI: Environmental responsibility

MFI's General Manager reports that they are familiar with the term 'environmental responsibility'. As described by the General Manager "*environmental responsibility means separating and recycling your waste, and minimise your use of non-recyclable products so that you don't contaminate the environment. Companies must be aware of their impact on the environment, the impact of their product, and their waste*". MFI perceive that they are an environmental responsible company and learnt about environmental responsible practices

from memberships for example, through their SAPRO membership, and through self-learning for example, internet and media.

MFI have neither an environmental policy, an environmental certification nor a budget for environmental projects. Similarly, there is no system in place to ensure compliance with environmental legislation. MFI do not employ health, safety or environmental personnel and the Health and Safety function is absorbed by the Humans Resources function. Health and Safety Representatives have been trained in basic Health and Safety Representatives duties and preform these tasks over and above their designated role in the organisation.

At the time of the interview, MFI were developing an environmental management system in application for ISO 14001 certification. Development had been in process for six months and they anticipated a further six months to completion.

The General Manger monitors water and electricity consumption and waste volumes on a monthly basis. It is noted that these metrics are monitored as the cost of electricity and waste disposal are significant for the business.

5.2.4.10.2 MFI: Environmental responsibility activities

MFI Mouldings perceive that the business have a responsibility to protect the environment but admit that their operations are not 100% environmentally responsible. They identify waste to landfill and electricity consumption as their most significant environmental impacts. Picture frame glass cannot be recycled and MFI are disposing of large quantities of this waste stream every week (approximately two 7m^3 skips full twice a week) in a local landfill. Electricity consumption is significant and accounts for 50% of the organisations monthly costs. These impacts were identified due to cost implications to the business. MFI partake in some of the environmentally responsible activities investigated in this study (Table 5.16).

Table 5.16 Description of MFI Moulders environmentally responsible activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	MFI sort internal waste for recycling for example, paper, cardboard and plastic. Interestingly, MFI do not utilise the service of a waste management company and sell their recyclables directly to recyclers.
2	Extended producer	X	

Environmental responsible activity		Yes / no	Description
	responsibility		
3	Pollution control and effluent emissions	n/a	
4	Reducing water consumption	X	Water use is domestic type and no measures have been taken to reduce water consumption. It is noted that small amounts of water are used during the pelletizing process but this is in a closed loop system and water is cycled through the system repeatedly. There is no waste water discharge as waste evaporates out the machinery and is topped up when necessary.
5	Energy management	√	MFI have outsourced an energy audit to an independent consultant to identify high energy use areas. At the time of the interview, the results of the energy audit were pending. It was envisaged that the results would inform energy reducing strategies that could be implemented for example, energy efficient lighting. MFI are also investigating options for solar energy, they have a large roof area that would be suitable for installation of solar panels. At the time of the time of the interview, they were acquiring quotes to assess the feasibility of such a venture.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	√	MFI own and small fleet of small trucks for the collection of post-consumer waste. In order to reduce fuel consumption, daily route planning is undertaken. It is noted that this exercise is undertaken solely for the purpose of reducing costs.
8	Minimising use of raw materials and conservations of natural resources	√	Picture frame glass is not recyclable and large volumes of this waste stream are landfilled every month. The glass waste is a problem so they are experimenting with alternative for the frame glass reduce this waste stream for example, thin, recyclable plastic, laminating the picture so that it does not require a glass cover.
9	Air emissions management	n/a	MFI Moulders perceive that air emissions are not applicable to their business.
10	Environmental reporting	X	
11	Staff engagement	√	Some environmental aspects are covered during induction training and weekly toolbox talks. It is noted that the focus is on operations and health and safety. Environmental issues are addresses infrequently.
12	Green procurement	X	
13	Green design/green building	X	MFI perceive that the cost of adapting a building to include 'green' elements would not be affordable.
14	Reduction in use of harmful chemicals and or hazardous materials	X	
15	Investment in green technology and or innovation	X	
16	Other	X	

Environmental responsible activity		Yes / no	Description
Number of relevant environmentally responsible activities investigated		13	1. Waste management 2. Extended producer responsibility 3. Reducing water consumption 4. Energy management 5. Carbon emissions management 6. Transport, travel and fuel consumption 7. Minimising use of raw materials and conservations of natural resources 8. Environmental reporting 9. Staff engagement 10. Green procurement 11. Green building/design 12. Reduction in use of harmful chemicals and or hazardous materials 13. Investment in green technology and or innovation
Number of MFI environmentally responsible activities		5	1. Waste management 2. Energy management 3. Transport, travel and fuel consumption 4. Minimising use of raw materials and conservations of natural resources 5. Staff engagement
17	Social responsibility activities	√	MFI donate funds to local charities at their request. MFI also participates in the "bread tags for wheelchairs project". The bread tags for wheelchairs project is an initiative where the public are encouraged to collect bread tags for recycling. Approximately 500 collection points for example, schools and shopping centres are located throughout South Africa. Once the collection point has accumulated 270kg of bread tags, MFI remunerate the Polystyrene Packaging Council of South Africa for the value of the plastic, usually equivalent to the cost of one wheelchair. The wheelchair is purchased by the PPCSA and donated to a person with a physical disability (PPCSA website). Partaking in this initiative has inspired MFI and they also contribute wheelchairs to the project

5.2.4.10.3 MFI: Limitations, opportunities and benefits

MFI demonstrate some environmental responsibility but have neither an environmental certification nor an environmental management system, it is therefore difficult to establish possible limitations and benefits that MFI may experience regarding environmentally responsible practices. MFI perceive that they sell an environmentally responsible product and that they are perceived as an environmentally responsible company and describe challenges associated with being an environmentally responsible business. MFI note that their most significant challenge is the sourcing of clean post-consumer polystyrene for recycling. As described by the General Manager "*it is becoming more and more difficult to source material and this means that material is becoming more expensive*". For this reason, MFI have diversified from their reliance on waste management companies for material and

have started sourcing their own post-consumer material. They have entered into agreements with large retails stores for the collection of their post-consumer packaging waste. These stores require that MFI take all of their packaging waste, which includes non-polystyrene waste (mostly cardboard and plastic). This has resulted in MFI requiring extra labour to sort the packaging and space for sorting and storage of the non-polystyrene packaging. There is a level of contamination and a percentage of the recovered polystyrene is disposed as it is too 'dirty' to recycle.

MFI explain that as they are a small company, an employee can often be expected to perform duties outside their job description. Being overstretched means that duties that are not core to the functioning of the business are not prioritised for example, environmental responsibility. The General Manager remarked, honestly, that "*our core focus is running a business and though we are concerned about environmental issues it gets pushed to the back of the que – it is not a priority*".

MFI would like to do more to be environmentally responsible, but have limited skills within their staff compliment and limited resources means that they are not able to employ a staff member dedicated to environmental responsibility. According to MFIs General Manager, they have implemented environmental responsibility projects for two reason; cost savings and ethical considerations.

5.2.4.10.4 MFI: Stakeholder engagement

MFI are members of the South African Plastics Recyclers Organisation and the Polystyrene Packaging Council of South Africa. They attend meetings of these organisations when possible. During 2011, MFI Mouldings were awarded a Silver award by the South African Plastics Recyclers Organisation (SAPRO) for the best recycled product in the category 'percentage mixed recyclate with virgin'.

MFI have experienced considerable pressure from their customers to be environmentally responsible, notably Woolworths, Clicks and Pick 'n Pay, all of whom distribute their picture frames to the public. Woolworths conduct SHE audits on a monthly basis and will not purchase from MFI if they fail an audit. The General Manager remarks "*we don't have a choice, we have to comply because Woolworths is big*".

5.2.4.10.5 MFI: Summary of findings

In summary, MFI demonstrate an understanding of, and some commitment to, environmental responsibility (early stages of developing and EMS and implementing ISO 14001). MFI participate in some environmental and social responsibility activities (Figure 5.8).

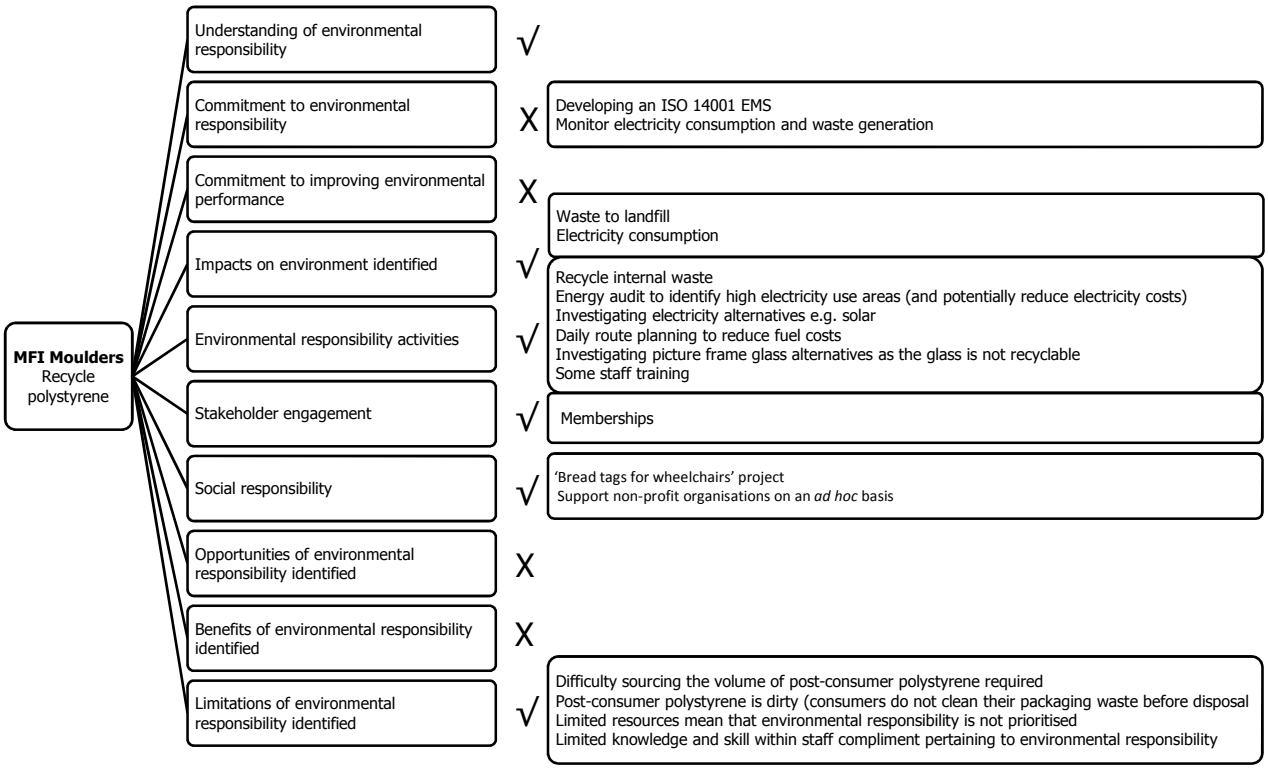

Figure 5.18 Summary of findings for MFI

5.2.4.11 Anchor Pail and Drum Reconditioners (AP and D): Company overview

Anchor Pail and Drum Reconditioners (AP and D) are in the business of reconditioning used containers for the petro-chemical industry. These range from 20 to 1 000 litre plastic containers, steel drums and other bulk chemical packaging vessels for example, flobins. They purchase used steel drums and plastic containers, recondition them and resell them in bulk, back to industry (Figure 5.19). AP and D service customer owned containers and own a specialised fleet of vehicles that collect and deliver nationwide (AP and D, 2012).

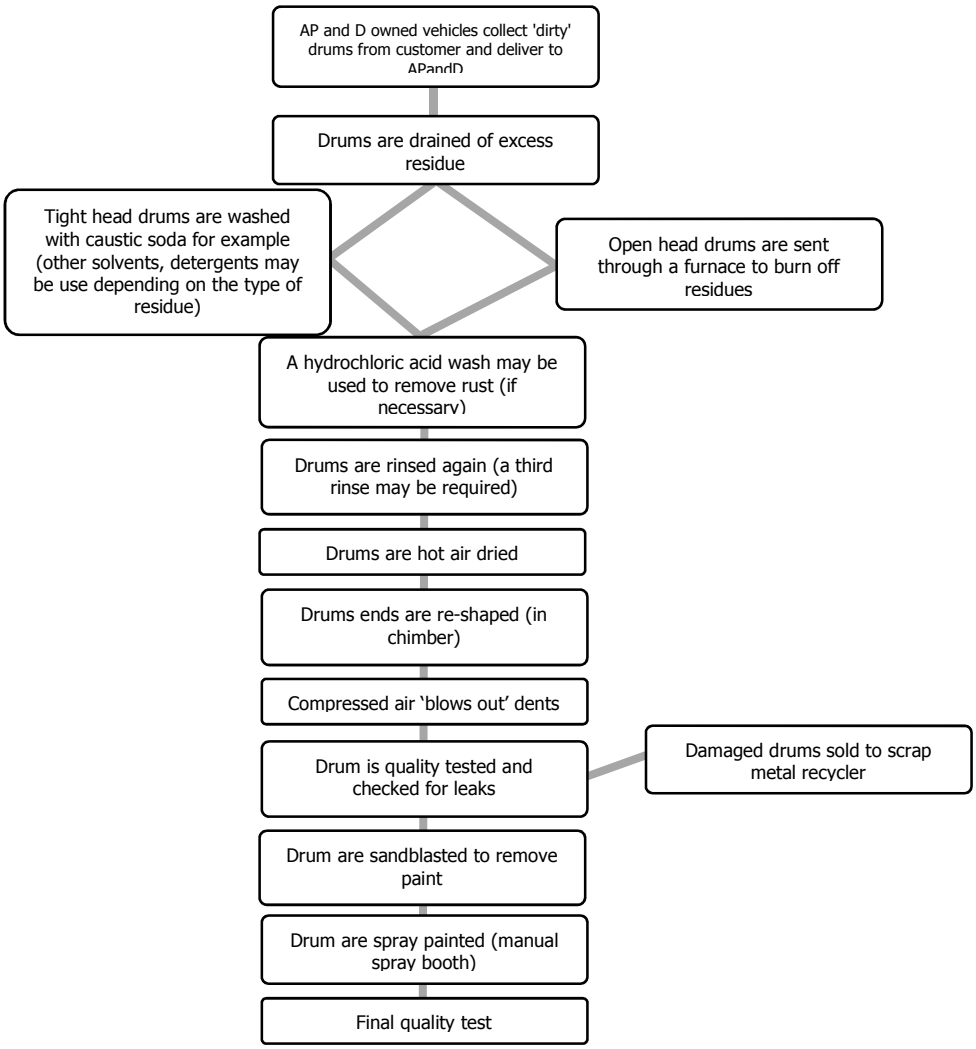

Figure 5.19 Summary of AP and D's steel drum reconditioning process

AP and D operate from two premises. 'Anchor I' the head office, are located in Clairwood and 'Anchor II', a more recently acquired premises, is located in Jacobs (both in the greater Durban area, eThekwini). AP and D has been in operation for 22 years and according to the National Small Business Amendment Act of 2003's definition of a SME, AP and D are classified as a small to medium-sized business (manufacturing) having an annual turnover of between R0.2 and R5 million, and employ 94 staff. The demographic profile of AP and D is 94% male, 6% female; 89% Black, 2% Coloured 6% Indian and 2% White.

5.2.4.11.1 AP and D: Environmental responsibility

AP and D are familiar with the term environmental responsibility and describe the concept as "*harming the environment is the result of the actions of the business and growth of the business. There are two parts, the outside environment, nature and the impact inside the*

business. Responsibility is looking out for both". The group have become familiar with these concepts through interaction with stakeholders, membership workshops and training, and self-learning (newsletters, and other media).

AP and D are ISO 14001 certified and are regulated by an active environmental management system. AP and D's Environmental Policy, demonstrates commitment from the company's leadership and is communicated to staff through the staff notice board and internal training. Their environmental committee meets monthly to discuss health, safety and environment issues.

Commitment extends to employment of a Safety, Health, Environment and Quality (SHEQ) Manager who is responsible for maintaining the ISO 14001 system. The SHEQ Manager has been trained in ISO 14001. Legal audits are outsourced to an environmental consultant and are reviewed annually. Environmental responsibility projects are implemented on an on-going basis and there is budgetary allowance for environmental improvement.

As part of AP and D's ISO14001 system, environmental metrics are recorded monthly and environmental targets are set and reviewed annually. AP and D conduct induction training to inform employees about health, safety and environmental risks and procedures. Certain staff are trained to conduct weekly 'internal audits' to ensure procedures are being followed and identify new risks. The 'internal audit' reports are then reviewed by the SHEQ Manager.

AP and D are ISO 14001:2004 and ISO9001:2008 certified and are members of Responsible Packaging Management Association of Southern Africa (RPMASA), Chemical Allied Industries Association (CAIA) and the Rose Foundation. As CAIA members, AP and D have voluntarily signed a pledge at CEO level, committing to these guiding principles of Responsible Care. Responsible Care is a global initiative whereby the chemical industry have committed to continuously improve all aspects of health, safety and environmental performance and to open communication about its activities and achievements (CAIA, 2010).

5.2.4.11.2 AP and D: Environmental responsibility activities

AP and D have identified air emissions, effluent emissions, the transporting of hazardous waste (containers with residual chemicals), noise and dust as their significant environmental impacts (Table 5.17).

Table 5.17 AP and D's significant environmental impacts

Environmental impact	Cause
Air emissions	Incinerator – burning residual chemicals off drums VOCs – from spray painting booth Vehicle fleet – diesel emissions
Effluent emissions	Wash bay – cleaning drums (plastic and steel) of residual chemicals and oil
Transporting hazardous waste	Vehicle fleet – collection of drums with residual chemicals and oils from customers
Noise	Noise – machinery, vehicles and unloading of drums
Dust	Sandblasting – dust from sandblasting old paint off drums

AP and D partake in a number of environmentally responsible activities investigated in this study (Table 5.18) and require permits from the local authorities to release trade effluent and to operate their boiler.

Table 5.18 Description of AP and D environmentally responsible activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Process specific waste products are recycled. Cleaned plastic containers and drums that do not pass quality testing are sold to recyclers. Residual oil from drum is sold to the Rose Foundation for recycling. AP and D are remunerated for these recyclables and the amount generated is contributes to staff costs. It is noted that EnviroServ both use the services of AP and D and manage AP and D's hazardous waste to landfill.
2	Extended producer responsibility	√	AP and D consider their core business function to play an imperative role in their customers extended producer responsibility. ApandD refurbish drum containers for the customers re-use and ensure environmentally responsible practices in their operations.
3	Pollution control and effluent emissions	√	AP and D require a permit to release trade effluent (5.2.4.11.2.1).
4	Reducing water consumption	√	AP and D report that water use is substantial. One thousand litre flobins are rinsed clean with water and an average of 20 to 30 flobins are rinsed per day. Water is also used for the wash bay and domestic use. At the time of the interview, AP and D were investigating rain water harvesting as an alternative water supply for washing flobins.
5	Energy management	√	AP and D perceive electricity consumption and the cost of electricity to be a significant risk to the business. Though AP and D have refined many of their processes, and custom engineered equipment lines to use minimise energy, electricity consumption is still substantial. Further, the recently acquired 'Anchor II' is an old plant and lighting is old and inefficient. It is noted that boilers are fuelled with coal and the incinerator is

Environmental responsible activity		Yes / no	Description
			fuelled with diesel.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	√	AP and D's utilise a vehicle fleet GPS tracking system for the purpose of route planning and monitoring driver behaviour, in an effort to optimise fuel efficiency. The entire vehicles meet with standards set out by the dangerous goods legislation (The National Road Traffic Act 93 (Act 93 of 1996).
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	√	AP and D require a permit to operate their boiler (5.2.4.11.2.2).
10	Environmental reporting	√	AP and D are subject to frequent testing by the local authorities for their effluent and air emissions. They are also required to report to the local authorities in order to maintain their permits. This is outsourced to various environmental consultants.
11	Staff engagement	√	Staff are trained about environmental issues during induction training, weekly toolbox talks and during monthly health, safety and environment committee meetings.
12	Green procurement	√	All waste contractors have been audited for health, safety and environmental legal compliance. AP and D are audited by customer for health, safety and environmental legal compliance regularly and annually for ISO 14001 re-certification.
13	Green design/green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	X	No measures have been put in place to reduce the use of harmful chemicals and hazardous materials. AP and D reason that due to the nature of their business, this is unlikely.
15	Investment in green technology and or innovation	X	
16	Other	√	As per the requirement of their ISO 14001 EMS, AP and D seek too continually improve their environmental performance and new projects are being identified quarterly. The projects are prioritised and implementation is subject to budgetary allowance.
Number of relevant environmentally responsible activities investigated		15	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting

Environmental responsible activity		Yes / no	Description
			11. Staff engagement 12. Green procurement 13. Green building/design 14. Reduction in use of harmful chemicals and or hazardous materials 15. Investment in green technology and or innovation
Number of AP and D environmentally responsible activities		10	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Transport, travel and fuel consumption 7. Air emissions management 8. Environmental reporting 9. Staff engagement 10. Green procurement 11. Continued improvement of environmental performance
17	Social responsibility activities	√	AP and D support the Ethembeni Place of Hope, Child and Family Welfare Society, Clarehills Youth League, Divine Life Society of South Africa, Durban Care for the Aged, Sparak Dynamics, Hlala Wazi Destitute Fund, Chatsworth Regional Hospice Association, Souls Haven children's Ministries.

5.2.4.11.2.1 Pollution control and effluent emissions

The discharge of industrial effluents into the municipal sewer system is regulated by the eThekwini Municipality in terms of Sewage Disposal Bylaws. AP and D's wash bay, used to clean drums of residue, is subject to permitting under these bylaws. The permit is renewed annually, on submissions of an effluent monitoring report conducted by an independent consultancy and subject to random testing by the local authorities.

Diesel is stored in a portable fuel tank to fuel boiler and incinerator. The fuel tank is stored in a bunded area to prevent accidental spill, spill kits are available and staff are trained in accidental spill procedures.

5.2.4.11.2.2 Air emissions management

National Environmental Management: Air Quality Act (No 39 of 2004) provides for the regulation of ambient air quality for example, the control of dust, noise, offensive odours and combustion installations and operations. The Act requires listed activities to apply for an Air Emissions License (AEL) which is licensed and monitored through the eThekwini Metropolitan Municipality.

As AP and D had a permitted incinerator prior to the pulmigation of the AEL regulations, they have until the end of 2013 to apply for an AEL under the new regulations. They have outsourced this task to WSP Environmental Consultants. There is an onsite boiler for the purpose of heating water for the wash bay for which AP and D have a permit to operate subject to regular testing by the local authorities and annual renewal. AP and D identify VOC emission from the paint spray booths as a notable health, safety and environmental impact and are investigating stronger extraction hoods to mitigate the impact.

5.2.4.11.3 AP and D: Limitations, opportunities and benefits

AP and D perceive that environmentally responsible practices have benefitted their business. They have played an active role "*cleaning up the drum industry*" which traditionally had a 'dirty' and non-compliance reputation. This has resulted in AP and D gaining a good image and reputation in the industry, and they believe that they are the preferred drum reconditioner in Durban. AP and D report that ISO certification and the ISO auditing process (internal and external) has resulted in continual improvement of their environmental performance. AP and D perceive that these two major benefits have contributed to the long term sustainability of the business. Furthermore, AP and D report that their environmentally responsible practices have benefitted the health and welfare of their staff.

AP and D describe two key challenges with environmentally responsible practices. First, the cost of air and effluent emission licences. These are subject to on-going testing and renewal. This requires the service of environmental consultants, which is costly, as are the regular water and air emissions testing. The second major challenge is the waste permitting legislation which changes frequently and is difficult to understand. Again the service of environmental consultants is required. From an internal perspective, AP and D report that awareness of environmental responsibility among staff is low and despite on-going training, they have seen little improvement in general environmental awareness.

AP and D suggest that government should offer support for the cost of environmental consulting fees to small business. They suggest that, in terms of extended user responsibility, the manufacturers of the drum and drum contents should pay a fee to assist with compliance cost. AP and D argue that they are cleaning up the manufacturers waste.

AP and D report that their most significant limiting factor for doing more to improve their environmental performance is limited financial resources.

5.2.4.11.4 AP and D: Stakeholder engagement

AP and D engage with Environmental Consultants and the local authorities on an on-going basis for the purpose of maintaining the air effluent emissions licences. Regular reporting to the local authorities is required.

They have played an active and participatory role in developing regulations for the drum industry with local and national government and other relevant stakeholders (notably the Responsible Packaging Management Association of Southern Africa). During 2001, the Rose Foundation facilitated the formation of SAICRA (South African Industrial Containers Recycling Association), a body that attempt to ensure compliance amongst drum reconditioners in South Africa. SAICRA consists of 30 founding members, comprising 26 drum re-conditioners, three new drum manufacturers and the ROSE Foundation; AP and D are one of the founding members.

AP and D in association with other drum reconditioners where consulted on the development of SANS 10406; Transport of dangerous goods – The reprocessing of previously certified packaging. SANS 10406 outlines procedures to follow for the reprocessing of previously certified packaging for the transport of dangerous goods, to ensure that the reprocessed packaging meets agreed upon quality standards and that the safe transport of goods packaged in such reprocessed packaging is not compromised (SABS, 2010).

AP and D perceive that they have played an active and important role in improving the environmental performance and image of the drum industry.

5.2.4.11.5 AP and D: Summary of findings

AP and D demonstrate an understanding of, and a commitment to, environmental responsibility (ISO 14001 certification) and partake in a number of environmentally responsible activities (Figure 5.20). AP and D are active in working with stakeholders and social responsibility activities.

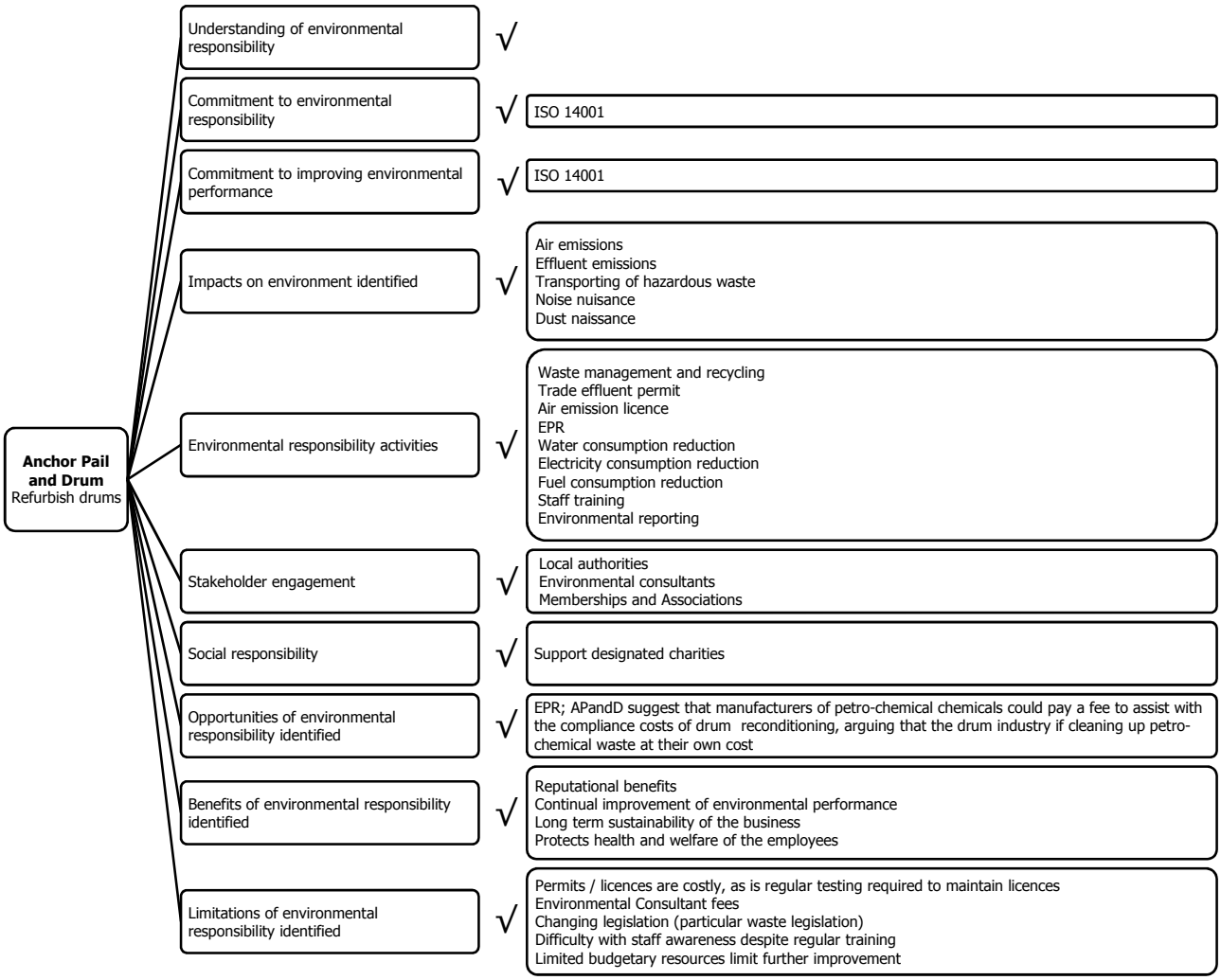

Figure 5.20 Summary of findings for AP and D

5.2.4.12 Drumnet

Correspondence with Drumnet was by e-mail and telephonic and the owner of the company did review the questionnaire and purpose of the study. After numerous attempts over a period of four months to set-up an appointment with Drumnet, the researcher ceased further correspondence with the company.

5.2.4.13 Green Office

Green office was discussed in a previous section (5.2.2.18 Green Office: Company Overview).

5.2.4.14 Atlas Scrap

Correspondence with Atlas Scrap was by e-mail and telephonic and the owner of the company did review the questionnaire and purpose of the study. Atlas Scrap declined stating that "*the nature of our business is very sensitive and we are not willing to share sensitive information*". They do not have a website and were not willing to share any information relating to their business.

5.2.4.15 Group Wreck: Company overview

Group Wreck offer a range of services related to the sourcing, trading, and purchasing of scrap non-ferrous metals (Figure 5.21). Primarily, they purchase non-ferrous scrap metal, i.e. copper, brass, lead, zinc alloys, cast aluminium, foil and nickel and they trade in some stainless steel and ferrous scrap. Extensive knowledge, experience, and analytical equipment ensure that metal is graded accurately (Group Wreck, 2012). Group Wreck collect approximately 7 000 tonnes of scrap metal per month.

Their Queensmead, Durban premises has a weigh-bridge and baling equipment. Metals are sorted, weighed, stripped, cut and baled before sale or export. Though they supply local recyclers where possible, the majority of the material is exported (through the company's own shipping department) to China, Korea and other international destinations.

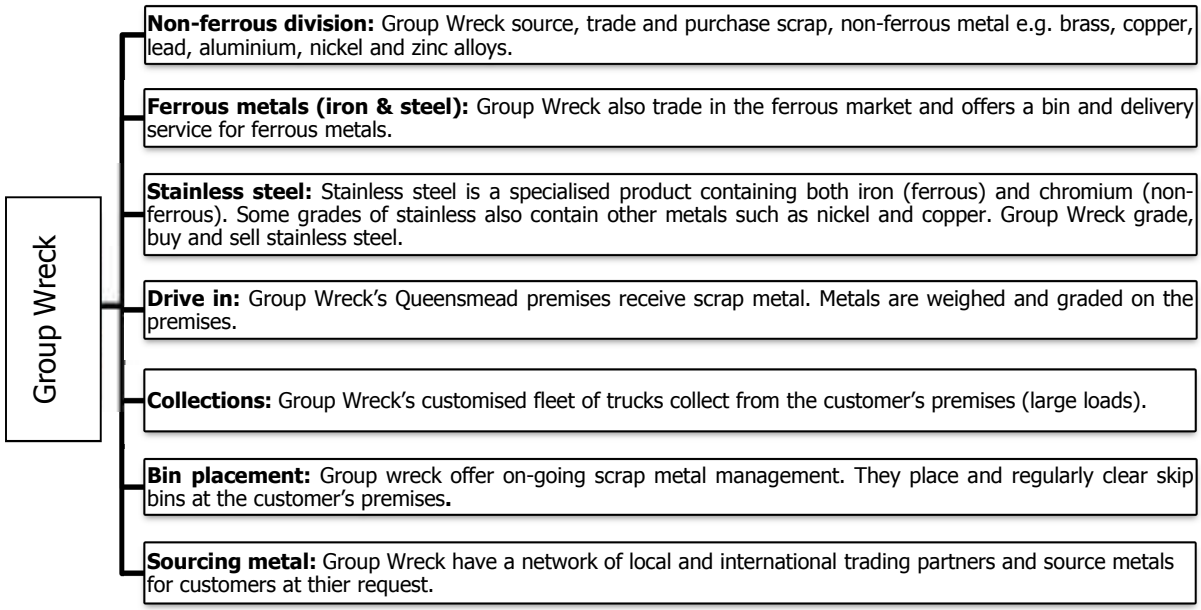

Figure 5.21 A diagrammatic overview of Group Wreck's service offering (Group Wreck, 2012)

Group Wreck acquire post-industrial and post-consumer scrap metal from five sources:

1. Directly from industry (post-industrial scrap), by either on-site skip scrap metal management or by regular collection from the client (truck fleet).
2. Purchase from smaller scrap dealers (other SMEs).
3. Drop off by large waste management companies for example, EnviroServ and The Waste Group.
4. From 'independent collectors'; one person businesses with small trucks who in turn collect from street hawkers and informal pickers.
5. Direct purchase from street hawkers.

Group Wreck are investigating importing scrap metals from neighbouring African countries for example, Angola.

Group Wreck has been in operation for 3 years, have an annual turnover of approximately R51 million, and employ 52 staff. The demographic profile of IPR is 90% male, 10% female; 80% Black, 10% Indian and 10% White. Group Wreck fall outside the National Small Business Amendment Act of 2003's definition of a SME. Group Wreck are classed as a small sized business (transport, storage and communications). Though they employ between 50 and 200 staff (medium-sized business), they have an annual turnover of approximately R51 million (more than the R26 million maximum to be classed as a medium-sized business).

5.2.4.15.1.1 Group Wreck: Environmental responsibility

The owner of Group Wreck reports that they are familiar with the term 'environmental responsibility' and describe the concept as *"not polluting the environment and making sure that the product that we present does not harm the environment*". Group Wreck believe that they have a significantly positive impact on the environment by preventing scrap metal and redundant electronics from littering the environment. They reason that their service benefits the environment and therefore "*environmental responsibility is the personality of the company*".

There is no environmental policy or system in place to ensure compliance with environmental legislation and they do not plan to pursue environmental certification or implement environmentally responsible practices.

5.2.4.15.1.2 Group Wreck: Environmental responsibility activities

Group Wreck have not considered the impact of their business activities on the environment other than the benefit to the environment by preventing scrap waste from littering the surroundings. Group Wreck do not partake in environmentally responsible activities (Table 5.19**)** and at the time of the interview, did not plan to implement environmental responsibility interventions.

Table 5.19 Description of Group Wreck's environmentally responsible activities

Environmental responsible activity		**Yes / no**	**Description**
1	Waste management	X	
2	Extended producer responsibility	X	Group Wreck are not familiar with the term 'extended producer responsibility'.
3	Pollution control and effluent emissions	X	
4	Reducing water consumption	X	Water use is domestic and no measures have been taken to reduce water consumption.
5	Energy management	X	Group Wreck report that their electricity usage is not a significant cost to the business and energy management interventions have not been considered.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	X	
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	X	
10	Environmental reporting	X	
11	Staff engagement	X	
12	Green procurement	X	
13	Green design/green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	X	
15	Investment in green technology and or innovation	X	
16	Other	X	

Environmental responsible activity		Yes / no	Description
Number of relevant environmentally responsible activities investigated		15	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green building/design 14. Reduction in use of harmful chemicals and or hazardous materials 15. Investment in green technology and or innovation
Number of Group Wreck environmentally responsible activities		0	
17	Social responsibility activities	√	Support local non-profit organisations at their request and on an *ad hoc basis* for example, Open Door Crisis Centre, Jewish Woman's Guild and community soccer teams.

5.2.4.15.1.3 Group Wreck: Limitations, opportunities and benefits

Group Wreck demonstrate limited environmental responsibility, and it is therefore difficult to establish possible limitations and benefits that Group Wreck may experience from environmentally responsible practices. Group Wreck perceive that, as they collect scrap metal, an environmentally preferable option to littering the environment, that they are an environmentally responsible company and there are challenges associated with this business practices. Group Wreck report that fluctuating prices for scrap metal is a challenge for the business. The price of metal is set by the London Metals Exchange and is dependent on the exchange rate, both which change daily. Furthermore, the scrap industry is highly competitive. If a competitor is buying scrap for even a few cents more than Group Wreck's price, the seller will sell to the competitor.

Local legislation, particularly B-BEEE requirements have been a challenge for the business. Group Wreck is a white owned, family business and the cost and the general requirements of the legislation have been difficult for the business to overcome.

Group Wreck report that there are many opportunities for the scrap metal industry to expand into neighbouring countries and the oversees market. The owner explains that "*there is a high demand for scrap metals, you can sell scrap anywhere, anytime*". Further, "*scrap metal presents an opportunity for the population; any person can collect scrap off the streets and earn money*".

5.2.4.15.1.4 Group Wreck: Stakeholder engagement

Group Wreck are members of the Metal Recyclers Association of South Africa, and report that they are not under pressure from stakeholders to improve their environmental performance. Their experience is that once the scrap has left the customers yard, they are no longer concerned with it. They do receive pressure from customer to keep the customers yards neat and tidy and collect waste timeously for this purpose.

5.2.4.15.1.5 Group Wreck: Summary of findings

In summary, Group Wreck demonstrate limited understanding of, and commitment to, environmental responsibility and do not partake in environmentally responsible activities. They do however participate in some social responsibility activities (Figure 5.22).

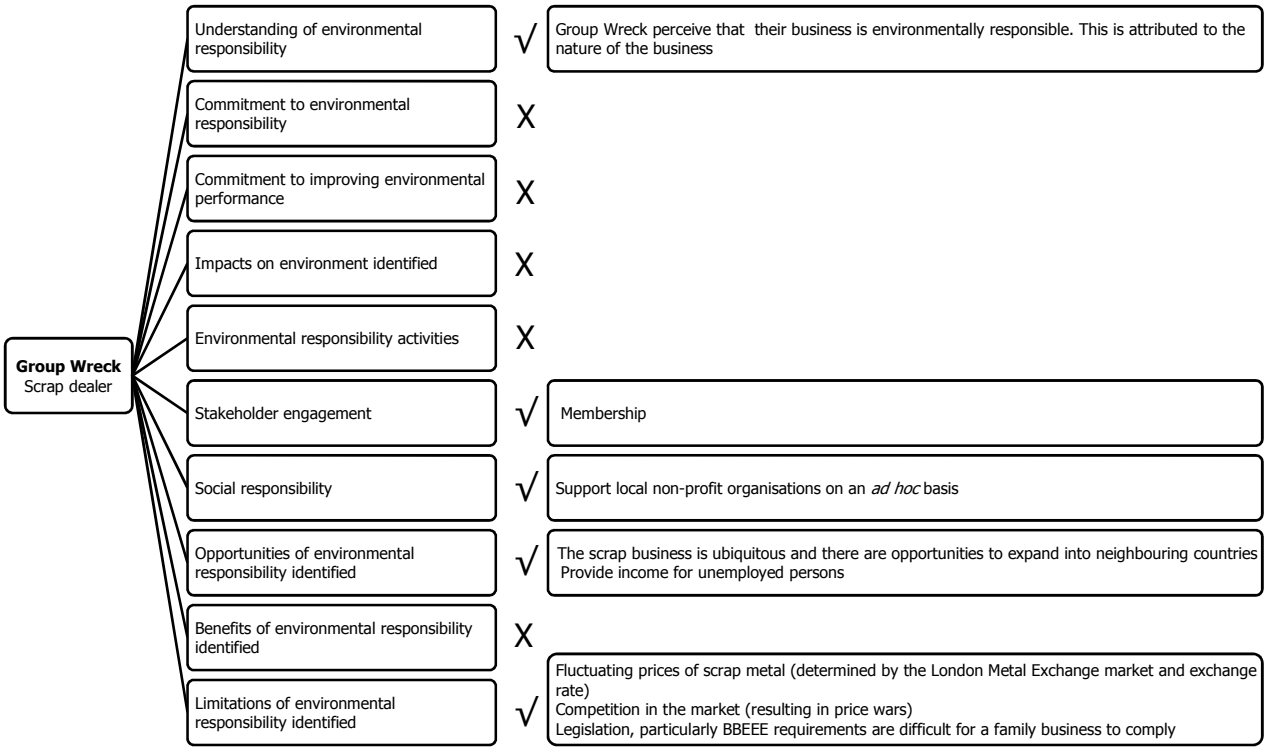

Figure 5.22 Summary of findings for Group Wreck

5.2.4.16 The New Reclamation Group

The New Reclamation Group has over 70 collecting and processing facilities located across southern Africa collecting ferrous and non-ferrous metals, paper, cardboard, glass and plastic and sorting and processing these according to end-user. The Group is the leading producer of recycled ferrous and non-ferrous metal products in southern Africa based on revenue and sales volumes (Reclam website).

The New Reclamation Group employ approximately 2 000 employees, with 700 purpose built vehicles and more than 6 000 specialised containers for the storing and transportation of recyclable material, such as hooklift bins, lockable non-ferrous bins, cardboard compactors, etc. Bins are placed at client sites for collection of recyclable materials. The New Reclamation Group typically collects, processes and delivers in excess of one and a half million tons of recycled products each year (Reclam website).

Correspondence with The New Reclamation Group was via the SHEQ Manager, both telephonic and by e-mail. The SHEQ Manager declined to be interviewed once senior management approval to participate in the study was denied.

5.2.4.17 Collect-a-Can

The core business of Collect-a-Can is to facilitate the recovery of used beverage cans thereby addressing the 'cradle-to-cradle' needs of the metal-can industry. Aerosol, aluminium, food, oil and paint cans are recovered. Collect-a-Can is a non-profit company and shareholders of the organisations are ArcelorMittal South Africa (Africa's major steel producer and producer of tinplate for steel cans) and Nampak (Africa's largest packaging company and beverage can manufacturer), (Collect-a-Can website).

Aside from recovering cans, Collect-a-Can places significant emphasis on environmental education and participates in clean up campaigns, which provide the infrastructure for the clean-up and giveaway bags, bins and t-shirts. Collect-a-Can actively work within the community, encouraging citizens to assist in can collecting efforts. In it's projects, specific attention has been on the involvement of school children, young adults and members of disadvantaged communities. This is achieved through school competitions and environmental education projects, entrepreneurial development and company's cash-for-cans initiative (Collect-a-Can website).

Collect-a-Can pays 'cash for cans' and provides tens of thousands of southern Africans with the opportunity to earn a living, most of whom are unemployed. In many cases, collectors form their own collection networks and deliver their cans directly to one of the company's branches for which they are paid. Collectors without transport link up with individual entrepreneurs or any of the agents, and in these instances receive a lower payment for cans as the entrepreneurs who have to cover their transport and vehicle maintenance costs, and running their respective businesses at a profit (Collect-a-Can website).

The recovery rate for used beverage cans for southern Africa has grown significantly from a modest 18% in 1993 to an all-time high of 72% in 2008 and 2011. On receipt, cans are baled at Collect-a-Can's various branches which are then either exported (65%) or sold locally (35%) for recycling. Collect-a-Can has six branches in South Africa. The company's head office is in Kyalami (Midrand). Other branches are in Pretoria, Johannesburg, Vanderbijlpark, Cape Town and Durban. In addition, the Company has branches in Gaborone in Botswana and Windhoek in Namibia and is in the process of establishing can recovery facilities in Angola (Collect-a-Can website).

Collect-a-can was not investigated for the purposes of this study as it is a non-profit organisation. It is noted in the study however, to demonstrate the complexity and diversity of organisations involved in the waste sector.

5.2.4.18 Silbert and Co.

Silbert and Company is a family owned business that supplies new and used woven polypropylene (PP), hessian and jute bags throughout South Africa. Silbert and Co. is located in Durban, KwaZulu-Natal and have been in business for 45 years (Silbert and Co., 2011). The Director of the company was willing to participate however, at the time of contacting Silbert and Co., the researcher had sufficient data and it was not necessary to interview Silbert and Co.

5.2.4.19 Sims Recycling

Sims Recycling Solutions has a global reach offering secure, sustainable and responsible recovery of redundant computers, Waste Electrical and Electronic Equipment (WEEE). They are the world's largest electronics recycling company, handling over 475 000 tonnes of e-

waste annually in over 50 locations worldwide. The local branch is located in Ballito, KwaZulu-Natal and provides recovery, reuse and recycling services for waste electrical and electronic equipment (WEEE) and IT equipment. This site provides e-waste recovery, recycling and IT asset management services to businesses and organisations in South Africa and sub-Saharan Africa (Sims Recycling Solutions, 2012).

Correspondence with Sims Recycling was via the Director of the company, both telephonic and e-mail. The Director of the company declined stating that "*we are a small company with few staff and we are too busy to meet with you*".

5.2.5 Case study I: EnviroServ: Summary of findings

EnviroServ show positive results for all of the environmentally responsible criteria investigated. One of the five SMEs (Anchor Pail and Drum) investigated are ISO 14001 certified and demonstrate an understanding of, and a commitment to, environmental responsibility and improvement of the environmental performance. A second SME (MFI) is developing an ISO 14001 environmental management system and demonstrate an understanding of environmental responsibility and participate in a number of environmentally responsible activities (Table 5.20). The remaining three non-environmentally certified SMEs demonstrate some understanding of environmental responsibility, this is attributed to the nature of their businesses, recycling which they report is environmentally preferable to waste being landfilled. Cyclocor and IPR participate in environmentally responsible activities, exhibit stakeholder engagement and are investing in 'green' technologies (Table 5.20). Group Wreck however, do not demonstrate commitment to environmental responsibility, nor commitment to improving environmental performance. They have not identified the impacts of their business operation on the environment and there is no involvement in environmentally responsible activities. All of the SMEs do participate voluntarily in social responsible activities.

The environmentally certified (ISO 14001) SME, Anchor Pail and Drum report that environmental responsibility and ISO 14001 certification has benefitted the reputation of their businesses, resulted in continual improvement of environmental performance and played a role in the protection of the health and welfare of the employees. They perceive that environment responsibility has contributed to the long term sustainability of the business. Anchor Pail and Drum further highlight limiting factors of certification; the high

cost of maintaining environmental permits and licences, changing legislation which is difficult to interpret; and limited budgetary resources limit the further improvement of their environmental performance.

The non-environmentally certified SMEs report that they are perceived as environmentally responsible, this is attributed to the nature of their business, recycling, which is environmentally preferable to sending waste to landfill. Key challenges for the SMEs in this regard are identified:

- Competition in the market results in fluctuating price of recyclables
- Difficulty sourcing the volume of post-consumer recyclables required
- SMEs demonstrate limited knowledge of environmental responsibility
- Uneducated public. The public are not educated in recycling and separating waste. This is also a barrier to sale of 'green' products
- Uneducated market. Uneducated recyclers and industry make it difficult to source recyclables.
- The legislative process is constantly changing, tedious and cumbersome making it difficult for business to comply
- Limited budget to implement and improve environmental performance.

Table 5.20 Summary of environmental responsible findings for the companies that participated in the EnviroServ case study

	EnviroServ	Cyclocor	Industrial Plastic Recyclers	MFI Moulders	Anchor Pail and Drum	Group Wreck
	Waste management	Recycle plastic	Recycle plastic	Recycle polystyrene	Refurbish drums	Recover scrap metal
	Large	SME	SME	SME	SME	SME
Approx. volumes per month	1 000 to 1 200 tonnes	750 tonnes	180 tonnes	46 tonnes	10 000 drums 800 flobins	7 000 tonnes
Understanding of environmental responsibility	√	Perceive that their business is environmentally responsible; this is attributed to the nature of the business	Perceive that their business is environmentally responsible; this is attributed to the nature of the business	√	√	Perceive that their business is environmentally responsible; this is attributed to the nature of the business
Commitment to environmental responsibility	• Group environmental policies, procedures and rules that are enforced through quarterly internal audits and other measures • SHEQ department • Risk committee (reports to board)	X	X	• Developing ISO 14001 environmental management system • Monitoring of environmental metrics	• ISO 14001 certification • Full time SHEQ Manager	X

	EnviroServ	Cyclocor	Industrial Plastic Recyclers	MFI Moulders	Anchor Pail and Drum	Group Wreck
Commitment to improving environmental performance	• Group EMS • Group internal SHEQ auditing • Compliance targets • Risk committee • Reward and recognition programme	X	X	X	ISO 14001 (annual target setting and review, on-going monitoring)	X
Impacts on the environment identified	• Transport • Potential hazardous material spills • Litter	X	X	• Waste to landfill • Electricity consumption	(ISO 14001 impacts and aspects) • Air emissions • Effluent emissions • Transporting of hazardous waste • Noise nuisance • Dust nuisance	X

	EnviroServ	Cyclocor	Industrial Plastic Recyclers	MFI Moulders	Anchor Pail and Drum	Group Wreck
Environmental responsibility activities	• Operational waste management and recycling • Auditing of sub-contractors • Pollution control (litter prevention and diesel spill management) • Staff training	• Recycling of production waste • Offer and EPR service • Minimisation of raw materials (investigating replacing sand with post-consumer crushed glass) • Investigating alternative energy sources	• Recycling of cardboard waste • Investigating electricity reduction • Installation of a wash bay to increase volume recycled • Investment in new technology to recycle plastic in a wood alternative	• Recycling and waste management waste • Energy audit to identify high electricity use areas • Investigating electricity alternatives • Daily route planning to reduce fuel costs • Minimisation of raw materials: Investigating picture frame glass alternatives • Some staff training	• Waste management and recycling • Trade effluent permit • Air emission licence • Offer an EPR service • Environmental compliance auditing of waste contractors • Water consumption reduction • Electricity consumption reduction • Route planning and vehicle tracking to reduce fuel consumption • Staff training • Environmental reporting	X

	EnviroServ	Cyclocor	Industrial Plastic Recyclers	MFI Moulders	Anchor Pail and Drum	Group Wreck
Number of relevant environmentally responsible activities investigated activities	12	13	14	13	15	15
Number of environmentally responsible activities participated in	5	5	4	5	10	0
Stakeholder engagement	Voluntary annual sustainability reporting	• Memberships • Local authorities • NGO's • Consultants	Memberships	Memberships	• Local authorities • Environmental consultants • Memberships and Associations	Memberships
Social responsibility	Not applicable for the purpose of this study	Support non-profit organisations on an *ad hoc* basis	Support non-profit organisations on an *ad hoc* basis	• 'Bread tags for wheelchairs' project • Support non-profit organisations on an *ad hoc* basis	Support designated non-profit organisations	Support non-profit organisations on an *ad hoc* basis

	EnviroServ	Cyclocor	Industrial Plastic Recyclers	MFI Moulders	Anchor Pail and Drum	Group Wreck
Opportunities of environmental responsibility identified	Not applicable for the purpose of this study	• Carbon credit model has the potential to grow the business • Housing sector and local government are becoming more aware of environmentally responsible practices and technologies. This implies potential growth of the business.	X	X	• In terms of EPR, a suggested 'manufacturers fee' could assist with the compliance costs in small business that ultimately clean up the manufacturers waste	• The scrap business is ubiquitous and there are opportunities to expand into neighbouring countries • Provide income for unemployed persons
Benefits of environmental responsibility identified		X	X	X	• Reputational benefits • Continual improvement of environmental performance • Long term sustainability of the business • Protection of health and welfare of the employees	X

	EnviroServ	Cyclocor	Industrial Plastic Recyclers	MFI Moulders	Anchor Pail and Drum	Group Wreck
Limitations of environmental responsibility identified	Not applicable for the purpose of this study	• Uneducated market is a barrier to sale of the product • Uneducated recyclers and industry make is difficult to source recyclables • Time spent educating • E-waste plastic volume in KZN are very low • Large volumes of e-waste in KZN but limited amount of e-waste plastic in the market • Tedious and cumbersome legislative processes • Unscrupulous environmental consultants	• Limited knowledge about environmental responsibility • Limited budget implement environmentally responsible practices • Competition in the market (resulting in fluctuating prices)	• Difficulty sourcing the volume of post-consumer polystyrene required • Post-consumer polystyrene is dirty (consumers do not clean their packaging waste before disposal) • Limited resources, particularly personnel, means that environmental responsibility is not prioritised • Limited knowledge about environmental responsibility	• Permits/ licences are costly, as is regular testing required to maintain licences • Environmental Consultant fees • Changing legislation (particular waste legislation) and difficulty interpreting the legislation • Difficulty with staff awareness despite regular training • Limited budgetary resources limit further improvement	•Fluctuating prices of scrap metal (determined by the London Metal Exchange market and exchange rate) •Competition in the market (resulting in price wars) •Legislation, particularly B-BBEE requirements are difficult for a family business to comply

EnviroServ's environmental responsibility is governed by a group SHE philosophy, environmental management system and environmental policy, and report on their environmental performance to stakeholders voluntarily. They have a well-established risk committee that reports directly to the Board and employ a team of SHEQ staff to ensure environmental and health and safety legal and group compliance. EnviroServ utilize the service of sub-contractors for recycling and refurbishment and subcontractors are required to passed an audit conducted by their SHEQ department, the audit ensures environmental legal compliance. EnviroServ were willing to disclose the details of 14 SME sub-contractors for the purpose of this research of which five agreed to participate. Of the five SME sub-contractors that participated in this research, one is environmentally certified and one is developing an ISO 14001 environmental management system with the view to obtaining certification. The remaining three SME sub-contractors exhibit a poor understanding of, and commitment to, environmental responsibility.

5.3 Case Study II: Packaging World and Waste Plan

5.3.1 Case Study II: Packaging World

Packaging World are a SME that manufacture flexible packaging for the food industry. Packaging World outsource their waste management to Waste Plan, a large waste management company that recover recyclables for trade and recycling. Trade and recycling activities are outsourced to sub-contractors (Figure 5.23).

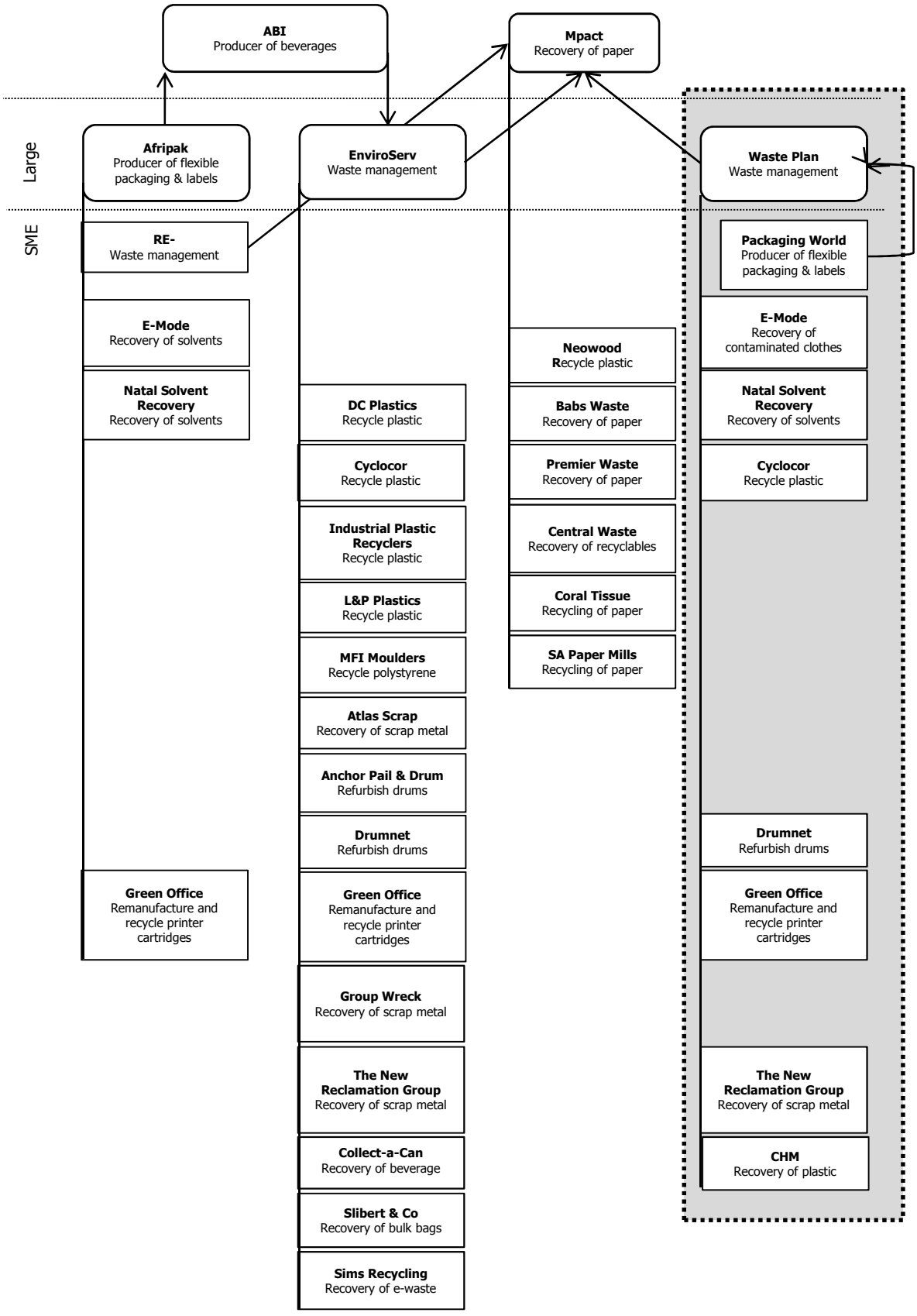

Figure 5.23 Schematic diagram of case studies

5.3.1.1 Packaging World: Company overview

Packaging World is a specialist flexible packaging business that produce printed flexible packaging solutions for the food, beverage, confectionery, industrial and general merchandise markets. A range of packaging products are supplied as reel stock or bags, flexographic or gravure printed in up to eight colours and customised (Packaging World website). Packaging World produce between 60 and 80 tonnes of packaging per month.

Packaging World, located in Pinetown, KwaZulu-Natal has been in operation for more than 10 years, have an annual turnover of between R13 and R51 million and employ 51 staff. The demographic profile of Packaging World is 52% female, 47% male; 51% Black, 16% Indian and 33% White. Packaging World fall within the National Small Business Amendment Act of 2003's definition of a SME being classified as a medium-sized business (in the manufacturing sector) as they employ between 50 and 200 staff and have an annual turnover of between R13 and R51 million.

5.3.1.2 Packaging World: Environmental responsibility

Packaging World's Quality Control Manager reports that Packaging World are familiar with the term 'environmental responsibility'; "*it means that the business takes responsibility for all the waste that goes out of our factory up to the point of recycling*". Packaging World have become familiar with environmental responsible activities thought their BRC certification and training provided by the Packaging Council of South Africa.

Packaging World holds the internationally recognised British Retail Consortium (BRC) standard of compliance certification which is a global safety and quality certification programme that is widely used by global suppliers and retailers. They facilitate standardization of quality, safety, operational criteria and manufacturers' fulfilment of legal obligations and help provide protection to the consumer (BRC, 2012). From an environmental perspective, the BRC certification covers waste management and requires a waste management policy and plan and certification does not cover any other environmental elements. The BRC certification was chosen as it opens the business to international opportunities and is the preferred certification by their large international customer, Marks and Spencer located in the United Kingdom. Other customers who recognise the certification include Woolworths and Pick 'n Pay.

Packaging World do not employ a dedicated environmental personnel, there are however, two staff dedicated to overseeing the BRC certification. The Quality Control Manager remarks; "*If we don't have the BRC certification, then we can't exist. We have to produce food grade packaging and prove that we have, the certification is our proof".*

The BRC certification requires an active food safety committee, who meet monthly and waste management is discussed. The BRC certification further requires that a legal register is maintained. This is achieved via subscription to relevant newsletters. Other than the waste policy and procedures required by the BRC certification, there is no other commitment to improvement of environmental performance.

5.3.1.3 Packaging World: Environmental responsibility activities

Packaging World identify waste as their most significant environmental impact, based on the requirements of the BRC certification system. Packaging World have not considered any other impact on the environment that may result from their business operations, they do however participate in environmentally responsible activities beyond their waste management plan (Table 5.21).

Table 5.21 A description of Packaging World's environmentally responsible activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Recycle production waste.
2	Extended producer responsibility	X	
3	Pollution control and effluent emissions	√	Solvents and inks are stored on the premises. These are stored in a secure, bunded area to prevent contamination in the event of an accidental spill. Spill kits are also available and staff are trained for the event of a spill.
4	Reducing water consumption	X	Water use is domestic and no measures have been taken to reduce water consumption.
5	Energy management	√	At the time of the interview, energy monitors were being installed on equipment to establish the cost to run each machine and monitor breakdowns.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	X	Packaging World own a small fleet of 3 small trucks, transport is typically outsourced.
8	Minimising use of raw materials and conservations of	√	Strategic selection of the size of raw materials allow for the minimisation of 'cut off' waste.

Environmental responsible activity		Yes / no	Description
	natural resources		
9	Air emissions management	√	Air filter and extraction systems reduce air emissions within the premises.
10	Environmental reporting	X	
11	Staff engagement	√	Staff are trained in waste management.
12	Green procurement	√	The BRC certification requires that all suppliers are undergo risk assessments. Packaging World have not yet audited Waste Plan but are planning to in the near future. The solvent supplier / recycler has also not been audited. Risk assessments include auditing of supplier certifications (environmental and quality), legislation compliance, quality procedures, hygiene procedures and certification of chemical compounds used in packaging. Packaging World do not use suppliers that do not pass their risk assessment. It is interesting to note that Afripak have in the past supplied Packaging World with flexible packaging, and have been audited by Packaging World.
13	Green design/green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	√	Solvents are recycled and re-used for cleaning.
15	Investment in green technology and or innovation	X	
16	Other	X	Packaging World state that they would like to improve their environmental performance but do not have sufficient understanding or knowledge about environmentally responsible practices to do so.
Number of relevant environmentally responsible activities investigated		15	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green building/design 14. Reduction in use of harmful chemicals and or hazardous materials 15. Investment in green technology and or innovation

Environmental responsible activity		Yes / no	Description
Number of Packaging World environmentally responsible activities		8	1. Waste management 2. Pollution control and effluent emissions 3. Energy management 4. Minimising use of raw materials and conservations of natural resources 5. Air emissions management 6. Staff engagement 7. Green procurement 8. Reduction in use of harmful chemicals and or hazardous materials
17	Social responsibility	√	Packaging support the Kloof Round Table on an on-going basis.

5.3.1.3.1 Waste management

Waste Plan are Packaging World's sole waste management service provider. Packaging World have neither quantified nor monitored their waste volumes in the past but estimate that they produce approximately six to eight tonnes of production waste per month. This would largely be made up of printed and clear biaxially oriented polypropylene (BOPP) and some laminated film offcuts.

Packaging World identify that they have had issues with the safe disposal of trademark waste in the past and now request that the customer disposes of their own trademark waste. Other problem wastes include fluorescent tubes, solutions for fluorescent tubes have been investigated but no feasible solution has been found. Inks and solvent waste is also problematic as it is hazardous and requires responsible disposal and Packaging World have specified that the supplier take back ink and solvent waste which is recycled and Packaging World purchase the recycled solvent for cleaning purposes.

5.3.1.4 Packaging World: Limitations, opportunities and benefits

Packaging World's environmental responsibility is focused on their waste management practices, and it is difficult to establish possible limitations and benefits that Packaging World may experience from environmentally responsible practices. Packaging World have identified the benefits and limitations experienced with waste management activities.

Packaging World identify that having a waste policy and staff training on correct waste management, has resulted in a reduction in waste to landfill. Other companies who are

aware of environmental responsibilities, prefer to use suppliers who value the same responsibilities.

Being a small company means that thy do not have dedicated personnel for the separation of waste and this has limited further improvement of their waste recycling. Furthermore, they have had difficulty sourcing reliable recyclers who will be responsible and ensure that the waste is recycled and not landfilled.

5.3.1.5 Packaging World: Stakeholder engagement

Packaging World has a relationship with the Department of Agriculture at the University of KwaZulu-Natal (Pietermaritzburg) that acts as their technical arm. The laboratories at the University are used to trial and test every product and conduct research and development on new products.

5.3.1.6 Packaging World: Summary of findings

In summary, Packaging World demonstrate a limited understanding of environmental responsibility and commitment to environmental responsibility. They do participate in some environmentally responsible activities (Figure 5.24).

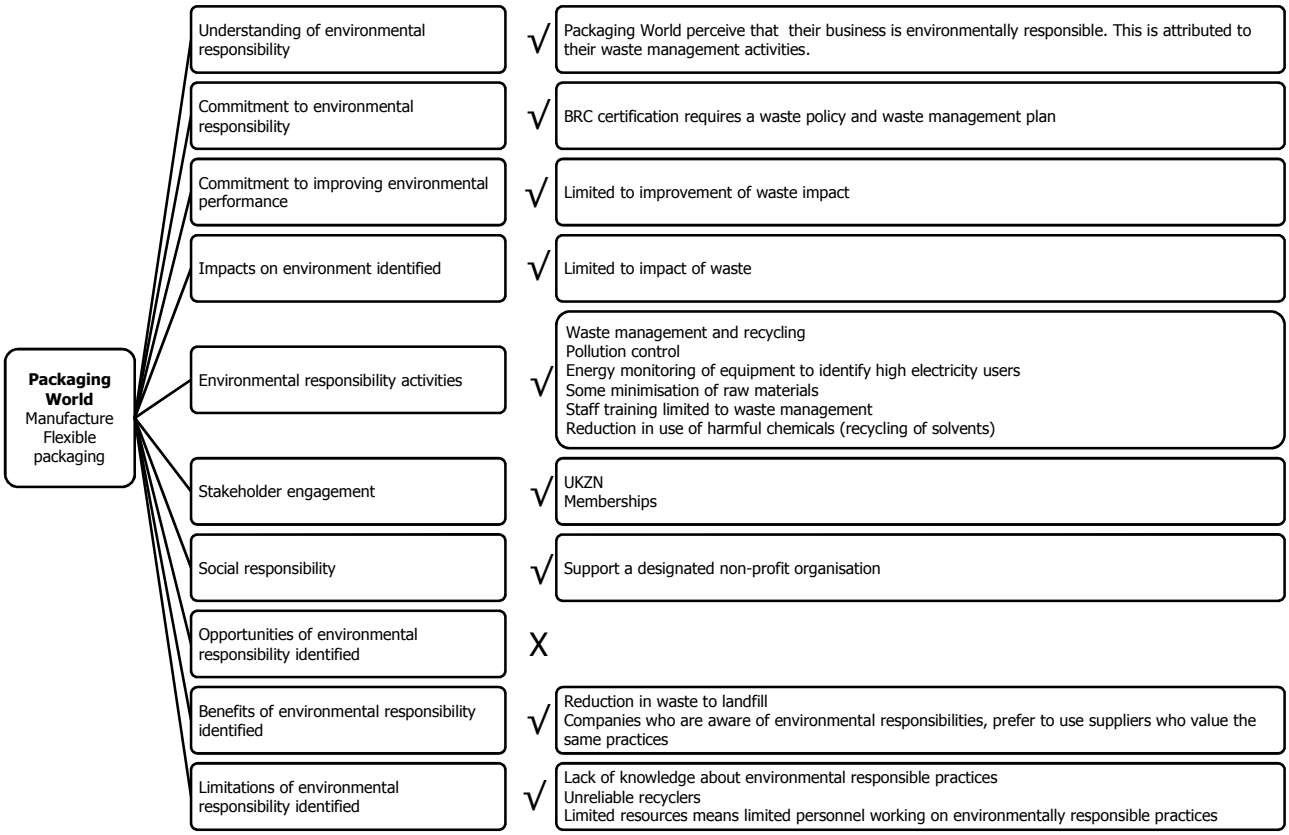

Figure 5.24 Summary of findings for Packaging World

5.3.1.7 Case Study II: Waste Plan: Company overview

Waste Plan is a national waste management company, the largest company of its kind in the Western Cape, and the second largest in South Africa, specializing in commercial on-site waste management that ensures that their clients comply with environmental legislation and reduce waste sent to landfill (Figure 5.25). This service comprises of the sorting and management of waste including an on-site designated waste area and the sub-contracting collecting of waste streams for recycling and/or disposal. The Cape Town (Kraaifontein) and Gauteng (Waltloo) facilities include materials recovery facility (MRF) for the sorting of recyclables into different streams before selling to recyclers – both in conjunction with the local authorities. The Kraaifontein MRF is the biggest mechanised waste sorting facility in Africa. Waste Plan's service offering includes residential collections, event waste management and total greening (Waste Plan 2012).

Waste Plan are active members of the E-Waste Association of South Africa, the Institute of Waste Management South Africa and the South African Association for Food Science and Technology. They were National Business Awards finalists in 2012, a premier South African

business award that aims to recognise and honour the top performers of the year in business and industry, individuals, companies and government. Waste Plan won the National Productivity Award for the Emerging Sector category during 2010 (Waste Plan 2012).

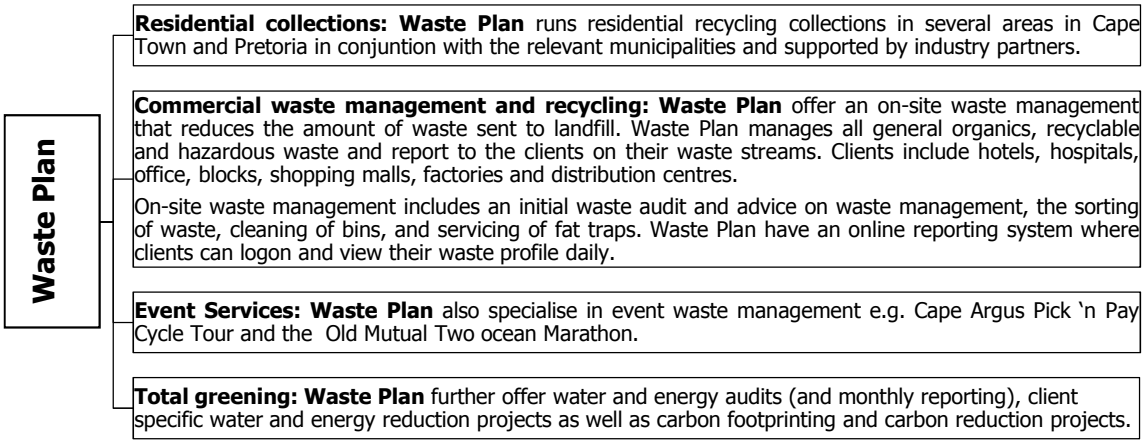

Figure 5.25 A diagrammatic overview of Waste Plan's service offering (Waste Plan, 2012)

Waste Plan have a significant footprint in Cape Town, are growing in Gauteng, and have been pursuing business in Durban for more than 12 months. They have had success with residential collections and collaboration with local authorities in Cape Town and Pretoria, and aim to implement the same model in Durban, in due course. They recently secured one client but have several contracts awaiting approval and continue to pursue business in the Durban area. The Durban operation currently employs 12 persons (an operations manager, a trainer and 10 on-site waste sorters).

Durban projects are overseen by the operation manager whose duties include identifying suitable recyclers for the sale of recyclable materials, the management of the on-site waste sorters and co-ordinated of recyclable collections from clients. Waste Plan Durban outsource the collection and recycling function and neither collect, bail nor process recyclables, they simply provide the on-site sorting of recyclables and waste, co-ordinate recyclable collections and payment for recyclables to clients (for which they charge a fee).

Waste Plan has been in business for almost eight years (though formal registration of the company was finalised in 2008) and have experienced rapid growth to an annual turnover of approximately R13 to R51 million and employ 505 staff. The demographic profile of Waste Plan is 47% female, 53% male; 68% Black, 0% Indian, 21% White and 12% Coloured.

Waste Plan fall outside the National Small Business Amendment Act of 2003's definition of a SME (transport, storage and communications) as they employ more than 200 staff and have an annual turnover of more than R26 million.

5.3.1.8 Waste Plan: Environmental responsibility

Waste Plan's Environmental Scientist reports that they are familiar with the term 'environmental responsibility' and describe the concept as "*our shared responsibility to protect the environment and use the earth's resources responsibly in a way which allows future generations to also have access to the earth's resources*". Waste Plan have been familiar with the concept since inception. According to their Environmental Scientist, Waste Plan was founded on the principle of environmental responsibility in diverting waste from landfill thereby protecting the environment and the well-being of society. Waste Plan continually strive for best practice in waste management. Particularly, in the last few years, they have focused on, and made improvements in, the environmental and social aspects of their business.

Waste Plan have an environmental certification; Heritage (Gold Status) and are in the process of developing an ISO 14001 environmental management system to obtain their ISO 14001 certification. The Heritage Environmental Rating Programme is a South African based rating system has been developed to provide all types of businesses with an effective environmental management programme that is designed to reduce and limit the impact that their operations have on their environment. Heritage incorporates the standards of seven international programmes but is based largely on the ISO 14001, Green Globe and other international standards specifically focused on the tourism sector (Heritage SA, 2012). Once an organisation has reached the highest level of recognition in the Heritage programme, the Heritage Platinum Status, they are eligible to qualify for ISO certification. Initially, the majority of Waste Plan's clients were in the tourism sector (and still a significant portion of their client base) and the sector encouraged Waste Plan to obtain a Heritage certification.

Waste Plan have had an environmental policy since inception and prior to environmental certification. The policy is communicated internally through presentations at monthly 'green team' meetings, is included in internal training, and is formally incorporated in their induction programme where new staff are trained. The policy is communicated externally via

posters at client's waste areas and in pamphlets that are handed out to clients and prospective clients.

Waste Plan's leadership demonstrate commitment to environmental responsibility; department heads are present at regular 'green team' meetings and their CEO is active and respected in the waste sector. The CEO has been involved with the Institute of Waste Management South Africa prior to inception of the business and travels internationally to learn about new technologies and international best practice in waste management. He is also involvemed with local government on reducing waste to landfill.

Commitment extends to the employment of a full time Environmental Scientist who is educated in the subject to the level of a post-graduate degree (PhD). The Environmental Scientist's role has existed for 2.5 years and includes (but is not limited to) the management, implementation and improvement of the Heritage environmental management system, environmental compliance, and internal and external environmental education and training.

Budgetary allowance for environmental responsibility projects is dependent on focus projects at the time and pressure from the industry. It is noted, however, that improvements in environmental performance have been made with limited budgetary resources for example, Waste Plan's Head of Projects increased glass retrieval by 10% on a mechanised line and decreased spoil of mechanised sorting from 17% to 7% using existing resources in their factory at the time.

Waste Plan capture environmental metrics on a daily basis to monitor their environmental performance. Though no formal targets are set for the reduction of waste to landfill, electricity and waste use, these are monitored with the intent of bettering their performance, and that of their clients. A more formal system for setting targets and reviewing achievement of targets on environmental performance is being developed with their ISO 14001 environmental management system.

Waste Plan do not have a formal legislation register but keep up-to-date with legislative requirements through e-mail newsletter subscriptions and through interaction with their stakeholder's for example, environmental consultants and City of Cape Town officials in the solid waste department.

5.3.1.8.1 Waste Plan: Environmental responsibility activities

Waste Plan have identified carbon emissions from fuel (company owned vehicles) and electricity consumption as their most significant environmental impacts. This is due to the large transport infrastructure required for transporting waste and recyclables from clients and residential collections to central depots and landfill. High electricity consumption is a result of machinery that is run at their mechanised plants, for the sorting and processing of waste/recyclables, which are energy intensive. Business travel, particularly flights (national and international) are identified as having a considerable impact. Waste Plan note that the handling of hazardous waste for example, crushing of fluorescent tubes and e-waste handling, if not done responsibility could potentially cause harm to the environmental and staff. These impacts were identified through informal risk assessments conducted internally. Waste Plan participate in numerous environmental responsibility activities investigated for the purpose of this study (Figure 5.22).

Monitoring of environmental metrics are undertaken monthly however the data for electricity and water use are inaccurate as premises are rented and billing is based on squared meter rented and not actual consumption.

Table 5.22 A description of Waste Plan's environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Waste Plan offer a waste management service and implement these practices at their operations (5.3.1.8.1.1)
2	Extended producer responsibility	√	As a free service, Waste Plan organise subject matter expert speakers for their clients to inform them about environmental legislation and other environmental issues relevant to their business. This is subject to budgetary allowance.
3	Pollution control and effluent emissions	√	Oils are required for lubricating machinery, diesel is stored for fuelling forklifts and there is a Municipal fuelling station onsite (Kraaifontein MRF). To prevent accidental spills, the Municipal fuelling station is in a bunded area and the oil and diesel are stored in contained areas. Additionally, grates have been placed on all drains outlets to stop waste and potential spills entering the storm water drains. For cleaning, office, factory and vehicles, non-ammonia based, environmentally preferable cleaning products are used.
4	Reducing water consumption	√	Water use is domestic type and no water is used in processes other than cleaning vehicles, bins and some machinery. Water consumption is not seen as a significant impact of the business.

Environmental responsible activity		Yes / no	Description
			However, there is signage in on all water outlets to educate staff but the impact of the wasteful use of water. Also, staff who use water for cleaning the vehicles are trained to close the tap when not using water, and to check the tap is closed correctly to avoid wastage. Waste Plan have also recently purchased a waterless vehicle washing system at their Kraaifontein facility.
5	Energy management	√	Electricity use is largely for powering machinery, lighting and general office equipment. No measures have been taken to reduce electricity use but efficient lighting options have been investigated. Staff awareness through education posters and training have been implemented to reduce electricity wastage.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	√	Waste Plan are implementing the use of biodiesel in their vehicle fleet (5.3.1.8.1.2)
8	Minimising use of raw materials and conservations of natural resources	√	In terms of office paper use, it is policy to use electronic format rather than hard copies. Staff are encouraged to look after their Personal Protective Equipment for example, gloves and overalls, to increase their longevity. Fines are issued to staff who do not care for their Personal Protective Equipment. Waste Plan also purchase cleaning materials in bulk and decant to reduce the amount of packing waste they produce.
9	Air emissions management	n/a	Waste Plan argue that air emission are not applicable to their business.
10	Environmental reporting	√	There was no legal requirement for Waste Plan to report on environmental performance to stakeholders (as they are not listed on the JSE). As described in section 5.3.1.8.1.4, Waste Plan have an online reporting system for their clients (which is also used for their environmental metrics), this is limited to volumes of materials recycled, electricity and water consumption. Internal reporting is achieved through regular meeting of the 'green teams'.
11	Staff engagement	√	Staff are trained and included in environmental responsibility activities (5.3.1.8.1.3).
12	Green procurement	√	Waste Plan's have a 'green' procurement policy. Successes of the policy include the procurement of environmentally preferable / biological cleaning products and office paper with a recycled content. Waste Plan do not audit their suppliers/sub-contractors but are piloting a questionnaire for the purpose of assessing environmental responsibility.
13	Green design/green building	n/a	Not applicable as all premises are rented at this time.
14	Reduction in use of harmful chemicals and or hazardous materials	√	Waste Plan use environmentally preferable/biological cleaning products for office and vehicle cleaning. The same cleaning agents are used for cleaning on clients sites.
15	Investment in	√	Waste Plan have develop their own, tailored online platform for the

Environmental responsible activity		Yes / no	Description
	green technology and or innovation		capture, retrieval and monitoring of environment metrics for their operations and that of their clients (5.3.1.8.1.4).
16	Other	X	
Number of relevant environmentally responsible activities investigated		13	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Environmental reporting 10. Staff engagement 11. Green procurement 12. Reduction in use of harmful chemicals and or hazardous materials 13. Investment in green technology and or innovation
Number of Waste Plan environmentally responsible activities		12	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Transport, travel and fuel consumption 7. Minimising use of raw materials and conservations of natural resources 8. Environmental reporting 9. Staff engagement 10. Green procurement 11. Reduction in use of harmful chemicals and or hazardous materials 12. Investment in green technology and or innovation
17	Social responsibility activities	√	Waste plan are also proactive about their social responsibility working with and empowering informal waste pickers (5.3.1.8.2)

5.3.1.8.1.1 Waste management

Waste Plan's internal waste management includes the recycling of all office waste including organic waste, their onsite worm farm has reduced their organic waste to landfill from 13% to 7%. Waste Plan's residential collections Waste Plan (Cape Town and Pretoria) service a total of 150 000 households diverting more than 1 500 tons of waste from landfill every month. In total, an average of 787.6 tonnes per month of waste is recycled and 602.6 tonnes is disposed per month, at a group level (Table 5.23).

Table 5.23 Waste Plans national waste profile

Solid waste type	Waste/recyclable type	Volume per month (tonnes)
Non-recyclable	General waste	21.7
	Hazardous waste	580.9
Recyclable	Cardboard	411.7
	E-waste	2.3
	Foil	0.22
	Food waste (composting)	34.7
	Glass	68.6
	Metal (cans)	14.5
	Paper – common mix waste	76.0
	Paper – magazines	12.4
	Paper – newspaper	18.6
	Paper – polyboard	28.5
	Paper – white	28.5
	Plastic – LD	58.0
	Plastic – PET	14.7
	Plastic – PP	10.2
	Plastic – PS	1.5
	Plastic – PVC	0.8
	Scrap metal	1.2
	Tetrapak	5.2
	TOTAL	**1 390.2**

5.3.1.8.1.2 Transport, travel and fuel consumption

Waste Plan will be the first Waste Management Company in South Africa to address the impact of fuel consumption by company owned vehicles through the use of a biodiesel blend in their vehicle fleet. Waste Plan have been in investing the use of biodiesel in a portion of their fleet at the Cape Town facility for more than a year. The vehicle manufacturer has agreed to maintain the warranty on their truck fleet using a 5% biodiesel mix. Obtaining this agreement from the vehicle manufacturer has stalled the implementation of the biodiesel implementation. Based on the success of the 5% mix, they will increase the biodiesel blend over time.

Waste Plan use a GPS tracking system to plan daily routes and monitor driver behaviour thereby optimising fuel efficiency. Drivers observed driving over the speed limit and guilty of excessive idling are fined.

5.3.1.8.1.3 Staff engagement

Waste Plan's 'green teams' (environmental committees) meet monthly to discuss pertinent environmental issues within the business and practical ways to implement environmental responsible projects and improve environmental performance. The meetings close with a short presentation on a popular environmental topic for example, daily electricity and water saving tips, the green economy and relevance to South Africa and sustainability in business.

It is noted that the success of these meeting is based on taking theoretical concepts and making them practical for staff to implement, constant reinforcement (repetition) and positive communication. Internal staff training, induction training, supervisor training, waste sorter training, and hazardous waste training include a strong element of environmental awareness. Waste Plan note that more attention, environmental awareness and health and safety training needs to be given to their onsite staff.

5.3.1.8.1.4 Investment in green technology and/or innovation

Waste Plan have develop their own, tailored online platform for the capture, retrieval and monitoring of environment metrics for their operations and that of their clients. Waste streams are measured daily and fed into the web-based reporting mechanism. Clients have full access to their waste information through a secure login on the Waste Plan website. Other environmental metrics such as water and electricity consumption have recently been added to the platform. Waste Plan utilize this data to determine the volumes of waste recycled and landfilled and to monitor their own and their client's environmental performance. Clients can login and view their environmental data at their convenience.

The online platform is dynamic and modules are added as the need is identified. Recent additions include the logging of sales calls and residential complaints. This allows the Waste Plan to identify 'problem' areas from a residential collection perspective, timeous correction of issues and constant monitoring that ensure continual improvement.

Waste Plan have investigated the viability of waste to energy technologies. Working with a local engineer and using a process called pyrolysis (the thermochemical decomposition of organic material) they have had some success with using dirty and low value waste plastics, organic waste, used disposable nappies (cleaned of the organic component) and mixed medical waste to generate energy to power boilers and biodiesel. This is still experimental.

The implementation of a biodiesel blend as described in section 5.3.1.8.1.2 is an example of the use of a green innovation. Waste Plan have also invested in a waterless vehicle washing system to reduce water consumption.

5.3.1.8.2 Waste Plan: Social responsibility

Waste plan are proactive about their social responsibility. They are active members of the South African Waste Pickers Association and are investigating models to formalise waste picker responsibility. Waste Plan's CEO recently visited Brazil, where waste is effectively being managed by informal waste pickers, to investigate whether the Brazil model can be adopted in a South African context.

As a pilot, Waste Plan have an informal arrangement with waste pickers in the Pinelands (Cape Town) area. There is no formal sorting of residential waste in this residential area and Waste Plan train waste pickers (usually homeless persons) to sort and collect waste from bins and residential road side collections. They are remunerated for the recyclables they collect.

Waste Plan recognise that there are ethical considerations with such a project, and are in the process of formalising this model. They are working on a model, with the City of Cape Town whereby residential waste is sorted at source (before road side collection) to make waste picking 'cleaner'. The model will include the formal employment of the waste pickers and skills development opportunities.

5.3.1.8.3 Waste Plan: Observations

Environmental responsibility in the business is largely driven by the CEO who is active and respected in the waste sector. This has been the case since inception of the business. Waste Plan have many environmental responsibility activities but their systems require formalisation and quantification.

Waste Plan are unique and go beyond regularity compliance, in that they are investigating and have implemented green innovation and technology for example, biodiesel, their custom web based platform, waterless car wash, waste to energy technology.

5.3.1.8.4 Waste Plan: Discussion and linkages

Waste Plan recover recyclables for trade with, and recycling by, approved sub-contractors. The SME's that participated in this study were referred to the researcher by Waste Plan. It is noted that these are not the sole sub-contractors to Waste Plan, but the SMEs and linkages that Waste Plan were willing to disclose, and those that fell within the definition of a SME for the purposes of this dissertation. Of the seven SMEs approached to participate in the study, one declined an interview and six participated in the study and disclosed the required information (Figure 5.26). For the purpose of this case study, only those SME's unique to Waste Plan will be discussed (CHM Enterprises), other SMEs have be described in earlier sections.

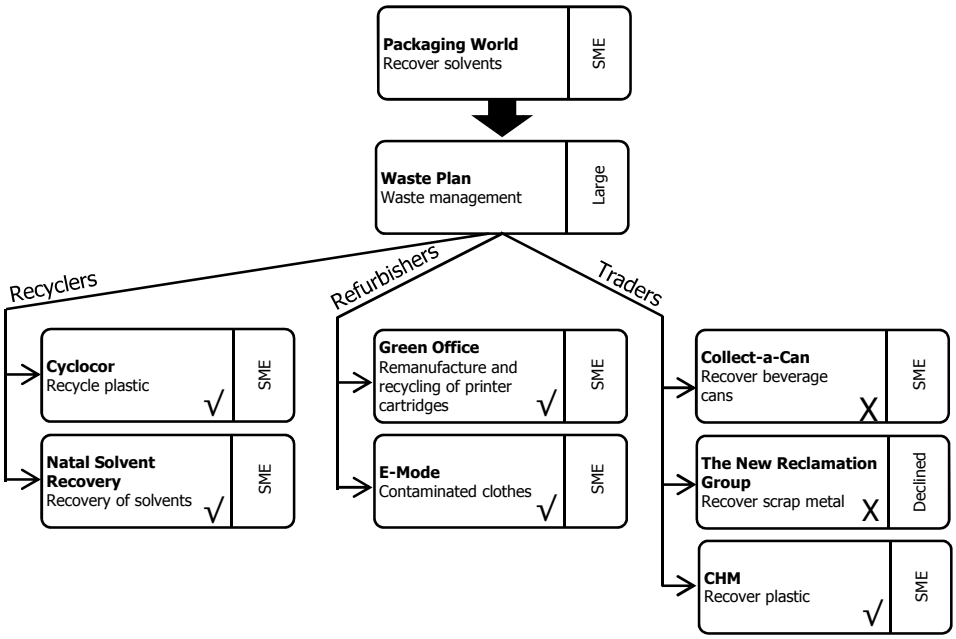

Figure 5.26 Key SMEs that Waste Plan trade with, and outsource recycling companies (where √ denotes the organisations that participated in the research and X denotes those that did not

5.3.1.9 Cyclocor

Cyclocor was discussed in a previous section (5.2.4.8 Cyclocor: Company overview).

5.3.1.10 Natal Solvent Recovery

Natal Solvent Recovery was discussed in a previous section (5.2.2.12 NSR: Company overview).

5.3.1.11 Green Office

Green Office was discussed in a previous section (5.2.2.18 Green Office: Company Overview)

5.3.1.12 E-Mode

E-Mode was discussed in a previous section (5.2.2.6 E-Mode: Company overview).

5.3.1.13 Collect-a-Can

Collect-a-Can was discussed in a previous section (5.2.4.17 Collect-a-Can).

5.3.1.14 CMH Enterprises: Company overview

CMH's business is the purchasing and subsequent re-sale (trading) of waste materials; waste paper, cardboard, and HD and PET plastic. The owner of the business collects and sells recyclables himself, and co-ordinates five drivers who do the same. The collected material is transported by small truck, directly and to recyclers. Recyclers are selected primarily on geographical location and second on price. It is reasoned that a fast turnover of material results in an increased number of loads per day, and maximises profit.

CHM do not operate from a premise. They spend their time travelling between seller and buyers of recyclables, trading material. CMH purchase recyclables from street hawkers, smaller informal traders and two large waste management companies, Waste Plan and Don't Waste Services. Each of CMH's small truck is equipped with a 'hang up' scale and material are weighed and paid for directly, on a cash basis. Cardboard and paper waste is primarily sold to Premier Waste with whom they have a good relationship.

CMH has been in business less than one year and according to the National Small Business Amendment Act of 2003's definition of a SME, CHM are classed as a micro-enterprise (transport, storage and communications) as CHM employ six staff and has an annual turnover is less than R0.2 million. They demographic profile is 100% male; 83% Black and 17% Indian.

5.3.1.14.1 CMH Enterprises: Environmental responsibility

CHM are not familiar with the term 'environmental responsibility'. They have neither considered whether their business has a responsibility to protect the environment, nor whether their business is environmentally responsible. There is no environmental policy and no system in place to ensure compliance with environmental legislation. CHM does not plan to pursue environmentally responsible practices.

5.3.1.14.2 CMH Enterprises: Environmental responsibility activities

CHM have not considered the impact of their business activities on the environment and do not participate in any of the environmental responsibility activities investigated for the purpose of this study (Table 5.24).

Table 5.24 A description of CHM environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	n/a	CHM do not generate waste, they only buy and sell clean, value recyclables that have been separated from general and contaminated waste.
2	Extended producer responsibility	X	CHM was not familiar with the term 'extended producer responsibility'.
3	Pollution control and effluent emissions	n/a	CHM do not operate from a premises and do not process any waste.
4	Reducing water consumption	n/a	
5	Energy management	n/a	
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	X	
8	Minimising use of raw materials and conservations of natural resources	n/a	
9	Air emissions management	X	
10	Environmental reporting	X	CHM were not familiar with the concept of environmental reporting or stakeholders
11	Staff engagement	X	
12	Green procurement	X	CHM were not familiar with the term 'green procurement'.
13	Green design/green building	n/a	CHM were not familiar with the term 'green building'.
14	Reduction in use of harmful chemicals and or hazardous materials	n/a	CHM do not operate from a premises and do not process any waste.
15	Investment in green	X	CHM were not familiar with the term 'green technology'.

Environmental responsible activity		Yes / no	Description
	technology and or innovation		CHM were considering purchasing a grinder as they believe that ground plastic fetches a better price and can improve the profitability of the business.
16	Other	X	For the period 14 August – 31 October, Amalgamated Beverage Industries launched a School Recycling Programme. One hundred and twenty Primary Schools in KwaZulu-Natal and Gauteng were invited to participate. The project aimed to raise awareness about recycling in schools and the local community. Premier Waste were approached to participate and are the designated collectors of recyclables from the participating schools. Premier Waste have do not have the resources to collect the volumes of waste that the project is generating and CHM have partnered with Premier Waste to assist
Number of relevant environmentally responsible activities investigated		8	1. Extended producer responsibility 2. Carbon emissions management 3. Transport, travel and fuel consumption 4. Air emissions management 5. Environmental reporting 6. Staff engagement 7. Green procurement 8. Investment in green technology and or innovation
Number of CHM environmentally responsible activities		0	
17	Social responsibility activities	X	CHM do not participate in social responsibility activities.

5.3.1.14.3 CMH Enterprises: Limitation, benefits and opportunities

CHM demonstrate neither understanding of, nor commitment to. Environmental responsibility and it is therefore difficult to establish possible limitations and benefits that CHM may experience from environmentally responsible practices. CHM report that as a waste collector their business does not face any significant challenges but there are a few areas of concern.

First, the price of material fluctuates. This is attributed to 'supply and demand'. If a recycler has a yard full of material, he may turn the plastic seller away. Second, material is paid for by volume. The more volume the business supplies a recycler, the better price they are paid for the material. Lastly, it is noted that they often have to travel a far distance to source materials, this can decrease the profitability of the exercise.

CHM report that there are many opportunities for recyclable materials traders. Many companies do not manage their waste and do not recycle. There is great potential for growth of the business as they could approach companies that do not recycle and pay them

for their recyclables rather than the material going to landfill. CHM perceive that there is continual pressure from recyclers to supply more material, this implies further growth for the business.

5.3.1.14.4 CMH Enterprises: Stakeholder engagement

CHM only interact with business stakeholders i.e. buyers and seller of recyclables.

5.3.1.14.5 CMH Enterprises: Summary of findings

In summary, CHM do not demonstrate an understanding of environmental responsibility, nor a commitment to environmental responsibility, and do not participate in environmental responsibility activities (Figure 5.27).

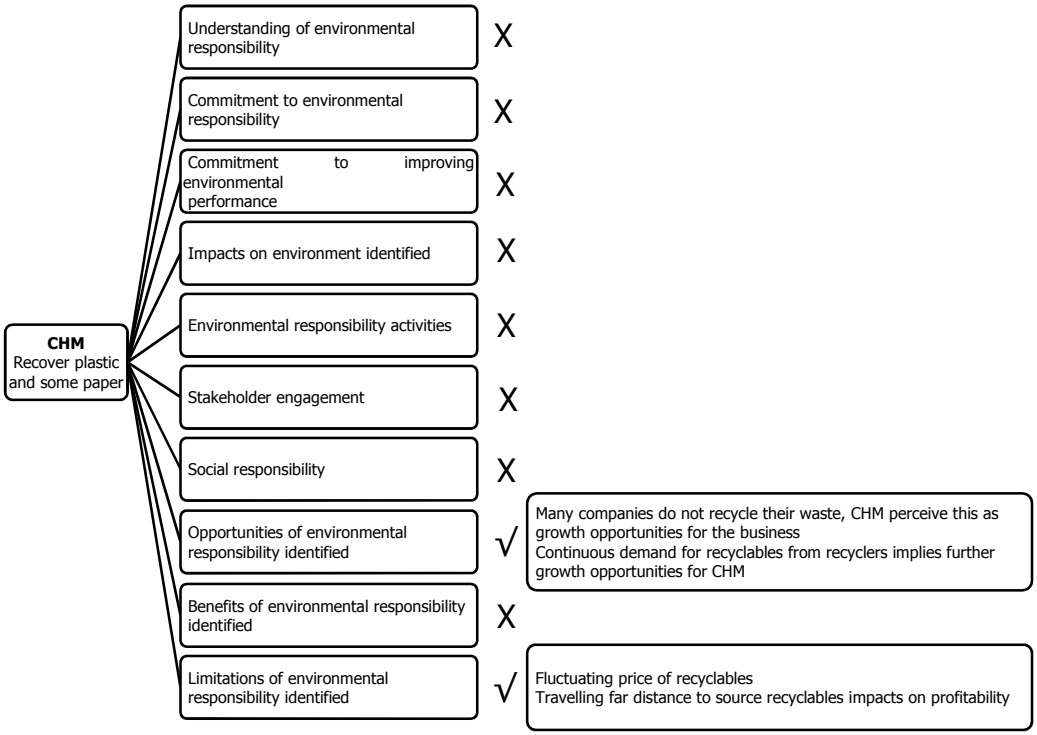

Figure 5.27 Summary of findings for CHM

5.3.2 Case study II: Packaging World: Summary of findings

In the case of the Packaging World case study, Packaging World is a SME and their waste contractor, Waste Plan is a large company. Waste Plan uses the services of SME sub-contractors, most of whom have been described in other sections. Only CHM, a plastic trader, is unique to the Packaging World case study.

Neither of the SMEs, Packaging World nor CHM demonstrate an understanding of environmental responsibility (Table 5.25). Packaging World's environmental responsibility is limited to waste management activities, as required by their BRC certification. They do however, participate in some environmentally responsible activities, motivated by reasons other than environmental responsibility. CHM appear to be a survivalist operation and have not considered environmental responsibility.

Although their environmentally responsible activities have been limited, Packaging World identify limitations, preventing them from participating further in environmental responsibility:

- They acknowledge that they do not fully understand environmental responsibility and how to identify and implement environmentally responsible practices.
- Limited resources means that they cannot employ dedicated staff to work on environmentally responsible practices, or delegate further duties to existing staff.
- Unreliable recyclers prevent they from further improving their waste management and recycling activities.

Table 5.25 Summary of environmental responsible findings for the companies that participated in the Packaging World case study

	Packaging World	**Waste Plan**	**CHM**
	Manufacture flexible packaging	Waste management	Recover plastic
	SME	Large	SME
Approx. volumes per month	60 to 80 tonnes	787.6 tonnes recycled 602.6 tons disposed	Not known
Understanding of environmental responsibility	Packaging World perceive that their business is environmentally responsible. This is attributed to their waste management activities.	√	X
Commitment to environmental responsibility	British Retail Consortium (BRC) certification requires a waste policy and waste management plan	• Environmental certification; Heritage (Gold Status) • Environmental Policy • Developing an ISO 14001 EMS • CEO is active and respected in the waste sector • Full time Environmental Scientist (with PhD qualification)	X

	Packaging World	Waste Plan	CHM
Commitment to improving environmental performance	Limited to improvement of waste impact	• Capture and monitoring of environmental metrics on a daily basis • Developing an ISO 14001 EMS	X
Impacts on the environment identified	Limited to impact of waste	• Vehicle emissions • Electricity consumption • Handling of hazardous waste • Business travel, particularly air travel	X
Environmental responsibility activities	• Waste management and recycling • Pollution control (safe storage of solvents) • Energy monitoring of equipment to identify high electricity users • Some minimisation of raw materials • Staff training limited to waste management • Reduction in use of harmful chemicals (outsourced recycling of solvents) • EPR: Suppliers are subject to risk audits	• Waste management and recycling • EPR: Education of clients about environmental issues • Pollution control: safe storage of hazardous materials and use of 'green' cleaning products • Fuel, electricity and water reduction strategies (largely through staff education) • Staff training • Conservation of natural resources through staff education to re-use where possible • Some 'green' procurement • Investment in 'green' innovation: use of biodiesel in vehicle fleet, online platform for environmental metrics monitoring and waterless car wash	X
relevant environmentally responsible activities investigated	15	13	8
Number of environmentally responsible activities participated in	8	12	0
Stakeholder engagement	• UKZN • Memberships	Not applicable for the purpose of this study	X

	Packaging World	Waste Plan	CHM
Social responsibility	Support a designated non-profit organisation		X
Opportunities of environmental responsibility identified	X		• Many companies do not recycle their waste, CHM perceive this as growth opportunities for the business • Continuous demand for recyclables from recyclers implies further growth opportunities for CHM
Benefits of environmental responsibility identified	• Reduction in waste to landfill • Companies who are aware of environmental responsibilities, prefer to use suppliers who value the same practices		X
Limitations of environmental responsibility identified	• Limited knowledge about environmentally responsible practices • Unreliable recyclers • Limited resources means limited personnel working on environmentally responsible practices		• Fluctuating price of recyclables • Travelling far distance to source recyclables impacts on profitability

Packaging World is BRC certified (a global safety and quality certification) and the only environmental requirement of the certification is waste management; a waste management policy and plan. The BRC certification requires the procurement of legally complaint suppliers. Packaging World outsource their waste management to Waste Plan, who they have not audited for legal compliance. Waste Plan is a national waste management company that are Heritage (Gold Status) certified and are pursuing ISO 14001 certification. Waste Plan utilize the services of sub-contractors for recycling and refurbishment that are not audited for environmental legal compliance. Waste Plan are emerging into the KwaZulu-Natal market and utilised the services of seven SME sub-contractors, four agreed to participate in this research and of the four, two are environmentally certified and the remaining two exhibit a poor understanding of, and commitment to, environmental responsibility.

5.4 Case Study III: Mpact Recycling

Mpact Recycling are a division of the Mpact Group and the largest paper recycler in South Africa. They are largest collector of waste paper in KwaZulu-Natal and largely outsource this function to SME's, that they have initiated, and continue to develop and support (Figure 5.28). Many large waste management companies such as EnviroServ and Waste Plan, sell recovered paper waste exclusively to Mpact Recycling.

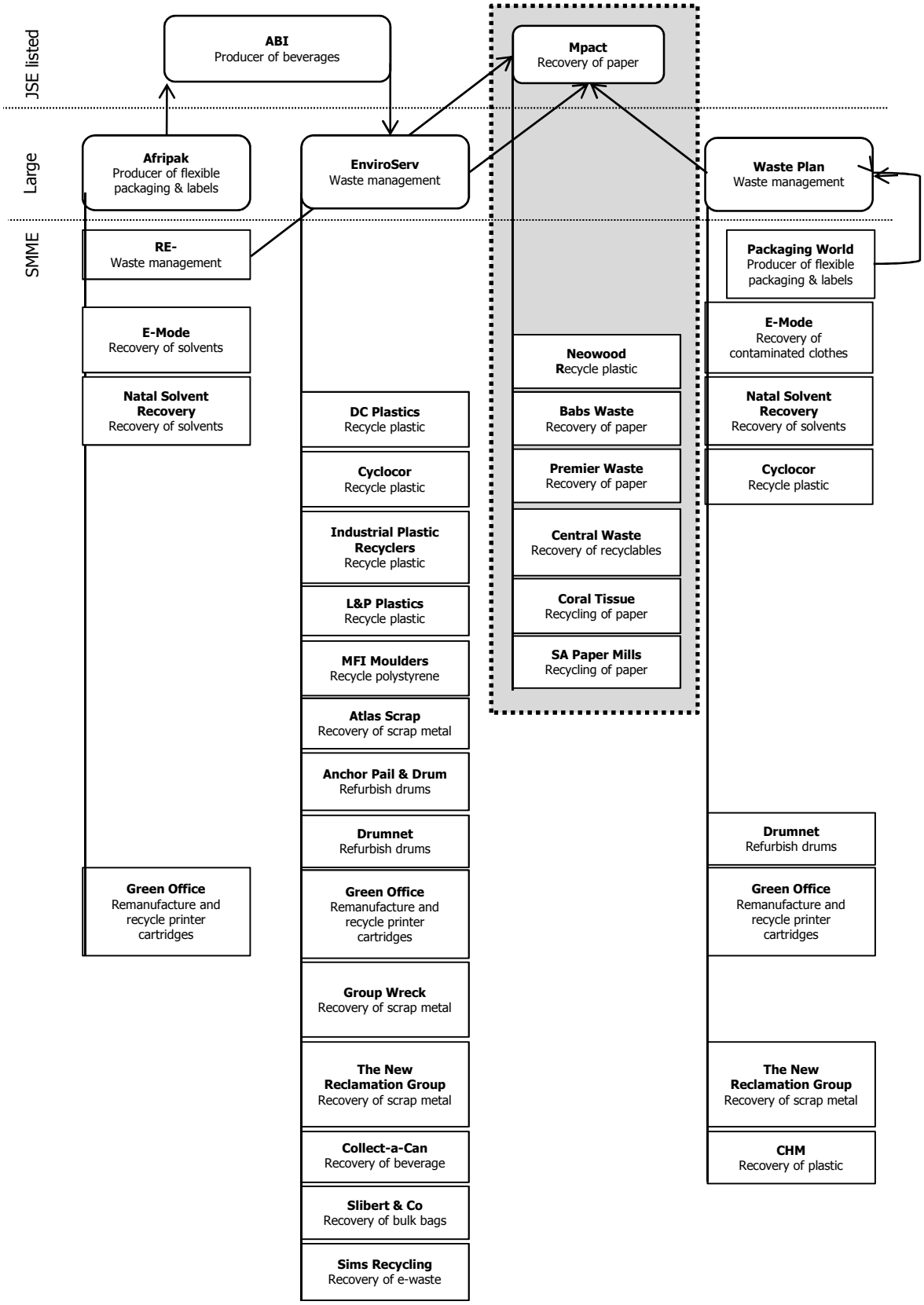

Figure 5.28 Schematic diagram of case studies

5.4.1.1 Case Study III: Mpact Recycling: Company overview

Mpact Limited, formerly Mondi Packaging South Africa, is one of the largest paper and plastic packaging businesses in southern Africa (Figure 5.29). Mpact employs more than 3 700 people within its 30 operating sites, 23 of which are manufacturing operations, based in South Africa, Namibia, Mozambique and Zimbabwe (Mpact, 2012). The Group listed as a separate entity on the JSE and demerged from Mondi in July 2011. Mpact has the leading market position in southern Africa in corrugated packaging, recycled-based cartonboard and containerboard, recovered paper collection, polyethylene terephthalate (PET) preforms, styrene trays and plastic jumbo bins (Mpact, 2012).

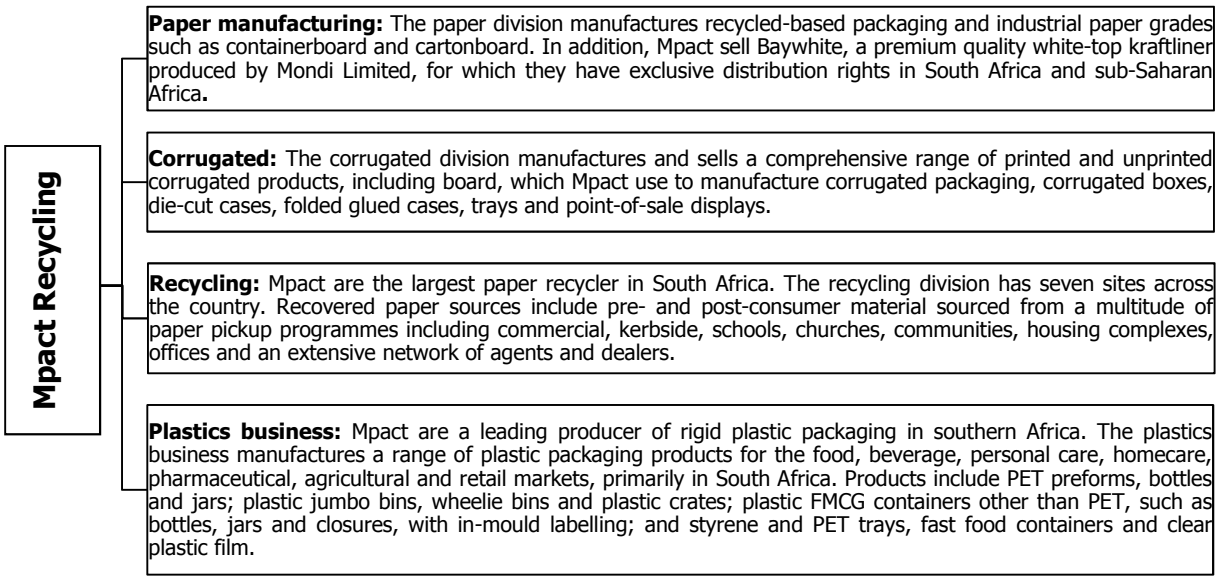

Figure 5.29 A diagrammatic overview of Mpact's service offering (Mpact, 2012)

Approximately 450 000 tonnes of paper and other paper product waste was collected for recycling during 2011 by Mpact's Recycling division. Paper is collected through a number of mechanisms for example, from schools, offices, recycling centres and kerbside collections (Figure 5.30). Mpact Recycling Agents such a Babs and Premier Waste play a key role in paper collections.

Offices, educational institutions and factories	• Mpact Recycling Agents provide paper recycling bins and collect the bins once they are full. The Agents (Mpact supported SMEs)transport the paper to a central warehouse where it is sorted and bailed, which adds value to the waste and improves transport efficiencies. The waste is then transported to the Mpact Recycling.
Recycling centres	• The public are encouraged to collect paper from their homes and neighbourhood and take it to a local recycling centre. Mpact Recycling Agents collect from the recycling centres.
Schools	• Schools act as community recycling points. Scholars bring waste from home and school and it is stored at the school until it is collected by Mpact Recycling Agent. To encourage participation, schools are remunerated for the paper by weight.
Household recycling / kerbside pick-up	• Certain areas are supplied with rubbish bags designated for paper and plastic waste, which are collected by Mpact Recycling Agents on the same day as municipal general waste collection.
Municipal dump	• Waste pickers recover paper from municipal dumps. This is either sold to Mpact Recycling Agents or Mpact Recycling Centres.

Figure 5.30 An overview of the paper collection mechanisms employed by Mpact Recycling.

Mpact's kerbside house-to-house collection service commenced in 2007 and is a joint venture with the eThekwini municipality and Durban Solid Waste. The programme aims to provide residents with a convenient and hassle free recycling collection service at no cost to the participating households. Resident's receive a three month supply of recycling bags for the collection of paper, cardboard, newspaper, magazines, Tetrapak, plastic and polystyrene, on a weekly basis. The bags are placed on the curbs and collected on the same day as the black bag (general/municipal waste) collection (Mpact, 2011). The project services approximately 400 000 homes, employs approximately 150 people (including drivers, collectors and sorters) and generates approximately 1 000 tonnes of recyclables on a monthly basis (Mpact, 2011).

5.4.1.2 Mpact Recycling Buy Back Centre, Maydon Warf

Mpact Recycling Maydon Warf, collect approximately 5 000 tonnes of paper waste per month, approximately one tonne is from kerbside collections. Collection is from pre-consumer and post-consumer sources. Pre-consumer sources include printers, publishers, industry and large business. Post-consumer sources are defined as household and small business sources. These are collected by the paper pickup schemes that include kerbside, churches, schools, small businesses and many more.

A significant source of paper for Mpact Recycling is from small local businesses that collect paper in their areas and then deliver it to Mpact Recycling buy-back centres. Mpact Recycling has contributed to the development of SMEs through the empowerment of more

than 40 entrepreneurial companies to facilitate their collection strategies. This is primarily related to owner drivers, ex-employees of the group, collecting recovered paper, under Mpacts mentorship and guidance, and the provision of training and equipment (Mpact, 2012).

These businesses vary in size from well-established recycling business in a regional city, to a one person business with a small truck, to street hawkers. Mpact provide street hawkers with wheel barrows to make it easier for them to transport the cardboard and paper they collect (Mpact, 2012). Examples of these SMEs based in the Greater Durban area include Babs Recycling, Premier Waste and Evergreen Recycling.

Mpact Recycling, a Mpact Buy Back Centre, based in Maydon Warf, Durban was the subject of the case study. Mpact Recycling has been in operation for more than ten years, has an annual turnover of more than R500 million, and employs 53 staff. The demographic profile of Mpact Recycling Maydon Warf is 49% male, 51% female; 31% Black, 13% Coloured, 15% Indian and 42% White. It is noted that Mpact Recycling outsource their collecting operations to SMEs and hence the small staff compliment at the Maydon Warf facility, consisting of management, safety, and administrative employees.

5.4.1.3 Mpact Recycling: Environmental responsibility

Mpact's Business Development Manager reports that Mpact are familiar with the term 'environmental responsibility' and describe the concept as "*disposing of waste materials in a manner that is not going to be detrimental to the environment*".

The Mpact Group operate in the pulp and paper industry, which is subject to stringent environmental regulation. Certain operations generate hazardous and non-hazardous waste, air and water emissions. As a result, the entire group manage their environmental obligations through regular safety, health, environmental and quality audits and maintain environmental management registers at an operational level. Water usage, wastewater discharge and quality, waste management and disposal, energy consumption, and air emissions are managed in accordance with applicable environmental laws and standards (Mpact, 2011).

Mpact's group safety, health and environmental (SHE) philosophy (that has been in place since 2004) states that all injuries, occupational illnesses, safety and environmental incidents are preventable and that the target for them is zero (Mpact, 2011). All of Mpact's operations have environmental management systems in place and are ISO 14001 certified which ensures that environmental policies and practices are well documented and there are Group-wide policies in relation to sustainable development and management guidelines to ensure consistency of application across the Group. This is reviewed annually. The Group invest substantial capital resources into ensuring environmental compliance and monitoring of their impact on the environment (Mpact, 2011).

To assist with the management of Safety, Health and Environment, Mpact implement a number of initiatives and programmes. These include a SHE plan, which was developed at Group level and was cascaded down to divisional level, and to plant and mill level. The plan defines the actions required, how these will be addressed, who will be responsible, target dates and the progress made to achieve targets set for safety, health and environment per division, plant or mill (Mpact, 2011).

The Group employ a number of Health, Safety and Environmental staff to ensure compliance. The minimum requirement for these positions is a three year diploma in the subject and work experience. Independent consultants are consulted on a regular basis to oversee licencing and compliance. Mpact Recycling, Maydon Warf employ one Safety, Health and Environmental Officer who is responsible for health, safety and environment and maintains the ISO 14001 environmental management system. Environmental committees are regional, made up of Management and SHE staff from the different divisions of the Group.

Regular compliance audits (both internal and external) and reporting are undertaken at local, divisional and Group level. Monthly health, safety and environmental committee meeting are held, internally and externally. Here environmental metrics are reviewed and compared to improvement targets that have been set.

To encourage improvement of environmental performance, Mpact present the Mpact Excellence in Environmental Performance Award for both excellence and improvements in environmental performance to the division who has shown the greatest environmental performance improvement per annum (Mpact, 2012). The CEO appoints an independent

environmental consultant to audit each operation, report on results and decide on the winner of the competition.

Resources, training, education, consultation and auditing functions are provided at a Group level to ensure compliance with environmental legislation and other requirements to which the Group subscribe.

5.4.1.4 Mpact Recycling: Environmental responsibility activities

Mpact as a group have identified water usage, wastewater discharge and quality, waste management and disposal, energy consumption, and air emissions as their significant environmental impacts (Mpact, 2011). Mpact Recycling Maydon Warf is a small operation of 53 staff consisting of office space and a warehouse, environmental impact is considered negligible compare to other divisions.

Vehicle emissions have been identified as the principal environmental impact. It is noted however, that this service is outsourced to SMEs as described in section 5.4.1.2. At their premises, on an operational level, potential diesel/oils spills have been identified as the most significant environmental risk.

Mpact Recycling have identified and quantified their impact on the environment and participate in a number of environmentally responsible activities to reduce this impact (Table 5.26).

Table 5.26 A description of Mpact Recycling's environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Waste management is Mpact Recycling core business. At an operational level, Mpact Recycling Maydon Warf collect waste paper and plastic waste for recycling.
2	Extended producer responsibility	√	Mpact Recycling's core business is a take back system for paper and plastic waste in South Africa for the Mpact Group, who are producers of paper and plastic packaging (Mpact Recycling perceive that their core business is an EPR service). While considerable volumes are already collected Mpact invest in continued education of and buy-in from the general public to increase collection rates.
3	Pollution control and effluent emissions	√	Diesel and oil are stored on site for the fuelling of forklifts. To prevent accidental spills, the diesel/oil storage area is bunded and the diesel is stored in contained areas to prevent and contain accidental spills. No other controls are applicable.

Environmental responsible activity		Yes / no	Description
4	Reducing water consumption	√	Water consumption is domestic use and is monitored monthly. Staff are trained in daily water conservation measures and encouraged not to waste water.
5	Energy management	√	At a Group level energy efficient projects are pursued on an on-going basis and various interventions are in place for electrical energy reduction and boiler efficiency improvements. Mpact Recycling, Maydon Warf is not a significant user of electricity. Electricity is used in the office and to run some light equipment for example, cardboard bailers. Electricity consumption is monitored monthly. Staff are trained in daily electricity conservation measures and encouraged not to waste electricity. At the time of the interview, Mpact Recycling, Maydon Warf were retrofitting al of their light fittings, and installing energy efficient lighting.
6	Carbon emissions management	√	At a group level, carbon footprint reporting is required for the disclosure of the group's carbon footprint in their annual sustainability report.
7	Transport, travel and fuel consumption	X	Mpact Recycling, Maydon Warf reason that as this service is outsourced, they are not directly responsible for transport and travel impacts.
8	Minimising use of raw materials and conservations of natural resources	√	Of the 450 000 tonnes of waste paper recovered during 2011, approximately 70% was used in the production of our cartonboard and containerboard. The input of recovered paper has a positive impact in terms of the environment, reusing a valuable resource and preventing the landfilling or incineration of used paper. Moreover, the recovery and recycling of paper in South Africa ensures local beneficiation of raw materials (Mpact, 2011). Mpact Recycling Maydon Warf state they do not use raw materials in any of their processes.
9	Air emissions management	n/a	
10	Environmental reporting	√	Since 1 March 2010, JSE listed companies have been required to produce an integrated report in terms of the JSEs listing requirements. An integrated report gives users an all-round view of the company by including social, environmental and economic performance along with the company's financial performance (IRC, 2011). At a Group level, reporting is required at divisional monthly SHE committee and management meetings at a plant level, and every 6 months at a divisional level. Annual reporting is required at a Group level.
11	Staff engagement	√	Staff are educated about environmental and health and safety issues during induction training and regular SHE briefs. There is also an internal newsletter and intra-web that includes environmental content. It is noted that the focus of staff training is on health and safety as Mpact have had adverse incidents in the past.
12	Green procurement	X	Mpact Recycling Maydon Warf do not engage is green procurement, either up nor down their supply chain. Mpact Recycling Maydon Warf, do not audit their suppliers, nor their purchasers of recyclables for environmental compliance. The

Environmental responsible activity		Yes / no	Description
			collection Agents/SMEs that Mpact support are supplied with bailing machines, which Mpact own. Mpact provide monthly maintenance and servicing of the equipment as well as training on the use of the equipment. This is done for safety purposes.
13	Green design/green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	√	Mpact Recycling, Maydon Warf use of bio-degradable and "environmentally friendly" products where possible for example, cleaning products.
15	Investment in green technology and or innovation	X	
16	Other	√	Mpact's focus area for environmental responsibility is to increase their volumes of recyclables collected, as they perceive that this would have the most significant positive environmental impact.
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Environmental reporting 10. Staff engagement 11. Green procurement 12. Green building/design 13. Reduction in use of harmful chemicals and or hazardous materials 14. Investment in green technology and or innovation
Number of Mpact Recycling environmentally responsible activities		11	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Minimising use of raw materials and conservations of natural resources 8. Environmental reporting 9. Staff engagement 10. Reduction in use of harmful chemicals and or hazardous materials 11. Increase recyclable volumes

5.4.1.5 Mpact Recycling: Social responsibility activities

Mpact have a long standing relationship with the World Wildlife Fund and are the sponsors of the Mondi Wetlands Programme. Established in 1991, the Mondi Wetlands programme has been the most successful non-governmental wetland conservation programme in South

Africa, and is recognised by its partner organisations for pioneering wetland conservation outside reserves in South Africa (WWFSA website).

During 2010, WWF ranked first in WWF's Paper Company Environmental Index. The index is a rating tool for measuring fine paper companies' global environmental footprint, that analysed performance in responsible fibre sourcing (responsible forestry), emissions in the manufacturing process (clean manufacturing) and transparency (WWFSA website).

5.4.1.6 Mpact Recycling: Discussion and linkages

Mpact Recycling Maydon Warf, recover paper and some plastic for the Mpact Group. The majority of the recovered paper is recycled into corrugated products by Mpact's corrugated division and some recovered paper is purchased by small independent mills for example, SA Paper Mills and Coral Tissue. Recovered plastic is purchased by recyclers for example, Neowood and Cyclocor (Figure 5.31).

Mpact Recycling Maydon Warf, are supplied with paper by a number of sources. A significant portion of their recovered paper is supplied by SME's that are supported by Mpact Recycling for example, Babs Waste, Premier Waste, and Central Waste. Waste management companies for example, EnviroServ, Waste Plan and RE- also supply Mpact Recycling with recovered paper (Figure 5.31).

The SME's that participated in this study were referred to the researcher by Mpact Recycling Maydon Warf, and it is noted that they only supplied information of key suppliers and recyclers. Of the eight SMEs approached to participate in the study, two declined and six disclosed the required information (Figure 5.31). For the purpose of this case study, only those SME's unique to Mpact Recycling will be discussed, other SMEs have be described in earlier sections. It is noted that these are not the sole suppliers and recyclers to Mpact Recycling, but the SMEs and linkages that Mpact were willing to disclose, and those that fell within the definition of a SME for the purposes of this dissertation.

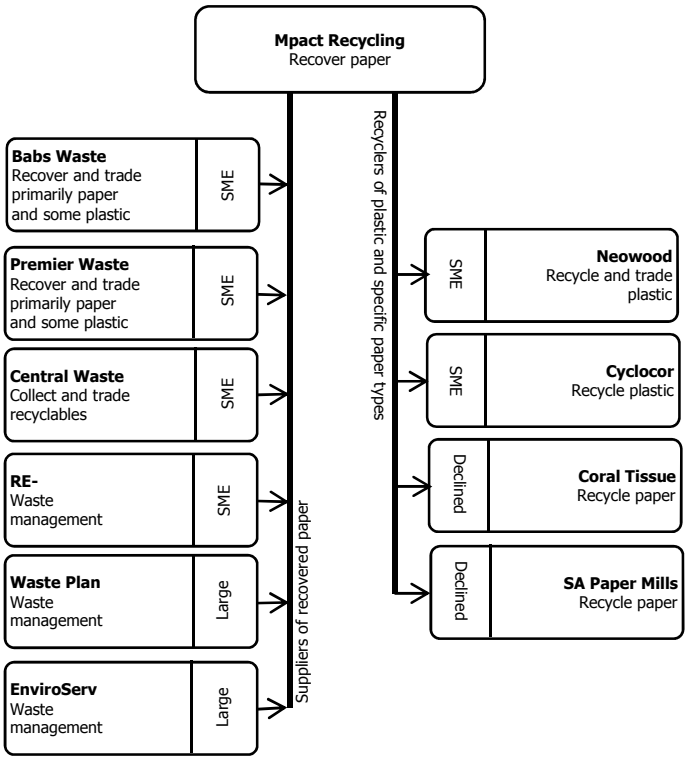

Figure 5.31 Key companies that supply Mpact Recycling with recovered paper, and recyclers that purchase recovered plastic and paper for recycling

5.4.1.7 Babs Waste: Company overview

Babs Waste's is the business of purchasing of waste materials; office waste paper, waste paper of different grades, cardboard, and different types of plastic. The collected material is sorted, compacted (using bailing machines) and sold to recycling companies, particularly large recycling companies such as Mpact Recycling, and waste management companies such as The New Reclamation Group, RE- and EnviroServ. Babs Waste are a Mpact Recycling paper collection Agent and ex-employees of the Group.

Babs Waste acquire a significant portion of their material from independent street hawkers. They purchase waste from informal waste pickers at the Bisasar Road landfill site (approximately 10 tonnes per month). Business / office waste comprises a small portion of their business and they offer a paper shredding service to corporate clients who require secure disposal of confidential documents. Babs Waste collect approximately 300 to 400 tonnes of waste per month.

Business operations are conducted at their premises Jacobs and they operate 24 hours a day, seven days a week, and they have been in business for more than 15 years. They

employ 55 staff and the demographic profile is 45% female, 55% male; 71% Black and 29% Indian. Babs Waste were not willing to disclose their annual turnover.

It is difficult to determine whether Babs Waste fall within the National Small Business Amendment Act of 2003's definition of a SME. They employ less than 200 staff but their annual turnover is unknown. Correspondence with Mpact Recycling's Business Development Manager confirmed that Babs Waste do in fact fall within the National Small Business Amendment Act of 2003's definition of a SME. This was determined by an independent (confidential) study recently commissioned by the Group.

5.4.1.8 Babs Waste: Environmental responsibility

Babs Waste report that they are familiar with the term 'environmental responsibility' and they consider themselves to be environmentally responsible as they "*keep waste off the streets*". Babs Waste perceive that they have a responsibility to protect the environment and that their business is environmentally responsibility. This is attributed to the nature of the business and that recycling waste benefits the environment.

There is no environmental policy and staff are not trained in environmental issues. Similarly, there is no system in place to ensure compliance with environmental legislation. They do not plan to pursue environmental certification or implement environmentally responsible practices.

Babs Waste do however, demonstrate some commitment to the Occupational Health and Safety Act and two staff have been trained in basic health and safety and are the companies designated Health and Safety Representatives. Health and Safety duties form part of their daily activities and do not include environmental responsibly.

5.4.1.9 Babs Waste: Environmental responsibility activities

Babs Waste perceive that their core business "*keeping waste off the street and employing people*" make them environmentally responsible. Other than this, they have not considered the impact of their operations on the environment and do not participate in any environmental responsibility activities investigated for the purpose of this study. They do practice some social responsibility (Table 5.27).

Table 5.27 A description of Babs Waste environmental responsibility activities

Environmental responsible activity		Yes / no	Description
1	Waste management	X	No waste management/recycling activities within the business for example, office waste is not recycled.
2	Extended producer responsibility	X	Not familiar with the term EPR.
3	Pollution control and effluent emissions	X	Not applicable but it is noted that no measures were taken to prevent littering of paper waste (blown by the wind) around their premises.
4	Reducing water consumption	X	Water use is domestic and no measures have been taken to reduce water consumption.
5	Energy management	X	
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	X	
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	X	
10	Environmental reporting	X	Not familiar with the concept of environmental reporting or stakeholders.
11	Staff engagement	X	
12	Green procurement	X	Not familiar with the term 'green procurement'.
13	Green design/green building	X	Not familiar with the term 'green building'.
14	Reduction in use of harmful chemicals and or hazardous materials	n/a	Not applicable.
15	Investment in green technology and or innovation	X	Not familiar with the term 'green technology'.
16	Other	X	At the time of the interview, Babs Waste did not plan to implement environmental responsibility interventions
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green design/green building 14. Investment in green technology and or innovation
Number of Babs Waste environmentally responsible activities		0	
17	Social responsibility activities	√	Babs Waste support several local schools and non-profit organisations for example, purchase wheelchairs for

Environmental responsible activity		Yes / no	Description
			persons with physical disabilities. They are also long term supporters of Operation Smile, an international charity that provides free surgeries to repair cleft lip, cleft palate and other facial deformities for children.

5.4.1.10 Babs Waste: Limitations, opportunities and benefits

Babs Waste demonstrate limited environmental responsibility, and it is therefore difficult to establish possible limitations and benefits that they may experience from environmentally responsible practices. As a waste collector, they note that their most significant challenge is competition with other collectors for recyclable materials. The fluctuating cost of diesel is problematic for the business and can affect profitability.

Babs Waste state that being a waste collector has meant that the business is perceived favourably by customers as they are collecting waste and "*keeping it off the street*".

5.4.1.11 Babs Waste: Observations

The researcher noted, on an inspection of the facility, that there is no Health and Safety signage but staff were wearing personal protective equipment. Housekeeping was orderly, there were demarcated areas for different activities and a clear work flow. Vehicles are required to drop-off and park in demarcated areas and are not permitted in the working area. All work is conducted under cover.

5.4.1.12 Babs Waste: Summary of findings

In summary, Babs Waste demonstrate limited understanding of environmental responsibility, commitment to environmental responsibility, and environmental responsibility activities. They do however participate in some social responsibility (Figure 5.32).

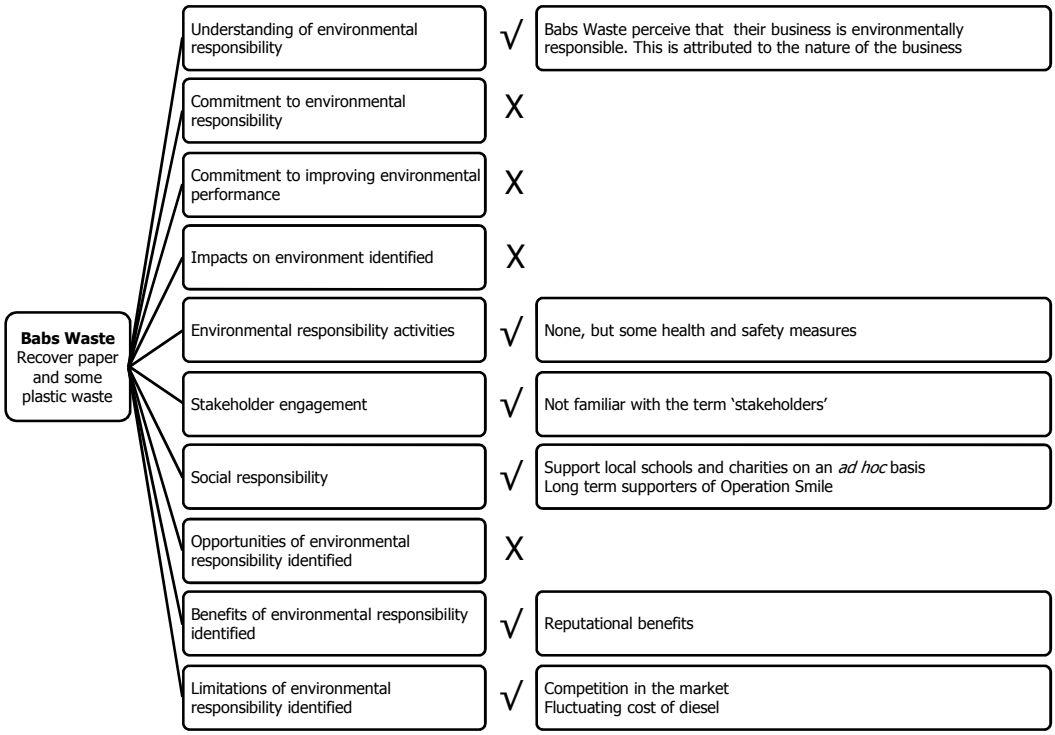

Figure 5.32 Summary of findings for Babs Waste

5.4.1.13 Premier Waste: Company overview

Premier Waste's business is the purchasing of waste materials; waste paper of different grades, cardboard, and different types of plastic. The collected material is sorted, compacted (using bailing machines) and sold to recycling companies, particularly large recycling companies such as Mpact Recycling, and waste management companies such as EnviroServ. Premier Waste are an Mpact Recycling paper collection Agent and ex-employees of the Group. Premier Waste collect approximately 900 to 1 100 tonnes of waste per month.

Premier Waste own a small fleet of trucks and manage their own recyclable collections. They purchase a considerable portion of recyclables from one person businesses with small trucks who in turn collect from street hawkers and informal pickers.

Business operations are conducted at their premises in Phoenix Industrial Park and they operate 24 hours a day, seven days a week. Premier Waste has been in business for more than nine years and employ 120 staff, the demographic profile is 80% female, 20% male; 90% Black and 10% Indian. Premier Waste were not willing to disclose their annual turnover.

It is difficult to determine whether Premier Waste fall within the National Small Business Amendment Act of 2003's definition of a SME. They employ less than 200 staff but their annual turnover is unknown. Correspondence with Mpact Recycling's Business Development Manager confirmed that Premier Waste do in fact fall within the National Small Business Amendment Act of 2003's definition of a SME. This was determined by and independent (confidential) study recently commissioned by the Group.

5.4.1.14 Premier Waste: Environmental responsibility

Premier Waste report that they are familiar with the term 'environmental responsibility' yet describe the term as "*environmental responsibility is about waste material and whether it is disposed of or recycled, and how it effects the ozone layer*". There is no environmental policy and no system in place to ensure compliance with environmental legislation and they do not to pursue environmental certification or implement environmentally responsible practices.

Premier Waste perceive that they have a responsibility to protect the environment and justify that they are environmental responsible as recycling waste is environmentally preferable than landfill. Premier Waste learnt about environmental issues through newspapers and other popular media.

5.4.1.15 Premier Waste: Environmental responsibility activities

Premier Waste have not considered the impact of their business activities on the environment, yet do participate in some of the environmental responsibility activities investigated in this study, the motive for these activities however is cost saving (Table 5.28). Premier Waste practice some social responsibility.

Table 5.28 A description of Premier Waste's environmentally responsible activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Recycle office waste.
2	Extended producer responsibility	X	Not familiar with the term EPR.
3	Pollution control and effluent emissions	X	Not applicable but it is noted that no measures were taken to prevent littering of paper waste (blown by the wind) around their premises.
4	Reducing water	X	Water use is domestic and no measures have been taken

Environmental responsible activity		Yes / no	Description
	consumption		to reduce water consumption.
5	Energy management	√	Installation of energy saving light bulbs to reduce the cost of electricity.
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	√	Daily route planning to minimise fuel consumption and save on the cost of diesel. The cost of diesel has been identified as a risk to the business.
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	X	
10	Environmental reporting	X	Not familiar with the concept of environmental reporting or stakeholders.
11	Staff engagement	X	
12	Green procurement	X	Not familiar with the term 'green procurement'.
13	Green design/green building	X	Not familiar with the term 'green building'.
14	Reduction in use of harmful chemicals and or hazardous materials	n/a	Not applicable.
15	Investment in green technology and or innovation	X	Not familiar with the term 'green technology'.
16	Other	X	At the time of the interview, Premier Waste did not plan to implement environmental responsibility interventions.
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green design/green building 14. Investment in green technology and or innovation
Number of Premier Waste environmentally responsible activities		3	1. Waste management 2. Energy management 3. Reduction in use of harmful chemicals and or hazardous materials
17	Social responsibility activities	√	Support several local schools and non-profit organisations.

Although Premier Waste were not identified as a waste sub-contract of ABI, they were approached by ABI to assist with a corporate social investment schools recycling project. For the period 14 August – 31 October 2012, ABI launched a School Recycling Programme. One hundred and twenty Primary Schools in KwaZulu-Natal and Gauteng were invited to

participate. The project aimed to raise awareness about recycling in schools and the local community. Premier Waste were approached to participate and are the designated collectors of recyclables from the participating schools. ABI have audited Premier Waste for environmental compliance.

5.4.1.16 Premier Waste: Limitations, opportunities and benefits

Premier Waste demonstrate limited environmental responsibility, and it is therefore difficult to establish possible limitations and benefits that Premier Waste may experience from environmentally responsible practices. As they recycle waste, an environmentally preferable option to landfilling, they have a good reputation for helping the environment and they play a role in creating awareness about recycling in the community. This has benefitted the reputation of the business.

As a waste collector, Premier Waste face two major challenges, the cost of diesel and competition. Premier Waste's Operations Manager explains that the cost of diesel fluctuates and when diesel prices are low, the market prefers virgin materials. Alternatively, when the cost of diesel is high, the market prefers recyclable materials. There is substantial competition for recyclable waste and many competitors in the market, this can result in 'price wars'. It is also noted that the volumes of recyclables is seasonal. During December for example, volumes of waste are markedly higher than during January and February.

5.4.1.17 Premier Waste: Observations

The researcher noted, on an inspection of the facility, that there is no Health and Safety signage and staff were not wearing personal protective equipment. Staff, mostly previously disadvantaged women, were working out in the open with no protection from the elements. Housekeeping was poor and it was difficult to determine whether there was any organisation of staff and piles of waste. There were no demarcated areas to assist with vehicle flow and vehicles were moving around the premises in a disorderly manner.

5.4.1.18 Premier Waste: Summary of findings

In summary, Premier Waste demonstrate limited understanding of, and commitment to, environmental responsibility. They do however participate in some environmental and social responsibility activities (Figure 5.33).

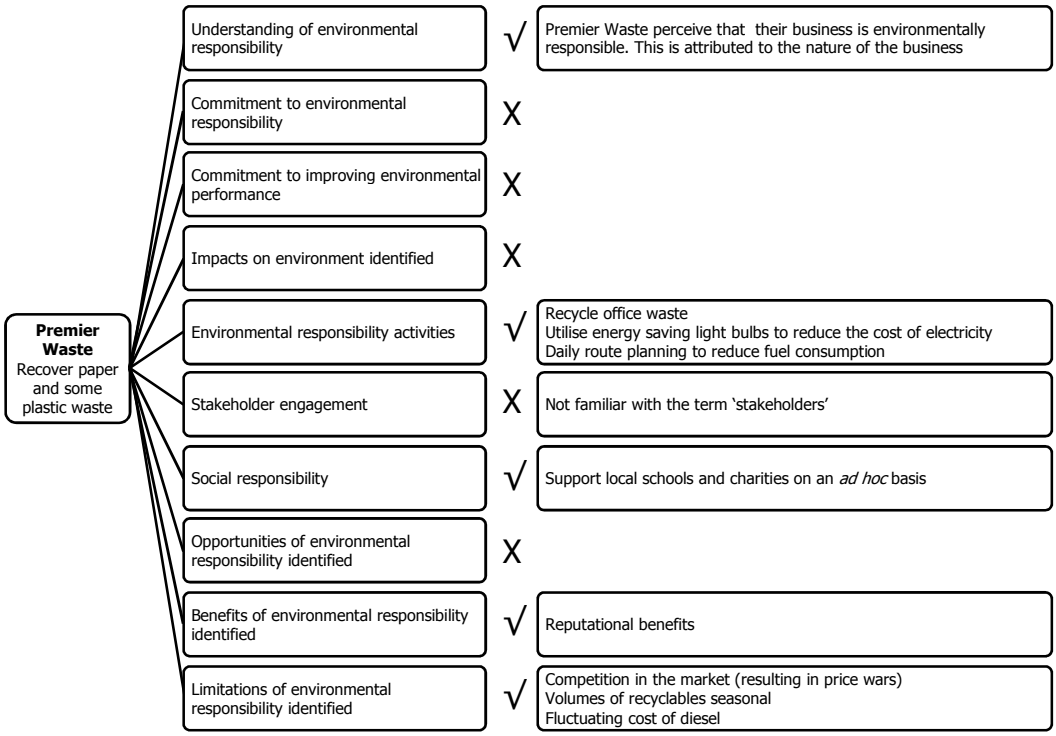

Figure 5.33 Summary of findings for Premier Waste

5.4.1.19 Central Waste: Company overview

In addition to their footprint in eThekwini, EnviroServ offer a waste management service to Pietermaritzburg which is outsourced to Central Waste. Central Waste provides a recyclable waste service to the city of Pietermaritzburg and surrounds. The business has expanded from its initial focus on solely collecting paper and cardboard to collecting a range of recyclables (predominantly cardboard, paper, plastic and steel). The collected material is sorted, compacted (using bailing machines) and sold to recycling companies (local and export).

Central Waste acquire post-industrial and post-consumer waste from seven main sources:

1. Central Waste attains a significant portion of their material from independent street hawkers and informal pickers. Many of these traders collect waste off Pietermaritzburg's landfill sites.
2. Independent collectors; one person businesses with small trucks (who in turn, collect from street hawkers and informal pickers), supply large volumes of material.
3. Drop off by large waste management companies for example, EnviroServ.

4. Directly from industry (post-industrial) and corporate clients, by either on-site waste management or by regular collection from the client (truck fleet).
5. Partnerships with large waste management companies for example, Don't Waste Services, a large waste management company that sub-contract Central Waste to collect recyclables from their Pietermaritzburg clients.
6. Curb side/residential collections. Mpact Recycling sub-contract Central Waste to oversee their residential collections in the Pietermaritzburg area.
7. Public drop off points. Mpact Recycling sub-contract Central Waste to oversee their public recyclable drop off points in the Pietermaritzburg area.

Central Waste collect predominantly cardboard and newspaper with plastic and steel making up a smaller proportion of their business (Table 5.29). Only 2% of the waste collected by Central Waste is landfilled and the residential collections are the major contributor.

Table 5.29 Approximate volumes of recyclables, by type, collected by Central Waste per month. All recyclables are sold to recyclers (either locally or exported)

Recyclable type	Approximate volume per month (tonnes)
Cardboard	1 000
Paper (predominantly newspaper, some office paper)	200
Plastic (all types)	250
Steel	300

Central Waste has been in business for more than 14 years employ 66 staff and have an annual turnover of more than R51 million. The demographic profile of Central Waste is 61% female, 39% male; 91% Black and 9% White. Central Waste fall outside the National Small Business Amendment Act of 2003's definition of a SME (transport, storage and communications). Although they employ less than 200 staff, their annual turnover is more than R51 million.

5.4.1.20 Central Waste: Environmental responsibility

Central Waste report that they are not familiar with the exact meaning of the term 'environmental responsibility' but reason the concept means "*making sure that the environment is clean and making sure that recyclable waste is recycled and not dumped*". Central Waste perceive that they have a responsibility to protect the environment and that their business is environmentally responsibility. This is attributed to the nature of the

business, and that recycling waste benefits the environment. There is no environmental policy and staff are not trained in environmental issues. Similarly, there is no system in place to ensure compliance with environmental legislation.

Central Waste have recently engaged with a consultant to learn about ISO 14001 certification, and the associated costs. This is attributed to upstream pressure from larger customers who conduct health and safety and environmental compliance audits at their premises. It is noted that ABI rejected Central Waste's business as they failed an environmental compliance audit. Other large companies such as EnviroServ, Don't Waste Services, Ramsay Engineering, Clover, and Fairfield Dairy have also audited Central Waste and continue to use their service.

One of Central Waste's staff has been trained in basic health and safety and is the companies designated Health and Safety Representative. They are not employed solely for this function, health and safety duties form part of their daily duties. The Health and Safety function does not include environmental responsibly.

5.4.1.21 Central Waste: Environmental responsibility activities

Central Waste have not considered the impact of their business activities on the environment other than of their core business; the benefit of diverting waste from landfill for recycling. Central Waste reason that their business benefits many local families, as their largest suppliers of recyclables are informal pickers. Central Waste participate in some environmental responsibility activities investigated in this study and practice some social responsibility (Table 5.30).

Table 5.30 A description of Central Waste's environmentally responsible activities

Environmental responsible activity		Yes / no	Description
1	Waste management	√	Recycle office waste.
2	Extended producer responsibility	X	Not familiar with the term EPR.
3	Pollution control and effluent emissions	√	Not applicable. It is notable that measures have been taken to prevent littering in the vicinity of the premises and grids have been place over drains to prevent litter entering the storm water system.
4	Reducing water consumption	X	Water use is domestic and no measures have been taken to reduce water consumption.
5	Energy management	X	

Environmental responsible activity		Yes / no	Description
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	√	Daily route planning and GPS tracking system to minimise fuel consumption and monitor driver behaviour.
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	X	
10	Environmental reporting	X	
11	Staff engagement	X	
12	Green procurement	X	
13	Green design/green building	X	
14	Reduction in use of harmful chemicals and or hazardous materials	n/a	Not applicable.
15	Investment in green technology and or innovation	X	
16	Other	X	At the time of the interview, Central Waste did not plan to implement environmental responsibility interventions.
Number of relevant environmentally responsible activities investigated		14	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption 8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green design/green building 14. Investment in green technology and or innovation
Number of Central Waste environmentally responsible activities		3	1. Waste management 2. Pollution control and effluent emissions 3. Transport, travel and fuel consumption
17	Social responsibility activities	√	Support several local non-profit organisations on an *ad hoc* basis for example, Hospice, Heart Foundation and the SPCA.

5.4.1.22 Central Waste: Limitations, opportunities and benefits

Central Waste demonstrate limited environmental responsibility, and it is therefore difficult to establish possible limitations and benefits that they may experience from environmentally responsible practices. Central Waste note that a significant challenge for their business as waste collectors, is a lack of public awareness and education; "*the public are not educated about recycling and do not separate and clean recyclable waste correctly. If the public were better educated, there would be less litter and less waste going to landfill*".

It is difficult for the business to prepare an annual budget as the prices and volumes of recyclables fluctuate, unpredictably, throughout the year. This is attributed to 'supply and demand' and the foreign exchange rate. There may be times in the market when it is more profitable to export cardboard, for example, than to sell it to a local recycler. It is also noted that the volumes of recyclables are seasonal. During December for example, volumes of waste are markedly higher than during January and February. Central Waste have a limited understanding of environmental responsibility and environmental certification and this is a barrier to improved environmental performance.

5.4.1.23 Central Waste: Stakeholder engagement

Central Waste are members of the Metal Recycling Association and the Pietermaritzburg Recycling forum. It is through these fora that Central Waste have had dealings with the local authorities pertaining to residential collections and formalisation of the waste pickers role in recycling. These projects are still in the conceptual phase.

5.4.1.24 Central Waste: Observations

The researcher noted during a tour of the facility that Health and Safety signage was present and staff were wearing personal protective equipment. Housekeeping was orderly, there were demarcated areas for different activities and a clear work flow. Vehicles are required to drop off and park in demarcated areas and are not permitted in the working area. All work is conducted under cover.

5.4.1.25 Central Waste: Summary of findings

In summary, Central Waste demonstrate limited understanding of, and commitment to environmental responsibility. They do however participate in some environmental and social responsibility activities (Figure 5.34).

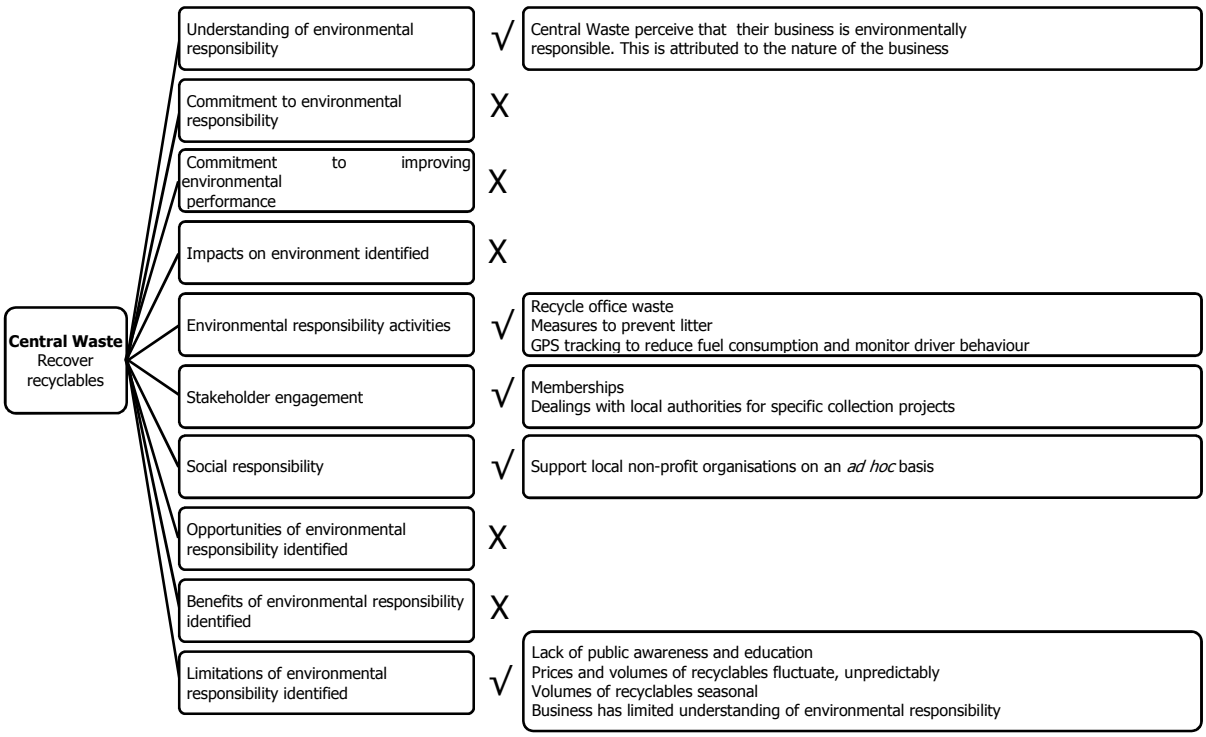

Figure 5.34 Summary of findings for Central Waste

5.4.1.26 Neowood: Company overview

Neowood have developed a process that converts waste plastics such as HDPE (mostly empty milk bottles) into a wood alternative that matches the aesthetics of natural wood and exceeds natural wood in terms of maintenance and repair requirements. The product is a 100% recycled polymer has been designed for outdoor use in both residential and commercial applications (Neowood website). When compared to natural wood, Neowood offers multiple benefits such as increased durability, low maintenance and upkeep, stain resistance, it is waterproof and UV resistant and resistant to insects, bacteria, mould and mildew (Neowood website).

Neowood acquire approximately 50 tonnes of post-industrial and post-consumer plastic waste per month, from three main sources:

1. Mpact Recycling sub-contract Neowood to recycle the plastic waste from their residential collections. Neowood do not recycle all the post-consumer plastic supplied by Mpact and trade the bulk of the material with other recyclers. More recently, Cyclocor have been assisting and purchasing the unwanted plastic directly from Mpact.

2. Neowood partner with industry to collect factory waste materials.
3. Neowood derive waste material from informal waste pickers, thereby contributing to the social upliftment of impoverished communities.

Neowood are based in Hilton, KwaZulu-Natal have been in business for less than one year, have an annual turnover of less than R0.2 million per annum and employ ten staff. The demographic profile of Neowood is 50% female, 50% male; 10% Black, 50% Indian, 20% White and 20% Coloured. They fall within the National Small Business Amendment Act of 2003's definition of a SME, and are classed as a micro sized business (in the manufacturing sector).

5.4.1.27 Neowood: Environmental responsibility

The founder and owner of Neowwod reports that Neowood is familiar with the term 'environmental responsibility' and describes the concept as "*solving the problem of post-consumer waste whilst creating employment and contributing to social upliftment*". Neowood have been familiar with the concept since inception since they rely on post-consumer waste for the manufacture of their products. The business is based on diverting waste from landfill thereby benefitting the environment. They have found that they can source recyclable materials from informal waste pickers and contribute to the economic development of these individuals and their dependants.

Neowood does not have, nor have they considered, an environmental policy and environmental certification. The cost of environmental certification is perceived to be significant (obtaining and maintaining), hence certification has not been considered. They do however believe that they have a responsibility to protect the environment and perceive themselves to be an environmentally responsible company. Neowood have not however, considered improving their environmental performance.

5.4.1.28 Neowood: Environmental responsibility activities

Neowood have considered that transport could be their largest environmental impact, as recyclable materials are transported in bulk to their factory in Hilton, then the product is transport back into the market. Neowood participate in some environmental responsibility activities investigated in this study and practice some social responsibility (Table 5.31).

Table 5.31 A description of Neowood's environmentally responsible activities

Environmental responsible activity		Yes / no	Description
1	Waste management	X	Office/production waste is not recycled. It is noted that the plastics sourced for the Neowood product are considered 'problem' plastics, laminated multi-films, that are traditionally difficult to recycle and are typically landfilled. Neowood is an innovative recycling solution for these plastics, diverting them from landfill.
2	Extended producer responsibility	X	Neowood do not have a take back or recycling solution for their product. It is noted that Neowood collect and utilise post producer waste, thereby assisting corporates/industry fulfil their extended producer responsibility.
3	Pollution control and effluent emissions	√	Neowood release contaminated water from their wash bay under strict conditions, as stipulated by local authorities.
4	Reducing water consumption	√	Water is recycled through the wash plant a number of times and water wastage is minimised. Once the water has passed through the wash bay several of times, it becomes contaminated and cannot be released. Neowood have engaged with the local municipality who have assisted with a 'cleaning' procedure and the water is released under strict conditions. No measures have been taken to reduce domestic water consumption.
5	Energy management	X	
6	Carbon emissions management	X	
7	Transport, travel and fuel consumption	X	
8	Minimising use of raw materials and conservations of natural resources	X	
9	Air emissions management	X	
10	Environmental reporting	X	
11	Staff engagement	X	
12	Green procurement	X	
13	Green design/green building	X	Neowood has been used by Architects in the construction of green buildings.
14	Reduction in use of harmful chemicals and or hazardous materials	√	Solvent based paints and solvents are used to finish the product. Investigation has been done to source solvents with a minimised 'toxic' component. It is noted that solvent containers are not disposed of in an environmentally responsible manner.
15	Investment in green technology and or innovation	√	Neowood consider their product to be an innovative recycling solution.
16	Other	X	
Number of relevant environmentally responsible activities investigated		15	1. Waste management 2. Extended producer responsibility 3. Pollution control and effluent emissions 4. Reducing water consumption 5. Energy management 6. Carbon emissions management 7. Transport, travel and fuel consumption

Environmental responsible activity		Yes / no	Description
			8. Minimising use of raw materials and conservations of natural resources 9. Air emissions management 10. Environmental reporting 11. Staff engagement 12. Green procurement 13. Green design/green building 14. Reduction in use of harmful chemicals and/or hazardous materials 15. Investment in green technology and/or innovation
Number of Central Waste environmentally responsible activities		4	1. Pollution control and effluent emissions 2. Reducing water consumption 3. Reduction in use of harmful chemicals and or hazardous materials 4. Investment in green technology and or innovation
17	Social responsibility activities	√	Neowood derive a portion of their recyclables from informal waste pickers. They consider that this as their core social responsibility activity as they are contributing to the social upliftment of impoverished communities.

5.4.1.29 Neowood: Limitations, opportunities and benefits

Neowood demonstrate limited environmental responsibility, and it is therefore difficult to establish possible limitations and benefits that Neowood may experience from environmentally responsible practices. Neowood perceive that they sell an environmentally responsible product and that they are perceived as an environmentally responsible company. They note that this has benefitted them in terms of gaining interest from prospective clients. It does not secure a sale and price is typically the determining factor in a sale, not environmental responsibility. Neowood feel that 'green' has been overdone and customers have become desensitized to environmental issues – 'green fatigue'.

Neowood have found that the social responsibility practices have had a bigger impact on prospective customers as demonstrating their social impact has had a positive result on their competitiveness in the market.

They explain that their most significant challenge is the competition for recyclable materials and price variability of the recyclable material. Also, there has been notable price decay over time that has been beneficial as the cost of the recyclable material decreases, the more competitive and profitable the Neowood product has become.

Neowood believe that plastic wood products have the potential to replace the timber wood market as timber wood is often obtained from unsustainable sources whereas a plastic wood product utilises post-consumer and commercial waste. There is a steady, if not increasing, availability of post-consumer and post-industrial waste.

5.4.1.30 Neowood: Stakeholder engagement

Neowood are a member of the Green Building Council of South Africa, and they actively engage with corporates such as Nampak, Unilever and Mpact for the purpose of offering a recycling solution for industrial and post-consumer waste. They have had dealings with the local municipality who have assisted with effluent emissions.

The Wildlands Conservation Trust have a waste collection programme in the greater Pietermaritzburg area which Neowood support through the purchase of recyclable plastic from the Trust.

5.4.1.31 Neowood: Summary of findings

In summary, Neowood demonstrate limited understanding of, and commitment to, environmental responsibility. They do however participate in some environmental and social responsibility activities (Figure 5.35).

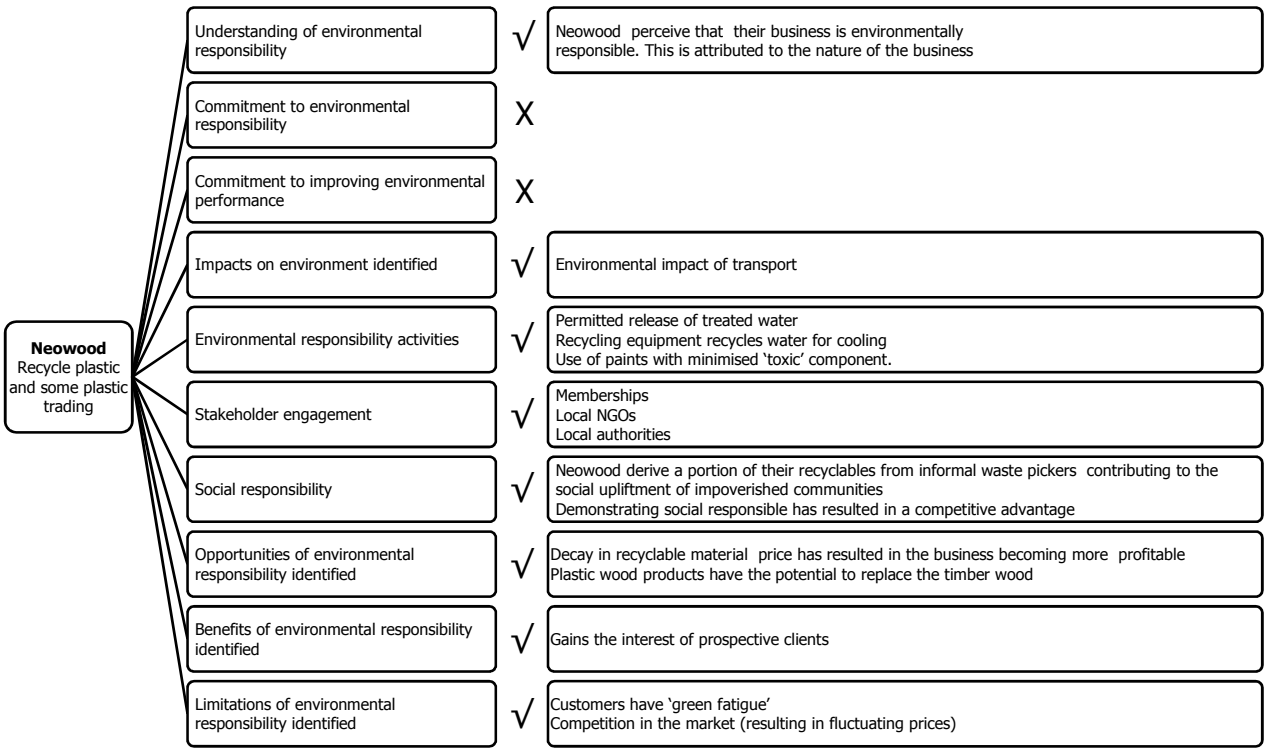

Figure 5.35 Summary of findings for Neowood

5.4.1.32 SA Paper Mills

South African Paper Mills (Pty) Ltd is an independent paper mill situated in Jacobs which operates three paper machines which produce approximately 15 000 tonnes of paper product per year (SA Paper Mill website). S.A. Paper Mills manufacture the following types of paper:

- Ribbed Kraft Paper
- Test Liner
- Fluting Paper
- Envelope Paper
- Exercise Book Cover paper
- Case Paper
- Wrapping Paper
- Packaging Paper
- White Kraft

These papers are used in the manufacture of school book covers, envelopes, gift wrap, paper bags, paper cores and corrugated sheets. Products are sold both locally and internationally for example, Botswana and other African countries, Dubai, Mauritius and the United Kingdom (SA Paper Mill website).

SA Paper Mills were not willing to participate in the study, the owner of the Mill communicated in an email, "*due to time constraints and confidential information, unfortunately we will not be able to assist you*".

5.4.1.33 Coral Tissue

Correspondence with Coral Tissue was telephonic and no details of the study were discussed. Coral Tissue declined and were not willing to discuss the matter further. They do not have a website and were not willing to share any information relating to their business.

5.5 Case study III: Mpact Recycling: Summary of findings

Recycling show positive results for all of the environmentally responsible criteria investigated. None of the SMEs linked to Mpact Recycling have environmental policies or certifications. All of the SMEs demonstrate some understanding of environmental

responsibility, this is attributed to the nature of their businesses, recycling which they report is environmentally preferable to waste being landfilled (Table 5.32). There is no commitment to environmental responsibility and little commitment to improving environmental performance. Most have not identified the impacts of their business operation on the environment and there is little involvement in environmentally responsible activities. Those that do participate in environmentally responsible activities are motivated by costs saving or the motivation for the activity was not environmental responsibility.

The SMEs do exhibit some stakeholder engagement activities and all participate voluntarily in social responsible activities.

All of the SMEs report that they are perceived as environmentally responsible, this is attributed to the nature of their business, recycling, which is environmentally preferable to sending waste to landfill. They report that this has benefitted the reputation of their businesses. Key challenges for the SMEs in this regard are identified:

- Competition in the market. There are many collectors and recycler of recyclables in the market and limited available recyclables.
- Competition in the market results in fluctuating price of recyclables.
- Fluctuating cost of diesel. Collecting recyclables is reliant on transport and an increase in the costs of diesel can reduce profitability.
- Volumes of waste/recyclables are seasonal and the supply is not stable.
- Lack of public awareness. The public are not educated in recycling and separating waste. Increasing public awareness could potentially result in business growth for all recyclers/waste traders.
- SMEs demonstrate limited knowledge of environmental responsibility.

Table 5.32 Summary of environmental responsible findings for the companies that participated in the Mpact Recycling case study

	Mpact Recycling	Babs Waste	Premier Waste	Central Waste	Neowood
	Recover paper and some plastic	Recover paper and some plastic	Recover paper and some plastic	Recover paper, plastic, glass and metal	Recycle plastic and some plastic trading
	JSE listed	SME	SME	SME	SME
Approx. volumes per month	5 000 tonnes	300 to 400 tonnes	900 to 1 100 tonnes	1 750 tonnes	50 tonnes
Understanding of environmental responsibility	Perceive that their business is environmentally responsible; this is attributed to the nature of the business	Perceive that their business is environmentally responsible; this is attributed to the nature of the business	Perceive that their business is environmentally responsible; this is attributed to the nature of the business	Perceive that their business is environmentally responsible; this is attributed to the nature of the business	Perceive that their business is environmentally responsible; this is attributed to the nature of the business
Commitment to environmental responsibility	• Group SHE policy • Group SHE plan • ISO 14001 certification • SHE department and personnel • Reward and recognition programme	X	X	X	X
Commitment to improving environmental performance	• ISO 14001 (annual target setting and review, on-going monitoring) • Regular internal SHE policy compliance audits	X	X	Investigating ISO 14001 certification	X

	Mpact Recycling	Babs Waste	Premier Waste	Central Waste	Neowood
Impacts on the environment identified	• Vehicle emissions • Potential diesel/oil spills	X	X	X	• Transport (vehicle emissions)
Environmental responsibility activities	• Recycling of office waste • Offer a EPR service for the Mpact Group and customers • Pollution control: safe storage of diesel and oil, use of 'green' cleaning products • Electricity and water consumption through staff education and monitoring • Energy efficient lighting • Carbon footprint reporting • Staff training	None, but some health and safety measures X	• Recycle office waste • Some energy efficient light bulbs • Route planning for fuel consumption reduction	• Recycle office waste • Litter prevention measures • Daily route planning and GPS tracking of vehicles to reduce fuel consumption	• Controlled release of effluent emissions • Offer an EPR service to corporates • Water recycling within recycling equipment • Paint with minimised 'toxic' component
Number of relevant environmentally responsible activities investigated activities	14	14	14	14	15

	Mpact Recycling	Babs Waste	Premier Waste	Central Waste	Neowood
Number of environmentally responsible activities participated in	11	0	3	3	4
Stakeholder engagement	Annual sustainability reporting	X	X	• Memberships • Engagement with local authorities	•Memberships •Engagement with local authorities •Engagement with industry
Social responsibility	Not applicable for the purpose of this study	•Support local schools and charities on an ad *hoc basis* •Long term supporters of Operation Smile	• Support local schools and charities on an *ad hoc* basis • Schools recycling (association with ABI)	Support local non-profit organisations on an *ad hoc* basis	Derive a portion of their recyclables from informal waste pickers contributing to the social upliftment of impoverished communities
Opportunities of environmental responsibility identified		X	X	Public education could result in less litter and less waste going to landfill. This would also result in growth for the business.	•Social responsibility activities have had reputational advantages •Plastic wood has the potential to replace timber wood in the market, recyclable plastic more readily available compared to raw timber

	Mpact Recycling	Babs Waste	Premier Waste	Central Waste	Neowood
Benefits of environmental responsibility identified	Not applicable for the purpose of this study	Reputational benefits	Reputational benefits	Reputational benefits	Decay of price of post-consumer plastic over time has resulted in the business becoming more profitable
Limitations of environmental responsibility identified		• Competition in the market • Fluctuating cost of diesel	• Competition in the market • Fluctuating cost of diesel • Volumes of waste are seasonal	• Lack of public awareness about environmental issues and recycling (public do not spate their waste for recycling correctly) • Fluctuating price of recyclables due to local supply and demand • Volumes of recyclable seasonal • Limited knowledge about environmentally responsible practices	•Customers 'desensitised' to environmental responsibility ('green fatigue') •Competition for recyclables •Fluctuating price of recyclables

Mpact Recycling's environmental responsibility is governed by a group SHE philosophy and all of Mpact's operations are ISO 14001 certified and the group operate in a sector which is subject to stringent environmental regulation. They employ a team of SHEQ staff to ensure environmental and health and safety legal and group compliance. Paper is recovered through a number of mechanisms such as schools, offices, recycling centres and kerbside collections, and Mpact Recycling Agents play a key role in paper collections. Mpact Recycling Agents are SMEs that were initiated, and supported by Mpact, and are owned by ex-employees of the Group. Mpact were willing to disclose the details of six SME sub-contractors of which five participated in this research. The SME sub-contractors exhibit a poor understanding of, and commitment to, environmental responsibility.

CHAPTER SIX
SUMMARY OF RESULTS

6.1 Introduction

Where the original purpose of the case study was descriptive, it is appropriate to develop a descriptive framework for organising the case study for analyses (Yin, 1994). A multiple case study usually adopts a comparative form of presentation and a sequence structure is one of three possible ways to present a comparative study (Rule and John, 2011). When sequence structure is used, individual cases are presented singly, and a useful way of building comparison into individual case studies is to use the same questions as headings within the cases. This allows for cross-case analysis by making it easy for readers to read through the cases to relevant sections and make their own comparison and allows for greater attention to the specifics of the case, including its particular context (Rule and John, 2011). During cross-case analysis, one will often note recurring patterns or themes which 'pull together' separate pieces of data (Miles and Huberman, 1994) that have been identified by the frequency by which the same term or synonym arises in the narrative description (Gagnon, 2010; Zikmund *et al*, 2010). Such patterns can often be found under the heading of repeated themes, explanations, and theoretical constructs and can be productive as an analysis strategy when there is a large number of sites and/or a large volume of data (Miles and Huberman, 1994), as was the case with this study. In the case of multiple case studies comparison across cases can reveal further common findings, which can generate tentative generalisations that might be tested in future studies (Rule and John, 2011).

As the study was descriptive and narrative, a sequence structure was adopted to present the case studies. Common headings were defined for the display of each case. This allowed for the easy identification of themes per case, and allowed for comparison across cases to reveal common themes. The research proposes to explore environmental responsibility in the waste sector SMEs, and the environmentally responsible relationship between packaging companies and their waste contractors. As such the findings of the larger organisations and their SMEs waste contractors were included in the results. For this reason and for the purpose of cross-case analysis, the cases were divided into three categories for the identification of themes per category; larger organisations which encompasses JSE listed and larger organisations, environmentally certified SMEs and non-environmentally certified SMEs. Environmental responsibility in SMEs is an important foci of the research, therefore SMEs were considered separately to larger organisations. Further, the environmentally

certified SMEs were considered separately from the non-environmentally certified SMEs and are referred to as non-environmentally certified SMEs to distinguish them from their environmentally certified counterparts.

6.2 Overview of the sample

A total of 20 organisations participated in the study (Table 6.1), consisting of two JSE listed, three larger organisations and 15 SMEs. Four of the SMEs are environmentally certified (ISO 14001) and 11 do not have environmental certifications. For the purpose of this research, the term 'larger organisations' will be used to describe the JSE listed and larger organisations, the term 'environmentally certified SMEs' will be used to describe the SMEs with ISO 14001 certifications and the term 'non-environmentally certified SMEs' will be used to describe the SMEs that do not have ISO 14001 certifications. Three of the participating organisations are manufacturers of a product and the remaining organisations are involved in waste related activities; six recyclers, three waste management companies, two refurbishers and six traders (buy and sell recyclables).

Table 6.1 Participating organisations

		Case study I		**Case Study II**	**Case Study III**
Large organisations	JSE listed (n=2)	ABI (Producer of beverages)		-	Mpact Recycling (Trader)
	Large (n=3)	Afripak (Producer of flexible packaging)	EnviroServ (Waste Management)	Waste Plan (Waste Management)	-
	Environmentally certified SMEs (n=4)	RE- (Waste Management)	Anchor Pail and Drum (Refurbisher)		-
		Green Office (Refurbisher)	Green Office (Refurbisher)	Green Office (Refurbisher)	-
		Natal Solvent Recovery (Recycler)		Natal Solvent Recovery (Recycler)	-
	Non-environmentally certified SMEs (n=11)			Packaging World (Producer of flexible packaging)	
			Cyclocor (Recycler)	Cyclocor (Recycler)	
		E-Mode (Recycler)	E-Mode (Recycler)	E-Mode (Recycler)	
			Industrial	CHM	Neowood

		Plastic Recyclers (Recycler)	(Trader)	(Recycler)
		MFI Moulders (Recycler)		Babs Waste Trader (Trader)
		Group Wreck (Trader)		Premier Waste Trader (Trader)
				Central Waste (Trader)

6.3 Understanding of environmental responsibility

Of the five participating larger organisations, one (EnviroServ) acknowledge the importance of compliance with environmental legislation and four of the five organisations recognised that the organisation must take responsibility for the impact of its activities on the environment. One of the organisations (Mpact) acknowledged responsibility for its impacts on the environment but only in the context of waste management (Table 6.2). All five of the larger organisations perceived that their organisation has a responsibility to protect the environment and perceived their organisations as environmentally responsible.

Of the four participating environmentally certified SMEs, none acknowledge the importance of compliance with environmental legislation, two recognised that the organisation must take responsibility for the impact of it activities on the environment, and two described environmental protection in the context of future benefits for the business and society as a whole. All four environmentally certified SMEs perceived that their organisation has a responsibility to protect the environment and that their organisations are environmentally responsible (Table 6.4).

Table 6.2 CER as defined by the large organisations and environmentally certified SMEs

Organisation	Description of CER	Interviewee
Large organisations		
ABI	"*protecting both our working environment in which we conduct our business as well as the external environment to the extent that we will not cause any detrimental impact to the environment*"	Risk Manager (and appointed Environmental Management Representative
Afripak	"*producing goods with the understanding that this must be done with minimal impact on the environment*"	Group Sustainability Manager

EnviroServ	"*making sure the company is complaint with environmental legislation and responsible for its environmental impact*"	Regional Recycling Manager
Mpact Recycling	"*disposing of waste materials in a manner that is not going to be detrimental to the environment*"	Business Development Manager
Waste Plan	"*our shared responsibility to protect the environment and use the earth's resources responsibly in a way which allows future generations to also have access to the earth's resources*"	Environmental Scientist
Environmentally certified SMEs		
APandD	"*harming the environment is the result of the actions of the business and growth of the business. There are two parts, the outside environment, nature and the impact inside the business. Responsibility is looking out for both*"	SHEQ/Operations Manager
Green Office	"*creating a business that can grow and continue into the future (thereby contributing the economy and job creation) whilst continually improving their environmental performance*"	Sustainability Leader
NSR:	"*taking care of our environment for those of our future*"	Environmental Manager
RE-	"*taking responsibility/ownership of how your business practises impact on the environment, and ensuring that negative impacts are reduced*"	Safety, Health, Environment and Quality Consultant

Many of the non-environmentally certified SMEs (nine of the 11) stated that they are familiar with the term 'environmental responsibility'. This was attributed to the nature of the business, either the collection and/or recycling of waste, or the manufacture of a product produced from recycled post-consumer waste (Table 6.5). The SMEs perceived that the collection and/or recycling of waste was environmentally preferable to landfilling waste. Likewise, the SMEs perceived the manufacture of a recycled product as environmentally preferable to producing a product from virgin material. Central Waste stated that were not familiar with the term 'environmental responsibility' yet their understanding of the concept was consistent with they that of the SMEs that perceived that they were familiar with the concept. Two of the recycling SMEs, Cyclocor and MFI, recognise that environmentally responsibility encompasses more than waste management and recycling. However, throughout the interview process, the emphasis was on the waste and recycling element. Only CHM Enterprises, a survivalist operation, were not able to describe the term.

Table 6.3 CER as defined by the non-environmentally certified SMEs

Organisation	Description of CER	Interviewee
E-Mode	No description offered	Business owner
IPR	"*being responsible for our actions and not dumping waste into the environment and causing pollution*"	Business owner
Cyclocor	"*from our perspective we are interested in creating a product that has a low environmental impact, a responsible product. Creating a cradle to grave condition for our product is also important, we utilize mixed plastics – other peoples waste and our product is 100% recyclable within our process*"	Business owner
MFI Moulders	"*environmental responsibility means separating and recycling your waste, and minimise your use of non-recyclable products so that you don't contaminate the environment. Companies must be aware of their impact on the environment, the impact of their product, and their waste*".	General Manager
Group Wreck	"*not polluting the environment and making sure that the product that we present does not harm the environment*"	Business owner
Packaging World	"*it means that the business takes responsibility for all the waste that goes out of our factory up to the point of recycling*"	Quality Control Manager
CHM	CHM are not familiar with the term 'environmental responsibility'	Business owner
Babs Waste	"*keep waste off the streets*"	Operations Manager
Premier Waste	"*environmental responsibility is about waste material and whether it is disposed of or recycled, and how it effects the ozone layer*"	Operations Manager
Central Waste	"*making sure that the environment is clean and making sure that recyclable waste is recycled and not dumped*"	Business owner
Neowood	"*solving the problem of post-consumer waste whilst creating employment and contributing to social upliftment*"	Business owner

Packaging World were the only manufacturing SME that participated in the study. They perceived the term 'environmental responsibility' as relating to waste management and recycling. This was attributed to their quality certification (BRC certification) that, from an environmental responsibility perspective, only requires waste management activities, a waste policy and waste management plan.

All of the eleven non-environmentally certified SMEs perceived that their organisation has a responsibility to protect the environment (Table 6.4). Additionally, all, with the expectation of one (IPR) non-environmentally certified SME, perceive that their organisations are environmentally responsible.

Table 6.4 Organisations perception of their environmental responsibility

	Large organisations (n=5)	Environmentally certified SMEs (n=4)	Non-environmentally certified SMEs (n=11)
Perceive that they have a responsibility to protect the environment	5	4	11
Perceive their organisation is environmentally responsible	5	4	10

6.4 Commitment to environmental responsibility

The two environmentally certified organisations, ABI and Mpact, were ISO 14001:2004 certified and meet the requirements of the standard, which include an environmental policy that demonstrates commitment to environmental responsibility from senior management, and the implementation of a documented environmental management system. The same is evident with Afripak and EnviroServ, despite the absence of an environmental certification and Waste Plan that do have a certification, Heritage (Gold Status), (Table 6.5). With the expectation of Waste Plan, the larger organisations are governed by corporate/group environmental policies, procedures and standards. Occupation health and safety and quality are grouped with environment, and the environmental policies, procedures and standards are not autonomous. Internal auditing to ensure compliance with group/corporate policies and procedures is common practice amongst the larger organisations. Furthermore, all five of the larger organisations employed full time personnel to oversee the ISO 14001 certification and/or environmental systems and environmental responsibility practices. With the expectation of Waste Plan, usually a team of several SHEQ personnel oversee SHEQ requirements from a corporate and certification perspective. Larger organisations use the services of environmental lawyers and employ legally qualified personnel to ensure legal compliance. Internal SHEQ audits ensure legal requirements are complied with throughout the group as per corporate/group requirements.

The four environmentally certified SMEs were ISO 14001:2004 certified and meet the requirements of the standard, which include an environmental policy that demonstrates commitment to environmental responsibility from senior management, and the implementation of a documented environmental management system (Table 6.5). Furthermore, all four of the SMEs employed a full time staff member to oversee the ISO

14001 certification and environmental responsibility practices. The SMEs demonstrate commitment to environmental responsibility from senior personnel in the organisation, for example the CEO or Director sit on the environmental committees and are involved in environmental decisions. The four ISO 14001:2004 environmentally certified SMEs maintain environmental legislation registers. The SMEs rely on memberships with industry associations and subscriptions to professional legal bodies, for example EnviroBrief Legal and LexisNexis South Africa for this information. RE- had their initial legislation register drafted by an environmental lawyer and NSR use the services of an environmental lawyer to maintain their legislation register. At the time of interview, Green Office had procured the services of an environmental lawyer to formalise an environmental legal opinion for the organisation.

Three of the four environmentally certified SMEs recover hazardous waste and one is a waste management company. The waste management SME, RE-, perceive that environmental responsibility is their core business, as their business is waste management and they assist their clients in meeting their obligations in terms of environmental responsibility. NSR were encouraged by client to gain their ISO 14001 certification, Green Office's Director is actively involved in environmental decisions and monitoring and AP and D perceive that they have played an active role "*cleaning up the drum industry*" which traditionally had a 'dirty' and non-compliance reputation, gaining the company a positive reputation.

Table 6.5 Commitment to environmental responsibility

	Large organisations (n=5)	**Environmentally certified SMEs (n=4)**	**Non-environmentally certified SMEs (n=11)**
Environmental certification	3	4	0
Environmental management system	5	4	0
Environmental policy	5	4	0
Environmental policy demonstrates commitment from organisations leadership?	5	4	0
Environmental policy communicated internally and/or externally	5	4	0
Designated environmental employee/representative	5	4	0

Evidence of procedures to identify environmental legal requirements for example, legislation register	5	4	1

Together with the absence of an environmental certification, the non-environmentally certified SMEs do not have environmental policies, environmental management systems or environmental strategies (Table 6.5) and ten of the eleven non-environmentally certified SMEs do not have systems in place to ensure compliance with environmental legislation. This is attributed to the SMEs lack of understanding and awareness of environmental responsibility (Table 6.4). Only Packaging World maintains a legislation register, a requirement of their BRC certification. None of the SMEs employ dedicated environmental personnel, though some have trained Health and Safety Representatives. There are no personnel with environmental qualifications or experience.

6.5 Commitment to improving environmental responsibility

The three environmentally certified large organisations (ABI, Mpact and Waste Plan) set annual environmental targets, record and monitor environmental metrics on a monthly basis, to assess progress against targets, and report on results at annual management review committee meetings (Table 6.6). Although not environmentally certified, EnviroServ and Afripak implement the same practices, which is a requirement of their group/corporate SHE polices. ABI are accountable to ABI corporate, SAB and Coca-Cola SHEQ requirements and are required to report on progress against targets at a corporate level, and for ISO 14001 re-certification. Similarly, Mpact and EnviroServ are required to pass internal audits that require reporting on progress against targets. As a supplier to ABI, Afripak are required to report to ABI on the same environmental requirements.

The four environmentally certified SMEs set environmental targets annually, record and monitor environmental metrics on a monthly basis, to assess progress against targets, and report on results at annual management review committee meetings (Table 6.6).

Ten of the eleven non-environmentally certified SMEs do not have a budget for environmentally responsible activities (Table 6.6). Only Packaging World were allocated a budget by the business for their waste management activities, a requirement of their BRC certification. None of the SMEs were planning to implement any other/new environmental responsibility activities other than those described in this research.

Table 6.6 Commitment to improving environmental responsibility

	Large organisations (n=5)	Environmentally certified SMEs (n=4)	Non-environmentally certified SMEs (n=11)
Success of environmental responsibility activities monitored	5	4	0
Environmental targets set	5	4	0
Success of environmental practices to monitored to ensure continual improvement	5	4	0

6.6 Impacts on environment

Larger organisations were accountable for environmental responsibility at a corporate/group level and have identified, quantified and monitor the environmental impacts of their business activities and the identified environmental impacts were specific to the activities of that organisation (Table 6.7). Four of the five larger organisations identified vehicle emissions as a significant environmental impact, the waste sector is reliant on a transport infrastructure for the collection of waste and recyclables. Electricity consumption was identified as a significant environmental impact by three of the five larger organisation, this is due to the operation of large industrial equipment.

Along with legal requirements, a list of the organisations most significant environmental aspects form the basis upon which the ISO 14001 environmental management system is based (Zackrisson *et al*, 2004). ISO 14001 specifies that the organisation must define its processes for evaluating the environmental aspects of its business and determining its most significant environmental impacts (Jackson, 1997). The standard defines an environmental aspect as an "element of an organisation's activities or products services that can interact with the environment" (SABS 2004;2) An environmental impact is defined as "any change to the environment, whether adverse or beneficial, wholly or partially resulting from and organisations aspects" (SABS, 2004;2). All four of the ISO 14001 certified SMEs had identified impacts on the environment that were specific to activities of each organisations (Table 6.7). Two of the SMEs, both in the business of hazardous waste, report that electricity consumption and volumes of hazardous waste to landfill as their significant environmental impacts.

Table 6.7 Environmental impacts identified large organisations and environmentally certified SMEs

Organisation	Significant environmental impact
Large organisations	
ABI	• Water consumption • Electricity consumption
Afripak	• Air emissions • Electricity consumption
EnviroServ	• Vehicle emissions • Potential hazardous materials spills • Litter
Waste Plan	• Vehicle emissions • Electricity consumption • Handling of hazardous waste • Business travel, particularly air travel
Mpact Recycling	• Vehicle emissions • Potential diesel/oil spills

Organisation	Significant environmental impact
Environmentally certified SMEs	
Anchor Pail and Drum	• Air emissions • Effluent emissions • Transporting of hazardous waste • Noise nuisance • Dust nuisance
Green Office	• Hazardous waste to landfill • Electricity consumption
Natal Solvent Recovery	• Hazardous waste to landfill • Electricity consumption
RE-	• Vehicle emissions • Handling and processing hazardous waste Potential fire risk

Three of the eleven non-environmentally certified SMEs have formally identified the impacts of their business operation on the environment. The remaining eight only considered and/or identified their environmental impacts during the interview of this research. The questionnaire investigated 16 environmental responsibility activities and as the SMEs discussed their activities, the impacts became more apparent. Impact on the environment included:

- Vehicles emissions (four of the SMEs). The waste sector is reliant on a transport infrastructure for the collection of waste and recyclables from industry and residential areas.
- Electricity consumption (four of the SMEs): The waste sector, predominantly recyclers, utilise heavy machinery for the processing of waste. Waste is either compacted, bailed or shredded (waste traders) or recycled, all processes require large industrial machinery.

6.7 Environmental responsibility activities

All of the large, all of the environmentally certified SMEs and seven of the nine non-environmentally certified SMEs participated in environmentally responsible activities (Table 6.9 Table 6.8).

All five of the larger organisations participate in staff training on environmental responsibility and waste management and recycling, which is outsourced to waste management companies. Four of the five organisations educate staff regarding, and monitor electricity and water usage, practice the safe storage of hazardous materials to prevent spills, and report on environmental performance internally and externally (Table 6.8). Three of the five large organisations procure the services of environmentally legally compliant subcontractors and conduct regular health, safety and environmental audits on their subcontractors, monitor and report on their carbon footprint, and have implemented strategies to minimise the use of raw materials and reduce the use of harmful chemicals. Two have take-back systems for product specific post-consumer waste, have air emissions license and monitor vehicle emissions, whilst one of the five has invested in a green innovation, the use of biodiesel in their vehicle fleet.

Four of the five environmentally certified SMEs participated in a waste management and recycling which is their core business, train staff on environmental responsibility, report on their environmental performance to the authorities/certification bodies, continually identify and implement new projects that will improve their environmental performance, and record and monitor their electricity consumption (Table 6.8). Three of the four SMEs have formal procedures to prevent accidental effluent releases, have implemented measures to reduce water consumption, utilise vehicle fleet GPS tracking systems for the purpose of route planning to optimise fuel efficiency, and conduct vehicle diesel and stack emissions testing to ensure compliance local authorities requirements. Two of the four SMEs calculate and report internally on their carbon footprint and have invested in 'green innovations' to improve their environmental performance. One SME has a take-back system for their products and has implemented strategies to reduce office paper consumption. Another only procures the services of environmentally legally compliant subcontractors. None of the environmentally certified SMEs have considered 'green design/building' elements, as the buildings are rented.

Eight of the eleven non-environmentally certified SMEs recycled operational and office waste. Five of the eleven identified that the cost of electricity threatened the long term sustainability of their business and all were investigating alternative power sources (Table 6.8). Four identified that the cost of diesel is a risk to the business and have implemented daily route planning and GPS tracking of vehicles to minimise fuel consumption and save on the cost of diesel. In terms of minimising the use of natural resources, two of the recyclers were investigating alternatives to reduce their raw material input and two others were re-using packaging where possible. Three trained staff in environmental responsibility and three of the recyclers were investing in new, innovative technologies to increase the profitability and financial sustainability of their business. Two of the eleven have formal procedures to prevent accidental effluent releases and have implemented recycling solutions to reduce the use of harmful chemicals. None of the eleven non-environmentally certified SMEs monitor electricity and fuel consumption, nor were they participating in environmental reporting activities or planning to implement any other/new environmental responsibility activities.

Table 6.8 Environmentally responsible activities

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		**Environmentally certified SMEs**		**Non-environmentally certified SMEs**	
Waste management (re-use, recycling, landfill)	5	All of the larger organisations participate in waste management and recycling activities. This function is outsourced to waste management companies for example, EnviroServ.	4	Environmentally certified SMEs contend that waste management/recycling is their core business. All recycle office and operation waste and outsource hazardous waste management for disposal in eThekwini's low hazardous rated landfills.	8	Many of the non-environmentally certified SMEs recycle their office and production waste.
Extended producer responsibility (take back system)	2	Mpact identify that they offer and EPR service to the Mpact and Mondi Groups. The Mpact Group are the manufactures of paper and plastic, Mpact Recycling collect post-consumer paper and plastic waste for recycling. ABI have take-back schemes for beverage packaging; glass and PET bottles and beverage cans. Waste Plan offer a free environmental educational service to their customers.	1	Green Office offers a take back service for their product. All remanufactured printer cartridges are sold with a return label, for courier back to Green Office, at Green Office's expense. Returned product is remanufactured or recycled. APandD and NSR consider that their business offer an EPR service to industry as they as they collect dirty solvent/drums form the customer, clean it and supply it back to them.	0	None of the non-environmentally certified SMEs have 'take back' systems for their product. Three of the SMEs identified that their business offering is an EPR service for industry i.e. collecting waste for recycling
Pollution control/effluent emissions	4	Larger organisations practice the safe storage of hazardous materials to prevent spills, Waste Plan and Mpact use 'green' cleaning products. ABI	3	APandD require a permit to release trade effluent. NSR conduct hazardous chemical substance risk assessments. Green Office have developed	2 Not applicable to 5 of the SMEs	The larger SME traders store oil and fuel on their premises for the purpose of fuelling machinery. Correct storage will prevent accidental spills. If

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
		discharge trade effluent into the municipal sewer system as regulated by the eThekwini Municipality in terms of Sewage Disposal By-laws.		standard operating procedures to prevent accident toner waste spills.		measures are not taken, large SME traders can also be responsible for litter in the vicinity of their premises.
Reducing water consumption	4	Water consumption reduction is achieved largely through staff education and continual monitoring of water usage. Afripak are investigating water saving opportunities with a reasonable return on investment.	3	Two of the SMEs report that water consumption is domestic and have taken measure to reduce water consumption; the fitting of flow restrictors to taps, monitoring of water consumption and plumbing maintenance schedules. APandD report that water is used in the washing of 1 000 litre flobins and is substantial. APandD were investigating rain water harvesting as an alternative water supply for washing flobins.	2 Not applicable to one SME; CHM Enterprises as they do not operate from a premises	Water use is largely domestic and not a high environmental impact for the waste sector. Recycling equipment is fitted with water reticulation and cleaning systems, thereby extending the use of the water in the recycling process reducing water consumption.
Energy management (reducing electricity consumption, use of renewable energy)	4	Electricity consumption reduction is achieved largely through staff education and continual monitoring of electricity usage. Afripak are investigating alternative energy sources and Mpact have installed energy efficient lighting.	4	All four SMEs record monthly electricity consumption for monitoring purposes. At the time of interview, both RE- and Green Office had outsourced energy audits to independent consultants to identify high energy use areas and inform electricity consumption reduction	5 Not applicable to one SME; CHM Enterprises as they do not operate from a premises	Electricity consumption as found to be a significant impact for recyclers and the manufacturer (Packaging World). This is attributed to the use of industrial machinery and operation that operate 24 hours a day, seven days a week. Five of the six recyclers/manufacturers

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		**Environmentally certified SMEs**		**Non-environmentally certified SMEs**	
				strategies. Electricity consumption is a significant cost and impact for both NSR and APandD. NSR are investigating an innovative, alternative energy source, using their waste product as a fuel and APandD use coal and diesel to fuel electricity intensive equipment.		identified that the cost of electricity threatened the long term sustainability of their business and all were investigating alternative power sources.
Carbon emissions management	3	Larger organisations calculate, monitor and report on their carbon footprint.	2	Two of the SMEs calculate their carbon footprint on a monthly basis and present the data at management review committee meetings.	0	Electricity and fuel consumption were identified as significant impacts for the SMEs, yet the carbon emissions management had not been considered by any of the SMEs.
Transport, travel and fuel consumption	2	Waste Plan penalise drivers for wasteful driving behaviour and ABI ensure maintenance of vehicles and monitoring of vehicle emission.	3	SMEs utilise vehicle fleet GPS tracking systems for the purpose of route planning and monitoring driver behaviour, in an order to optimise fuel efficiency.	4 Transport, travel and fuel consumption was applicable to nine of the SMEs. In the case of transport, travel and fuel consumption not being applicable, this service	Two traders and two recyclers identified that the cost of diesel is a risk to the business. Daily route planning and GPS tracking of vehicles were implemented to minimise fuel consumption and save on the cost of diesel.

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
					was outsourced	
Minimising the use of raw materials and conservation of natural resources	3	Waste Plan conserve natural resources through staff education to re-use where possible. Afripak have implemented strategies to reduce the use of raw materials and the amount of waste during production. ABI have invested in the light weighting of their packaging (PET bottles, labels and crates).	1 One SME, RE- perceived that minimising the use of raw materials and conservation of natural resources was not applicable	Green Office had implemented internal paper saving initiatives such as duplex printing. No other minimising use of raw materials or conserving natural resources projects have been implemented amongst the SMEs.	4 Not applicable to one SME; CHM Enterprises as they do not operate from a premises	None of the traders were participating in the minimisation of the use of raw materials and conservation of natural resources. Two of the recyclers were investigating alternatives to reduce their raw material input. Others were re-using packaging where possible for example, pallets and plastic bags.
Air emission management	2	ABI require an air emissions licence which is subject to regular testing by the local authorities and annual renewal. Afripak are assisting local authorities with air emissions benchmarking for the printing industry.	3	NSR and RE- conduct vehicle diesel emissions testing to ensure compliance with municipal vehicle emission limits, NSR also monitor stack emissions. APandD require an air emissions licence for their boiler and incinerator.	1 Air emission management was perceived to be not applicable to one of the non-certified SMEs; MFI Moulders	One SME, Packaging World, identified that air emissions was applicable to their business and had fitted an air filter and extraction systems reduce air emissions within the premises.
Environmental reporting	4	ABI's environmental performance is monitored from both a plant as well as corporate	4	The SMEs each identify differing activities that they perceive as environmental	0	None of the SMEs were participating environmental reporting activities.

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		**Environmentally certified SMEs**		**Non-environmentally certified SMEs**	
		level (accountability to ABI, SAB and Coca-Cola). As a supplier to ABI, Afripak report on environmental performance monthly to ABI, as per ABI's requirements. Similarity, Mpact and EnviroServ are required to report on environmental performance at a group level. EnviroServ voluntarily produce an annual sustainability report for distribution to stakeholders. EnviroServ and Waste Plan provide clients with monthly reports quantifying the volumes and types of recyclables recycled.		reporting activities; NSR are audited for environmental compliance by larger customer and an annual audit for ISO 14001 re-certification. RE- report on report annual to DEA on waste volumes, a requirement under section 20 of the Environment Conservation Act (Act 73 of 1989). RE- and Green Office provide clients with reports detailing the volumes of waste recycled, assisting them monitor and improve their environmental performance. APandD are subject to frequent testing by, and reporting to, the local authorities for their effluent and air emissions.		
Staff engagement	5	Larger organisations train staff on environmental responsibility during regular training and raise awareness through internal awareness campaigns.	4	The SMEs train staff on environmental responsibility during induction training and regular toolbox talks. Green Office promote environmental responsibility amongst staff using competitions with small incentives.	3	Packaging World have trained their staff in waste management and two of the recyclers cover some environmental aspects during toolbox talks. It is noted that the toolbox talks are intended for health and safety purposes.

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		**Environmentally certified SMEs**		**Non-environmentally certified SMEs**	
'Green' procurement / supply chain	3	EnviroServ and ABI procure the services of environmentally legally compliant subcontractors and conduct regular health, safety and environmental audits on their subcontractors. Afripak's ISO 22000 certification requires auditing of suppliers for general legal compliance.	1	RE- only procure the services of environmentally legally compliant subcontractors and conduct regular health, safety and environmental audits on their subcontractors.	1	Packaging World's BRC certification requires that suppliers are audited for legislative compliance.
'Green design' / building	0		0		0 Not applicable to one SME; CHM Enterprises as they do not operate from a premises	None of the SMEs had considered the impact of their building/premises on the environment.
Reduction in use of harmful chemicals / hazardous materials	3	Waste Plan and Mpact use environmentally preferable cleaning products for cleaning. Larger clients specify the solvent that Afripak are permitted to use in the production of food and beverage packaging.	1	Green Office has phased out the use of ammonia based cleaners for office cleaning and use a 'green' alternative.	2 Six of the SMEs perceived that reduction in use of harmful chemicals / hazardous materials was not applicable to their business	Packaging World sent their solvents for recycling and re-used for cleaning purposes. Neowood procured inks with a minimised hazardous component.

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
					operations	
Investment in 'green' technology / innovations	1	Waste Plan have implemented the use of biodiesel in their vehicle fleet, developed an online platform for environmental metrics monitoring and installed a waterless car wash for cleaning their vehicle fleet.	2	NSR are investigating alternative technologies to reduce electricity consumption. Green Office consider the initiation of the Green Able, a non-profit company, to be a green innovation	3 Six of the SMEs, perceived that the reduction in use of harmful chemicals / hazardous materials was not applicable to their business.	Three of the SME recyclers were investing in new, innovative technologies to increase the profitability and financial sustainability of their business. IRP were constructing a wash bay to increase their plastic yield and had purchased a new technology that recycles plastic into a 'wood equivalent' product. E-Mode are investigating the viability of incinerating the sludge waste to power cement kilms to reduce their hazardous waste to landfill (and associated costs). Cyclocor were investigating a carbon credit model to increase the profitability of their business.
Other	3	Afripak are the founders and custodians of South Africa's only industrial conservancy. ABI are always developing new projects as continual improvement of environmental performance is a requirement at a corporate level. Mpact's are continually developing mechanisms for increased post-consumer waste collections as this would have	4	As per the requirement of their ISO 14001 EMS, the SMEs seek to continually improve their environmental performance and new projects are being identified.	0	None of the SMEs were planning to implement any other/new environmental responsibility activities.

Environmentally responsible activity	Positive response (n=5)	Explanation	Positive response (n=4)	Explanation	Positive response (n=11)	Explanation
	Large organisations		**Environmentally certified SMEs**		**Non-environmentally certified SMEs**	
		the most significant positive environmental impact.				

Waste management and recycling is the most commonly practiced environmentally responsible activity by all of the organisations (17 of the 20 organisations that participated in this research); the larger and environmentally certified SMEs have implemented waste management programmes and the non-environmentally certified SMEs recycled their office and production waste. Many of the organisations (13 of 20) have implemented measures to reduce their electricity consumption; the larger and environmentally certified SMEs continually monitor electricity consumption and some are investigating alternative power sources. Two of the four environmentally certified SMEs and five of the nine non-environmentally certified SMEs identified electricity consumption as a significant impact on, and threat to, the long term sustainability of their businesses. Training staff on environmental responsibility is a commonly practiced (12 of 20) environmentally responsible activity by all of the organisations and the organisations (9 of 20) were concerned with fuel efficiency and practiced route planning and GPS tracking of vehicles to minimise fuel consumption.

Table 6.9 Number of environmentally responsible activities tested in this study

	Company	**Number of relevant environmentally responsible activities investigated**	**Number of environmentally responsible activities participated in by organisation**
Large organisations	ABI	16	15
	Afripak	16	13
	EnviroServ	13	5
	Waste Plan	14	12
	Mpact Recycling	15	11
	Average	**14.8**	**11.2 (75.7%)**
Environmentally certified SMEs	Anchor Pail and Drum	16	10
	Green Office	14	13
	Natal Solvent Recovery	16	9
	RE-	15	10
	Average	**15.3**	**10.5 (68.9%)**
Non-environmentally certified SMEs	Babs Waste	15	0
	Central Waste	15	3
	CMH Enterprises	9	0
	Cyclocor	14	5
	E-Mode	15	7
	Group Wreck	16	0
	Industrial Plastic Recyclers	15	4
	MFI Moulders	14	5
	Neowood	16	4
	Packaging World	16	8

	Company	Number of relevant environmentally responsible activities investigated	Number of environmentally responsible activities participated in by organisation
	Premier Waste	15	3
	Average	**14.5**	**3.5 (24.4%)**

A total of 16 environmental responsible activities were tested in this research; waste management, extended producer responsibility, pollution control/effluent emissions, reducing water consumption, energy management, carbon emissions management, transport, travel and fuel consumption, minimising the use of raw materials and conservation of natural resources, air emission management, environmental reporting, staff engagement, 'green' procurement/supply chain, 'green design'/building, reduction in use of harmful chemicals/hazardous materials, investment in 'green' technology/innovations and other. Where the organisation indicated an environmentally responsible activity under one of the headings, it was counted as a positive response and allocated a single point and where an environmentally responsible activity was non-applicable that activity was excluded from the score (Table 6.9). The points were totalled for each organisation to quantify their participation in environmentally responsible activities.

The non-environmentally certified SMEs engagement in the environmentally responsible activities was relatively low (24.4.%), whilst the environmentally certified SMEs participated in 68.9% of the environmentally responsible activities and the larger organisations participated in 75.7% of the environmentally responsible activities tested in this study.

6.8 Stakeholder engagement

Stakeholders are entities or individuals that can reasonably be expected to be significantly affected by the organisation's activities, products and/or services, and whose actions can reasonably be expected to affect the ability of the organisation to successfully implement its strategies and achieve its objectives (Terry, 2009). Stakeholders are sometimes called 'Interested and Affected Parties' (Perry-Davies, 2012). Current South African legislation requires that companies communicate with their stakeholders if they are to change or develop their activities (Perry-Davies, 2012).

All four environmentally certified SMEs describe engagement with stakeholders:

- ISO 14001:2004 certification is subject to annual review by the SMEs certification body. This is perceived as an independent assessment of the SMEs environmental performance.
- Three of the four SMEs have used the services of environmental lawyers.
- Two of the four SMEs have used the services of environmental consultants.
- Three of the four SMEs have contact with the local authorities and the Department of Environmental Affairs for the purpose of licensing for example, air emissions licence and waste licences.
- All four of the SMEs have been audited for environmental legislative compliance by larger clients.
- All four of the SMEs are active members of relevant industry bodies for example, Institute of Waste Management South Africa
- All four of the SMEs train staff in environmental responsibility, empowering them and their peers to make environmentally responsible decisions.

In addition to these activities, RE- sustain relationships with their sub-contractors, auditing and only utilizing the services of environmentally compliant sub-contractors. Green Office have a schools programme and play a role in educating scholars regarding environmental responsibility and founded a 'Sustainability Forum' for the purpose of interaction with stakeholders. AP and D have played an active and important role in improving the environmental performance and image of the drum industry, through a participatory role in developing regulations for the drum industry with local and national government and other relevant stakeholders.

Four of the eleven non-environmentally certified SMES were not familiar with the concept of stakeholders, three of the SMEs have had interaction with local authorities and six of the eleven SMEs are members of industry related bodies. Two of the recyclers, Cyclocor and Neowood have been assisted by the authorities with compliance issues (waste licence and effluent emissions) and one of the SMEs, Central Waste, has had contact with the local authorities with regards to residential recyclable collections.

6.9 SMEs: social responsibility

As this research attempts to assess environmental responsibility, initially, social responsibility was not considered in the questionnaire. It was found during the interview process that SMEs understood social responsibility to mean supporting non-profit organisations and SMEs

discussed these activities with little encouragement. In many instances, where the SMEs were unable to discuss their environmental responsibility, predominantly due to a lack of understanding of environmental responsibility and an inability to respond to the questionnaire, they referred to examples of their success with social responsibility. One SME (Neowood) asserted that social responsible activities were more beneficial to the reputation of business than environmental responsible activities, and had been an advantage to sales. As a point of interest, and due the SMEs willingness to disclose details regarding their social responsibility activities, the researcher included social responsibility in discussions with SMEs.

Three of the four environmentally certified SMEs participate in socially responsible activities (RE- did not respond). APandD and NSR support non-profit organisations on an *ad hoc* basis. Green Office assist non-profit organisation, schools and spinal cord injured persons raising funds through empty printer cartridge collections and have an active staff volunteer programme.

Two of the non-environmentally certified SMEs did not report on their social responsibility activities and one participated in social responsibility activities. Eight of the eleven non-environmentally certified SMEs participate in socially responsible activities. This is predominantly through the support of local non-profit organisations at their request or on an *ad hoc* basis. Some of the SMEs are long terms supporters of non-profit organisations.

6.10 SMEs: Opportunities of environmental responsibility

Two of the four environmentally certified SMEs identified opportunities from environmentally responsible practices, for example Green Office have diversified their business. As a result of aiming to divert their hazardous waste from landfill, Green Office founded Green Able, a separate legal entity registered as a non-profit company, the first and only facility in Africa to recycle printer cartridges and they initiated the 'Durban Business Sustainability Forum' which has the potential for growth. Both of these initiatives have resulted in visibility for Green Office, and reputational benefits that provide an advantage over competitors. AP and D suggested that in terms of extended user responsibility, there is an opportunity for the manufacturers of the drum and drum contents to pay a 'manufacturers fee' to assist with compliance cost of small business. AP and D argue that as they cleaning up the

manufacturers waste, the manufacturers should assist with the environmental compliance costs incurred by their business.

The non-environmentally certified SMEs demonstrate limited understanding of, and commitment to, environmental responsibility. It is therefore difficult to establish possible opportunities, limitations and benefits that the SMEs may experience from environmentally responsible practices. The SMEs do however, perceive that due to the service they offer, the collection and/or recycling of waste, or the manufacture of a product produced from recycled post-consumer waste, that they are environmentally responsible. Six of the eleven non-environmentally certified SMEs that participated in the research described the opportunities related to the nature of their businesses (Table 6.10); potential business growth and possible funding to assist SMEs from the manufacturing sector.

Table 6.10 Opportunities of environmental responsibility identified by non-environmentally certified SMEs

Opportunity of environmental responsibility identified the non-environmentally certified SMEs	Positive response (n=11)	Explanation
Opportunity for growth of the business	6	Non-environmentally certified SMEs perceive that there are opportunities for growth of their businesses. This is attributed to: • The continuous demand for recyclables from recyclers implies further growth opportunities. • Waste is ubiquitous and there is opportunity to expand the business into other areas, even neighbouring countries. • The SMEs identified that many businesses and a large proportion public do not separate their waste for recycling. The SMEs reason that improved education of the public and business would result in growth of their businesses. It is also noted by the SMEs that this would result in less litter and less waste going to landfill. • Two of the SMEs that manufacture a product from post-consumer waste (Cyclocor and Neowood) identify that as government, business and the public become more aware of environmental issue, there is potential for the businesses to grow. They further perceive that recycled plastic products have the potential to out compete products made from virgin materials.
Possible funding of SMEs in the waste sector by manufacturers	1	In terms of EPR, E-Mode suggested 'manufacturers fee' could assist with the development of small business that ultimately clean up the manufacturers waste

6.11 SMEs: Benefits of environmental responsibility

All four of the environmentally certified SMEs that participated in the study described the benefits of ISO 14001 certification and implementation of an environmental management system (Table 6.11). Benefits have been reputational, the SMEs being considered favourably by other businesses and clients due to the environmentally responsible practices, and the continued improvement of the SMEs environmental performance due to the implementation of ISO 14001 environmental management systems.

The non-environmentally certified SMEs demonstrate limited understanding of, and commitment to, environmental responsibility. It is therefore difficult to establish possible opportunities, limitations and benefits that the SMEs may experience from environmentally responsible practices. The SMEs do however perceive that due to the service they offer, the collection and/or recycling of waste, or the manufacture of a product produced from recycled post-consumer waste, that they are environmentally responsible. Five of the eleven non-environmentally certified SMEs that participated in the study described the benefits related to the nature of their businesses (Table 6.11). Benefits have been reputational and the SMEs being considered favourably by other businesses and the public due to the environmentally responsible service they offer.

Table 6.11 Benefits of environmental responsibility

Benefit of environmental responsibility	Positive response (n=4)	Explanation
Environmentally certified SMEs		
Reputational benefits	4	The SMEs report that environmental certification and environmentally responsible practices have resulted in a positive image for their businesses. The positive image has given the SMEs a competitive advantage and played a role in securing business with larger companies (that have the same values).
Continual improvement of environmental performance	3	Implementation of ISO 14001 environmental management systems has resulted in continued improvement of the SMEs environmental performance.
Staff benefits	2	Green Office report that that environmentally responsible practices have improved staff morale and played a role in attracting prospective employees. APandD that the ISO14001 environmental management system protects the health and welfare of their employees.
Environmental legal compliance	1	Implementation of ISO 14001 environmental management systems has resulted in certain environmental legal compliance for RE- and their sub-contractors.

Benefit of environmental responsibility	Positive response (n=11)	Explanation
Non-environmentally certified SMEs		
Reputational benefits	5	SMEs perceived that as their as they provide an environmentally responsible service / product, they are regarded as being environmentally responsible. This is considered favourably by other businesses and the public.
Reduction of waste to landfill	1	Packaging World noted that correct waste management reduced the amount of waste that their business sent to landfill.
Provide income for unemployed persons	1	Scrap metal is a relatively high value recyclable and unemployed persons can earn an income from scavenging for scrap metal. Many other recyclable types provide the same benefit, Group Wreck were the only SME to identify this advantage.
Increased profitability of the business	1	Neowood noted that a decay of the price of post-consumer plastic over time resulted in the business becoming more profitable.

Many of the SMEs (nine of 15) identified that environmentally responsible practices, whether through environmental certification or perceived environmentally responsible due to the nature of the business, had resulted in a positive image for their businesses gaining them a competitive advantage and favourable consideration by the public. The SMEs that have implemented environmentally responsible practices (four of 15) reported improvement of their environmental performance.

6.12 SMEs: Limitations of environmental responsibility

All four of the environmentally certified SMEs described the limitations of environmentally responsible practices (Table 6.12). Limitations have been in relation to the constantly changing South African waste legislation and associated difficulties with relevant authorities. The cost of environmental responsibility and limited budgetary resources have been described as restrictive factors.

All eleven of the non-environmentally certified SMEs described the limitations related to the nature of their businesses (Table 6.12); competition in the market resulting in the price of recyclables constantly fluctuating and the lack of awareness about environmental responsibility in the market.

Specific to environmental responsibility, the SMEs identify that they have limited knowledge regarding environmentally responsible practices, and limited resources (budgetary and personnel) which prevent the implementation of environmentally responsible practices. Two the SMEs exemplify this point; IRP and MFI describe the struggles of a small business and honestly remark that their primary goal is profit and environmental responsibility, though a concern for their businesses, it not a priority.

Table 6.12 Limitations of environmental responsibility

Limitation of environmental responsibility	Positive response (n=4)	Explanation
Environmentally certified SMEs		
Legal or regulatory barriers	3	The SMEs have difficulty with South African waste legislation and the responsible authorities. The legislation changes frequently and is difficult for the SMEs to interpret. The SMEs have encountered difficulties in getting assistance from DEA, experience apathy from the department and high staff turnover within DEA drawing out the licencing process.
Limited resources	2	The SMEs report that limited budgetary resources prevent further improvement in environmental performance.

Limitation of environmental responsibility	Positive response (n=11)	Explanation
Non-environmentally certified SMEs		
Legal or regulatory barriers	2	SMEs reported difficulties with legislation. Group Wreck is a family business that was having difficulties with BEE requirements. Cyclocor described waste legislation and "tedious and cumbersome" and had difficulties with environmental consultants.
Limited resources	4	SMEs noted that limited resources were preventing them from implementing environmentally responsible practices. Resources were identified as both financial (lack of budget) and personnel restraints. Personnel restraints were described as the business not being able to employ dedicated environmental personnel due to budgetary constraints, or current personnel were overburdened and cannot take on extra duties, or current personnel do not have environmental knowledge.

Lack of awareness about environmental responsibility in the market	1	Green Office report that the uneducated market is a barrier to sale of environmentally responsible products.
Cost of environmental responsibility	2	The SMEs report that the costs of environmental responsibility is a challenge for small business. The cost of ISO 14001 certification itself is substantial as are the lawyer and environmental consultant fees required to maintain environmental licences for example, air emissions and waste licences.
Staff environmental awareness	1	APandD report difficulty with staff environmental awareness despite regular training

Lack of awareness about environmental responsibility in the market	5	SMEs identified a general lack of awareness about environmental responsibility: • The public are not educated about recycling and do not separate and clean their waste for recycling • Large business, that claims to value environmental responsibility support non-complaint competitors that offer a reduced cost. • The uneducated market is a barrier to sale of environmentally responsible/recycled products. On the other hand, Neowood perceived that customers have been 'desensitised' to environmental responsibility resulting in a lack of interest in recycled products.
Limited knowledge	4	SMEs acknowledged that they have limited knowledge about environmental responsibility. Some remarked that they would like to improve their environmental performance but were not sure what to do.
Difficulty sourcing the volume of post-consumer recyclables	3	Recyclers stated that they have difficulty volumes of post-consumer recyclables that they require. This was applicable to post-consumer polystyrene, e-waste plastic and PP.
Competition in the market resulting in the price of recyclables constantly fluctuating	5	Recyclers and traders stated that there is competition in the market for post-consumer recyclables. This results in 'price wars' and the price of recyclables is constantly fluctuating.

	Fluctuating cost of diesel	3	The collection of recyclables is reliant on a transport infrastructure. The fluctuating cost of diesel can negatively affect the profitability of a small business. One trader, CHM Enterprises, further noted that they have to travel long distances to source value recyclables.
	Seasonal volumes of recyclables	2	The volume of recyclables in the market is seasonal. During December for example, volumes of waste are markedly higher than during January and February.

The SMEs (six of 15) were limited by budgetary and human resources that prevented the implementation of, and further improvement of, their environmental responsibility. Many of the SMEs (five of 15) experienced difficulties with the South African waste legislation and the responsible authorities; the legislation changes frequently, are difficult for the SMEs to interpret, and the authorities are not efficient in their support to applicants. A lack of awareness about environmental responsibility amongst the public and business means that the public and business at large are not receptive to environmentally responsible products and are not separating waste materials for recycling, limiting the SMEs (six of 15) growth in the sector.

6.13 Outsourcing

Outsourcing of waste management services and recycling was evident in both the larger organisations and the SMEs. Each of the five larger organisations outsource their waste management activities:

- ABI outsource their waste management to EnviroServ.
- EnviroServ, a waste management company, trade waste and outsource recycling to recyclers and other waste traders, many of whom are SMEs.
- Afripak outsource their waste management to four SMEs.
- RE-, Afripak's primary waste management outsource, such as EnviroServ are waste traders and outsource recycling to recyclers and other waste trader's, many of whom are SMEs.
- Packaging World, a packaging manufacturer, outsource their waste management to Waste Plan.
- Waste Plan, as with EnviroServ and RE-, are waste traders and outsource recycling to recyclers and other waste trader's, many of whom are SMEs.
- Mpact Recycling, are traders of post-consumer paper and plastic. Mpact Recycling outsource their recyclable acquisition activities to SME waste traders, small business that were initiated by, and are owned by ex-staff of Mpact Recycling. Plastic Recycling is outsourced to a SME recycler.

Each of the larger organisations outsource waste management activities; the manufacturing organisations, ABI and Afripak outsourced their waste management to waste management companies, and the waste management companies, EnviroServ, Waste Plan and Mpact Recycling, in turn outsourced recycling and waste recovery to sub-contractors (Figure 6.1). The SME waste management company, RE-, outsourced recycling to SME sub-contractors and smaller waste traders.

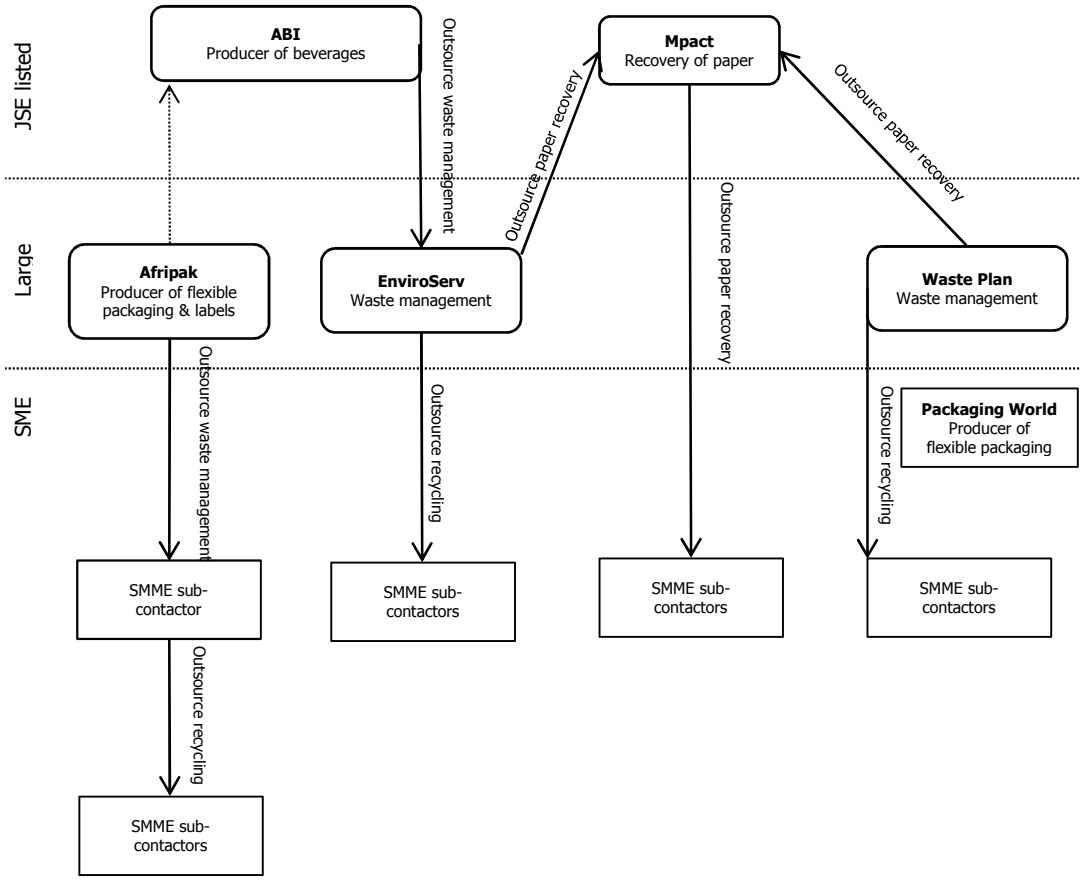

Figure 6.1 Outsourcing by participating organisations

Of the sample, five organisations were in the business of waste management and outsourced their recycling to sub-contractors. Seven of the SMEs are waste traders and collect and sell recyclables, which can be sold to a number of waste traders before final sale to a recycler (Figure 6.2).

Figure 6.2 Example of a typical waste material supply chain, especially evident with paper and scrap metal

In some cases, the SME recyclers and waste traders outsource their waste management and recycling. For example, Green Office outsource their waste management to EnviroServ and are a SME sub-contractor to EnviroServ. Packaging World, an SME, outsource their waste management to Waste Plan and NSR, an SME outsource their waste management to Inter Waste, a large waste management company that did not participate in this study.

6.13.1 Environmental responsibility

An environmental audit is an environmental compliance and management tool that aims to systematically, periodically and objectively examine and document an organisations environmental management activities and operations (Cohen, 2011). Environmental audits verify compliance with environmental regulations, environmental management practices and the effectiveness thereof (Cohen, 2011). Auditing of large waste contractors and SME sub-contractors for environmental compliance is reported between the large organisations and waste contractors:

- ABI procure the services of environmentally legally compliant waste contractors, including landfill. All waste contractors are audited annually for SHEQ legal compliance.
- Packaging World use sub-contractors that pass a specified risk assessment, though predominantly for food hygiene purposes, some environmental elements are audited. They have not audited Waste Plan, but plan too in the near future.
- Afripak audited RE- for environmental compliance prior to the acquisition of their services, and an annual audit thereafter. Afripak do not audit further downstream as

RE- is ISO 14001 certified which requires that RE- audit their downstream waste sub-contractors.

- RE- conduct bi-annual health, safety and environmental audits on their subcontractors and expect them to demonstrate improvement in their environmental performance.
- EnviroServ's sub-contractors are required to pass an audit conducted by their SHEQ department; the audit ensures environmental (as well as other) legal compliance. Sub-contractors are audited annually and are expected to demonstrate improvement in their environmental performance at each audit.
- Mpact do not audit their sub-contractors.
- Waste Plan do not audit their sub-contractors but are piloting a supplier/sub-contractor questionnaire for the purpose of assessing environmental responsibility.

The SMEs reported that larger organisations companies outside of the study, who procure their services, audit them for environmental compliance. NSR report having been audited by their large customers from the paint industry. Similarly, RE-, Central Waste, APandD and MFI report that they have been audited by some of their larger customers. Notable is the statement made by MFI's General Manager, commenting on the monthly environmental compliance audits conducted by Woolworths "*we don't have a choice, we have to comply because Woolworths is big*". All of the ISO 14001 certified SMEs are audited annually for ISO 14001 re-certification.

6.14 Summary

A total of 20 organisations participated in the study, of which five were larger organisations and 15 were SMEs. The larger organisations and the environmentally certified SMEs demonstrated an understating of, and commitment to, environmental responsibility. The non-environmentally certified SMEs associated environmental responsibility with the nature of their business, the recovery, refurbishment and recycling of waste and exhibited a low engagement in environmentally responsible business practices. The SMEs described the drivers, opportunities, benefits and limitations of environmental responsibility, and the broader waste sector.

There is a trend of outsourcing within the waste sector, and SMEs are an important component of the waste management, waste recovery and recycling value chain in the

waste sector. Larger organisations audit their waste contractors for compliance with environmental, health and safety regulations and management practices, and the effectiveness thereof.

CHAPTER SEVEN
DISCUSSION

With case study method, the goal is not to form a statistically representative sample but rather to find the most informative cases (Gagnon, 2010). The primary reason for studying a case is that is has specific or shared features of interest and when multiple cases are studied at the same time the researcher attempts to identify both the specific and shared features (Gagnon, 2010). In this chapter, a discussion based on the research aim and objectives is presented; the chapter attempts to draw together the three case studies (Figure 7.1), comparing them with respect to their environmental responsibility, outsourcing of waste management activities and the opportunities, benefits and limitations experienced by their SME sub-subcontracts. The experiences of the three case studies is placed in the context of relevant prior research and the experience of international findings. The findings of the study should be considered in relation to the research methods used, and due to the fact that only three case studies have been investigated and the sample is specific to the waste sector in the eThekwini Municipal area, the conclusions are valid for this sample of the research and caution should be applied when generalising the SME sector as a whole. The study does however, provide some clarity on why and how SMEs in the waste sector are incorporating environmental responsibility, and unexpected findings related to the waste sector as a whole are discussed.

The South African government is actively promoting SMEs, particularly in the waste sector where it is envisaged that the waste sector will contribute to the green economy through participation by SMEs in the waste management activities (DEA, 2011). Studies on CSR and environmental responsibility in SMEs in South Africa are lacking (Coleman, 1997; Viviers, 2009; Ladzani and Seeletse) and collectively, their significance in numbers means that SMEs play an important role in promoting sustainable development (OECD, 2007). Conversely, SMEs collectively have the potential to exert significant pressures on the environment including the use of finite resources and generation of pollution and waste (Lewis and Cassells, 2010; Hillary and Burr, 2011). This research therefore aims to explore the role that SMEs in the waste sector play in environmental and extended producer responsibility in waste management and recycling of larger business.

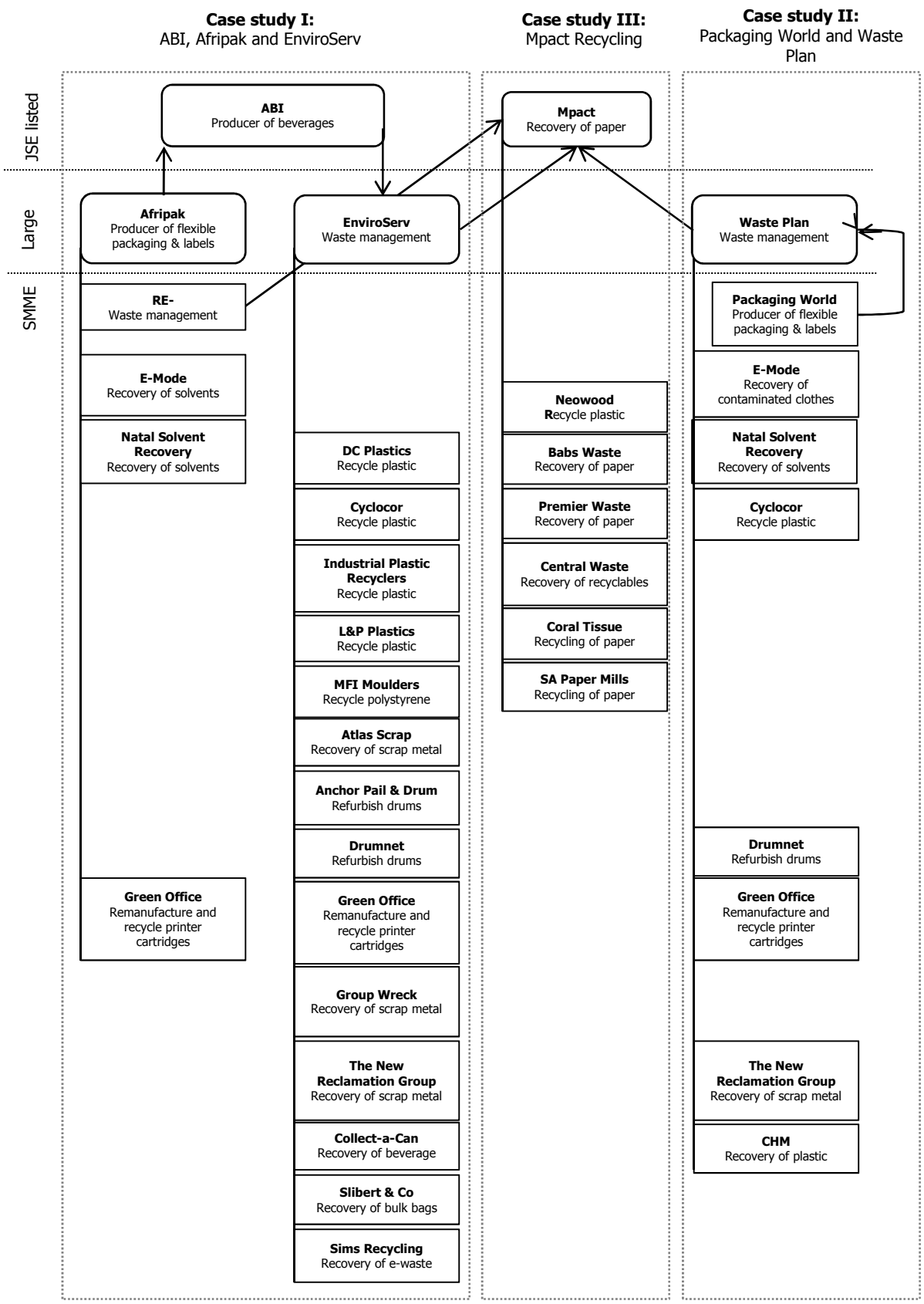

Figure 7.1 Case studies under discussion

The first case study, ABI, EnviroServ and Afripak (5.2 Case Study I: ABI, Afripak and EnviroServ) found that the larger organisations are governed by corporate environmental policies and standards that require monitoring and continual improvement of environmental performance. There are formal procedures, personnel and committees responsible for risk management and to oversee environmental legal compliance, which is grouped with Health, Safety and Quality. Outsourcing of waste management activities amongst organisations is evident, the manufacturing organisations (ABI and Afripak) outsource the waste management function to waste management companies (EnviroServ and RE-), who in turn outsource to sub-contractors, many of whom are SMEs. The waste management companies collect and trade waste, they do not recycle waste materials themselves, recycling and or further trade of the recyclable materials are outsourced to sub-contractors. The large manufacturing and waste management organisations audit their waste management sub-contractors for compliance with environmental regulations, environmental management practices and the effectiveness thereof. The SME sub-contractors, exhibit varying degrees of understanding of, and commitment to, environmental responsibility; the waste management companies and three of the four SMEs that recover hazardous waste are ISO 14001:2004 certified (a total of four SMEs in this supply chain are ISO 14001 certified), the remainder of the SME sub-contractors exhibit limited understanding of, and commitment to, environmental responsibility.

The second case study, Packaging World (5.3 Case Study II: Packaging World and Waste Plan) use the waste management services of Waste Plan who have an environmental certification; Heritage (Gold Status) and are in the process of developing an ISO 14001 environmental management system. Waste Plan partake in many environmental responsibility activities, however their environmental systems require formalisation and quantification. Environmental responsibility in the business is largely driven by the CEO who is active and respected in the waste sector. As with the previous case study (ABI, Afripak and EnviroServ), outsourcing of waste management activities amongst organisations is evident, the manufacturing organisation (Packaging World) outsource the waste management function to a waste management company (Waste Plan) who in turn outsource to sub-contractors, many of whom are SMEs. In this case, Waste Plan do not audit their waste management sub-contractors for compliance with environmental regulations, environmental management practices and the effectiveness thereof but are considering implementing such policy. The SMEs sub-contractors, exhibit limited understanding of, and

commitment to, environmental responsibility; as with the previous case, three of the four SMEs that recover hazardous waste are ISO 14001:2004 certified (the same SMEs described in the previous case), the remainder of the SME sub-contractors exhibit limited understanding of, and commitment to, environmental responsibility.

The last case study, Mpact Recycling (5.4 Case Study III: Mpact Recycling), is JSE listed and ISO 14001 certified and governed by a group Safety, Health and Environmental (SHE) philosophy. There are formal procedures and personnel responsible for risk management and to oversee environmental legal compliance, which is grouped with Health and Safety. Mpact outsource the recovery of paper to SMEs that were initiated and are supported by Mpact Recycling, and private waste management companies use the services of these SMEs. Recovered paper is typically traded, a number of times, from waste scavenger to a one-person businesses with small trucks to a SME before final sale to the recycler. Mpact do not audit their sub-contractors for compliance with environmental regulations and environmental management practices. The SMEs sub-contractors, exhibit limited understanding of, and commitment to, environmental responsibility.

6.15 Environmental responsibility in larger organisations

In all three cases the larger organisations maintain environmental standards and demonstrate improvement of their environmental performance. The JSE listed organisations have formal procedures, personnel and committees responsible for risk management and to oversee environmental legal compliance, which is grouped with Health, Safety and Quality. The same trend is evident with EnviroServ. Afripak and Waste Plan employ an appointed Risk Manager and an Environmental Scientist respectively, responsible for environmental compliance. The JSE listed companies, ABI and Mpact, are governed by group/corporate environmental policies and standards that require monitoring and continual improvement of environmental performance. The same trend is evident with EnviroServ, who were previously, but are no longer JSE listed and voluntarily report on corporate responsibility.

The JSE Social Responsibility Index is one of three prominent drivers for CSR in South Africa (Bezuidenhout *et al*, 2007; Viviers and Venter, 2007; Hamann, 2009) and all companies listed on the All Share Index (approximately 160) are eligible to participate and the SRI assessment process (Hanks, 2007; IRC 2011). According to the KPMG 2011 International Survey of Corporate Responsibility Reporting (KPMG, 2011) 97% of South Africa's Top 100

companies report on corporate responsibility activities and attribute this to the King Corporate Governance Commission and the resulting Corporate Governance code that came into force in 2010. The same study (KPMG, 2011) found that companies not yet reporting on their corporate responsibility activities are under significant pressure to start. This suggests that the JSE listed organisations that participated in this research, are not required to report on corporate responsibility, may be under pressure to do so and may explain their adoption of CSER. In the case of Mpact and EnviroServ, both companies operate in industries which are subject to stringent environmental regulation; the pulp and paper industry and the ownership and management of hazardous landfills, placing further legislative pressure on these two organisations.

Afripak and Waste Plan partake in environmental responsibility voluntarily and Waste Plan has a voluntary environmental certification, Heritage (Gold Status). In both cases, partaking in environmental responsibility was the result of supply chain pressure to differing degrees; Afripak are under pressure from ABI, their largest customer to monitor and improve environmental performance, and report to ABI thereon, and Waste Plan adopted the Heritage certification as a result of pressure from their largest customer base at the time, the tourism sector.

In the case of Waste Plan, environmental responsibility in the business is largely driven by the CEO who is active and respected in the waste sector. Studies have found that values and attitudes of owner-managers are highly influential factors in determining whether SMEs embrace environmental good practice. SME owner-managers who have strong altruistic feelings towards the environment and environmental issues are seen as important (Rutherford *et al*, 2000; Schaper, 2002; Perez-Sanchez *et al*, 2003; McKeiver and Gadenne, 2005; Revell *et al*, 2009; Battisti and Perry, 2011). Waste Plan are not a SME as defined by the National Small Business Amendment Act of 2003 (transport, storage and communications); although their annual turnover falls within the defined amount, they employ more than 200 staff. Being a relatively small business it is possible that the findings of Rutherford *et al* (2000), Schaper (2002), Perez-Sanchez *et al* (2003), McKeiver and Gadenne (2005), Revell *et al* (2009), and Battisti and Perry (2011) apply and owner-manager having strong altruistic feelings toward environmental issues is determining environmental responsibility in the business.

The findings of this research suggest that larger organisations are participating in environmental responsibility as a result of legislative (SRI and environmental regulations) and supply chain pressure, and owner/managers altruistic feelings towards the environment in the case of the smaller organisation. A recent study that investigated barriers to good waste management practices in South Africa (Godfrey *et al*, 2013) is in agreement with this finding having found that waste organisations are more concerned with, and under pressure to, ensure legal compliance of waste operations. Godfrey *et al* (2013; 302) suggests that this "compliance discourse within the waste sector creates a strong organisational culture towards implementing good waste management practice, which is evident in the normative beliefs in this sector".

6.16 Environmental responsibility in the supply chain

This research found that there is a trend of outsourcing waste management and recycling activities amongst the organisations, both large organisations and SMEs. Manufacturing organisations (ABI, Afripak and Packaging World) outsource their waste management to waste management companies (RE-, EnviroServ and Waste Plan), who in turn outsource to sub-contractors. The waste management companies collect and trade waste, they do not recycle waste materials themselves, all recycling, and/or further trade of the recyclable materials are outsourced to sub-contractors. The sub-contractors may or may not be SMEs, this research found that plastic and hazardous waste recycling is undertaken by SMEs, scrap metal is exported and paper is recycled by a large paper manufacturer. Paper and scrap metal are recovered and typically traded, a number of times, from waste scavenger to a one-person businesses with small trucks to a SME before final sale to the recycler. It is evident that SMEs are an important component of the waste management, waste recovery and recycling value chain in the waste sector. This is not unexpected for two reasons; first, the recovery of post-consumer recyclables in South Africa is predominantly supported by a large informal recycling sector which is dependent upon the income stream associated with informal collection (Oelofse and Strydom, 2010), and second, SMEs are often sub-contractors, suppliers of products or services to larger organisations (Talbolt *et al,* 2007; Rahman, 2012). Reliance on the participation of numerous SMEs can help improve or harm environmental performance within the supply chain (Talbolt *et al*, 2007; Hoskin, 2011). Waste, in particular is a strategic issue in the supply chain for a variety of reasons (Hicks *et al,* 2004; Rahman, 2012); first larger companies want to reduce costs by minimising waste within their supply chains, second, legislation and regulation (both national and

international) governing waste management is increasing, and third, customers and consumers are becoming more concerned with the impact of products and services on the environment. In a South African context, legislation governing end-of-life products is becoming more stringent, imposing the waste hierarchy of waste management and extended producer responsibility (product take-back). Industry is expected to play its role in responsible waste management and take responsibility for the waste generated throughout the life cycle of a product, including waste service delivery and recycling (DEA, 2011).

The large manufacturing company (ABI) audit their waste sub-contractors for compliance with environmental, health and safety regulations and management practices, and the effectiveness thereof. Similarly, manufacturing companies, Packaging World and Afripak use sub-contractors that pass a specified risk assessment, though predominantly for food hygiene purposes, some environmental elements are audited, as are general regulatory requirements. Two of the waste management companies, EnviroServ and RE- audit their waste sub-contractors for compliance with environmental, health and safety regulations and management practices, and the effectiveness thereof, whereas Waste Plan and Mpact Recycling do not. Evidence of auditing is reported by the SME sub-contractors, for example IPR report to have been audited by EnviroServ who advised them, and offered assistance, on improving their performance. There is further evidence of supply chain pressure on SMEs from larger companies outside of the SMEs that participated in the research, for example, MFI report that they are audited by Woolworths, Clicks and Pick 'n Pay. Despite this evidence of supply chain pressure and auditing requirements, many of the SMEs (11 of 15 SMEs) were found to have a limited understanding of, and commitment to, environmental responsibility.

The manufacturing organisations, ABI, Afripak and Packaging World outsource to waste management companies, EnviroServ, RE- and Waste Plan, all of whom demonstrated commitment to environmental responsibility either through environmental certifications or group SHE polices and requirements. There is evidence that manufacturing organisations rely on the waste management companies to audit their downstream waste contractors for environmental compliance for example, Afripak who do not audit further downstream than RE- as they perceive that as RE- is ISO 14001 certified, RE- are required to audit their downstream waste contractors for environmental compliance. However, ISO 14001 is site-related, not requiring certified companies to take the responsibility for the environmental conditions among suppliers (Mueller *et al,* 2009; Arimura *et al,* 2011). This indicates that

some of the larger organisations are passing on the responsibility for environmental responsibility in the supply chain to waste companies on the assumption that the waste companies are accountable for environmental responsibility of their sub-contractors; however, the waste company's environmental certification does not require this. In the case of EnviroServ, of the seven SME sub-contractors that participated in the research, only two were environmentally certified, similarly, in the case of Waste Plan, of the six SME sub-contractors that participated in the research, only two were environmentally certified. This suggests that, even though EnviroServ audit their SME sub-contractors for environmental responsibility, there is a poor uptake of environmental responsibility downstream in the supply chain. Waste Plan does not audit their SME sub-contractors for environmental responsibility and uptake of environmental responsibility downstream in the supply chain is equally as poor. This suggests that supply chain pressure and the auditing requirements of larger organisations is not translating downstream in the supply chain as the uptake of environmental responsibility amongst SME sub-contractors is poor both in the presence and the absence of supply chain pressure. Mpact Recycling is a sub-contractor of the waste management companies for the purpose of paper waste recovery, they do not audit their SME sub-contractors and none of the sub-contractors that participated in this research were environmentally certified. Although ISO 14001 does not require certified companies to take the responsibility for the environmental conditions among suppliers (Mueller *et al,* 2009) there is evidence that ISO 14001 certified organisations are more likely to green their supply chain (Arimura *et al,* 2011). Evidence from this research suggests that this is not the case for the eThekwini waste sector.

An important driver for environmentally responsible practice in SMEs is the demand from larger firms for responsible practices in their SME suppliers (Jenkins, 2006; Murillo and Lozano, 2006; Vives 2006; Spence, 2007; Baden *et al,* 2008). Evidence from this research suggests that this is not the case for SMEs in the waste sector in eThekwini. Waste management companies are professing to audit SME sub-contractors for environmental compliance with environmental, health and safety regulations and management practices, yet there is little evidence of environmental responsibility in the SMEs in their supply chains. Extended producer responsibility assigns responsibility of a company for its products and as "an active response to this juridical obligation, companies need to assume environmental responsibility for their products and for their products' downstream in the supply chain" (Kovács, 2008; 1572). This implies that, even although the manufacturing organisations are outsourcing and auditing waste management companies for environmental practices, their

responsibility extends further downstream to the SMEs that ultimately process their waste. Large enterprises wishing to improve their environmental performance cannot ignore their exposure to poorly performing suppliers and environmental improvement in business requires initiatives across the entire supply chain (Hoskins, 2011). SMEs are vital in this effort given their sheer number and participation throughout the supply chain for most products and services (Hoskins, 2011). As discussed earlier, previous studies have found that there is a strong organisational culture towards implementing good waste management practice in the South African waste sector (Godfrey, 2012a and b). Although this is evident in the waste manage companies (Mpact, EnvrioServ and Waste Plan), it does not appear to be translating down the supply chain to the SME sub-contractors.

6.17 Environmental responsibility in the larger organisations and the environmentally certified SMEs

The larger organisations and the environmentally certified SMEs exhibited an understanding of, and a commitment to, environmental responsibility. There are differing understandings of the term 'environmental responsibility' amongst the groups of organisations. The literature review of this research found that compliance with environmental legislation is the baseline of corporate environmental responsibility (Visser *et al,* 2007) and practices that benefit environment and/or mitigate adverse impacts of the organisation on the environment (Gunnigham, 2009) are key elements of corporate environmental responsibility. The larger and environmentally certified SMEs perceived their role in protecting and minimising their impacts on the environment, however only one of the larger organisations acknowledged the importance of compliance with environmental legislation. In contrast to their lack of recognition of the importance of compliance with environmental legislation in their understanding of the term 'environmental responsibility', all the larger and the environmentally certified SMEs employ designated environmental staff and have procedures in place to identify environmental legal requirements.

In terms of mitigating their impact on the environment, all of the larger organisations and the environmentally certified SMEs have identified, quantified and monitor their impacts on the environment, have implemented mitigation measures and have formal reporting procedures. They demonstrate commitment to improving their environmental performance through the setting of environmental targets, assessing progress against targets and the on-going implementation of new mitigation measures. This is demonstrated by their

engagement in the environmentally responsible activities considered in this research being relatively high; approximately 75.7% amongst the larger organisations and approximately 68.9% amongst the environmentally certified SMEs.

All of the larger organisations and the environmentally certified SMEs participate in waste management and recycling activities, where this function is not the core activity of the business, is outsourced. Similarity, the larger organisations and the environmentally certified SMEs participate in training their staff in environmental responsibility. All, with the exception of one of the larger organisations, practice electricity monitoring, or are planning to implement electricity consumption reduction strategies and technologies. In terms of environmental reporting, all of the organisations report on their environmental performance internally, environmentally certified organisations report on their environmental performance externally during ISO 14001 re-certification audits, the waste organisations report on waste volumes collected to customers and JSE listed organisation report to stakeholders. Most of the organisations (four of the five larger and three of the four environmentally certified SMEs) have implemented pollution control and controlled effluent emission procedures, either through compliance with regulations and required permits such as air emission and trade effluent licences and/or through the development of standard operating procedures and the controlled storage of hazardous materials. Water monitoring and reduction strategies are common amongst the organisations as is a commitment to the continual identification of new mitigation strategies. Fewer of the organisations participate in carbon emissions management, fuel consumption minimisation, air emission management, minimising the use of raw materials, and the reduction in the use of harmful chemicals. The only activity that they did not participate in were activities relating to 'green building', this was largely attributed to premises being rented and not owned.

The environmentally certified SMEs exhibited a degree of stakeholder engagement, all having procured the services of environmental consultants and lawyers, being active members of relevant industry bodies, had relations with local authorities and ISO 14001 certification bodies. Some have taken a leadership role in their industries, such as AP and D who have played an active and important role in improving the environmental performance and image of the drum industry and Green Office who initiated a 'Sustainability Forum' for the purpose of interaction with stakeholders.

All environmentally certified participate in the required activities and meet the requirements of the ISO 14001 standard. ISO 14001 describes the basic elements of an effective environmental management system (EMS). Elements of an EMS include creating an environmental policy, complying with applicable legal requirements, setting objectives and targets, implementing a programme to achieve those objectives, monitoring and measuring it effectiveness, correcting problems, and reviewing the system to improve it and overall environmental performance (SAB, 2004; Prakash and Potoski, 2009).

The environmentally certified SMEs described the drivers, opportunities, benefits and limitations specifically related to ISO 14001 certification and implementation of an environmental management system. RE- and Green Office perceived that as they are a waste management companies and that environmental responsibility is their core business they must demonstrate environmental responsibility. In a similar light, AP and D reported taking a leadership role in environmental responsibility in their industry. Godfrey *et al*, (2013) found that there is a strong organisational culture towards implementing good waste management practice in the South African waste sector due to waste organisations being under pressure to ensure legal compliance of waste operations This appears to be the case with the environmentally certified SMEs in this research; one is a private waste management company and the other three recover hazardous waste, implying that they are subject to more stringent legal requirements than their non-environmentally certified counterparts. This is in agreement with prior studies that found that legislation is one of the primary drivers of environmental management amongst SMEs (Hillary, 2004; Worthington and Patton, 2005; Williamson *et al*, 2006; Zorpas, 2010) and in a South African context where the main driver for EMS uptake amongst SMEs in the automotive sector is improving and achieving consistent compliance (Kehbila *et al*, 2009). In one case, NSR were encouraged by customers to pursue ISO14001 certification. An important driver for SMEs is the demand from larger firms for responsible practices in their SME suppliers (Biondi *et al*, 2000; Vives 2006) and external pressure is being exerted on SMEs to make environmental improvements through the supply chain and can play a key role in influencing SMEs to be more active in terms of implementing environmental practices (Lewis and Cassells,2010). This has been shown in South African SMEs in the automotive sector where a driver for EMS uptake amongst SMEs was supply chain pressure (Kehbila *et al*, 2009).

The main difficulty faced by the ISO 14001 certified SMEs (two of the four SMEs) was limited financial resources; the cost of ISO 14001 certification and annual re-certification

itself is substantial as are the lawyer and environmental consultant fees required to comply with environmental regulations and the maintenance environmental licences for example, air emissions and waste licences. Studies (Pimenova and Van der Vors, 2004; Lewis and Cassells, 2010) have shown that SMEs are often characterised by constrained financial resources and this can be a major barrier impeding EMS implementation (Hillary, 2004), particularly the costs incurred obtaining third-party verification, costs relating to EMS implementation and costs relating to the necessary technical measures to ensure the improvement in environmental performance (Biondi *et al*, 2000). The same barrier has been found in the South African context where SMEs in the automotive sector noted cost constraints as the second most significant difficulty with ISO 14001certification (Kehbil *et al*, 2009).

The SMEs listed three major benefits of ISO 14001 certification. First, the SMEs (three of the four SMEs) found that the implementation of ISO 14001 environmental management systems had resulted in continued improvement of the SMEs environmental performance, particularly a reduction of waste to landfill. This supported by the findings of Hillary (2004), ISO (2005), OECD (2007), Cassells *et al* (2010) and Zorpas (2010); organisations that implement an environmental management system are aware of their environmental impacts and the environmental benefits, derived from improved environmental performance, include increased energy/material efficiencies and recycling, and reduced pollution. The same benefits were found in South African SMEs in the automotive sector where lower impacts on the environment was the second most commonly noted benefit of ISO 14001 certification (Kehbila *et al*, 2009). Second, the SMEs (two of the four SMEs) mentioned benefits relating to company culture, for example Green Office report that that environmentally responsible practices have improved staff morale and played a role in attracting prospective employees, and AP and D found that their EMS played a role in protecting the health and welfare of their employees. This finding is supported by studies that have shown that SMEs that implement EMSs have experienced human resources benefits such as enhanced skills and qualifications, increased employee motivation and morale and a better company image among employees (Hillary, 2004; Biondi *et al,* 2000; ISO, 2005; OECD, 2007; Zorpas, 2010) and a cleaner and safer working environment (McKeiver and Gadenne, 2005; Kehbila *et al*, 2009). Finally, one of the SMEs, RE- found that the implementation of an ISO 14001 EMS had resulted in improved environmental legal compliance for themselves and their sub-contractors. As is in the case with previous studies that have found that adoption of an EMS

by SMEs resulted in improved legal compliance (Hillary, 2004; McKeiver and Gadenne, 2005; ISO, 2005; Kehbila *et al*, 2009; Zorpas, 2010; Hillary and Burr, 2011).

Opportunities of ISO 14001 certification were identified as improving and expanding business practices (two of the four environmentally certified SMEs), for example Green Office have diversified their business. As a result of aiming to divert their hazardous waste from landfill, Green Office founded Green Able, a separate legal entity registered as a non-profit company, the first and only facility in Africa to recycle printer cartridges. Green Office initiated the 'Durban Business Sustainability Forum'. Both of these initiatives have resulted in visibility for Green Office, and reputational benefits that are an advantage over competitors. Biondi *et al* (2000) and OECD (2007) have shown that improvement of their 'environmental image' is an important perceived benefit of environmental responsibility in SMEs that can result in business opportunities for the SME

6.18 Environmental responsibility in non-environmentally certified SMEs

The majority of the SMEs (11 of the 15) do not have environmental certifications. There is a trend amongst the non-environmentally certified SMEs to associate the term 'environmental responsibility' with waste management activities and many of the non-environmentally certified SMEs (nine of 11 SMEs) perceived that as the nature of their business is the collection and/or recycling of waste, or the manufacture of a product produced from recycled post-consumer waste and that the collection and/or recycling of waste as environmentally preferable to landfilling waste or using virgin materials, that they are 'environmentally responsible'. Despite this, there is a lack of awareness of their impact on the environment amongst the non-environmentally certified SMEs and many (eight of 11 SMEs) only considered and/or identified their environmental impacts for the first time during the interview for this research and their engagement in the environmentally responsible activities tested in this research was relatively low (24.4.%), much lower their environmentally certified counterparts (the environmentally certified SMEs participated in 68.9% of the environmentally responsible activities tested in this study). Similarly, unlike the environmentally certified SMEs, the non-environmentally certified SMEs do not have environmental policies, nor procedures to identify environmental legal requirements, do not measure and monitor environmental performance, do not have a budget for environmentally responsible activities and do not plan to implement any environmental responsibility activities. Only the manufacturing SME had an international food hygiene certification that

required procedures to identify legal requirements, not specific to environmental legislation and one of the recycling SMEs were in the process of developing an ISO 14001:2004 environmental management system. This finding is in agreement with previous studies that have found that there is lack of engagement in, and poor uptake of, environmentally responsibility amongst SMEs (Darnell *et al*, 2009; Gadenne *et al*, 2009; Daddi *et al*, 2010; Cassells and Lewis, 2011; Battisti and Perry 2011), and the majority of SMEs are characterised by a lack of awareness of their environmental impacts, the management of their environmental impacts and relevant legislation (Hillary, 2000; EU, 2007; Lewis and Cassells, 2009; NatRegs, 2009; Daddi *et al*, 2010; Iraldo *et al*, 2010; Zorpas, 2010). South African studies, although few, have found a similar trend; environmental awareness levels amongst South African SMEs is low and there is a general problem of non-compliance with environmental legislation (Coleman, 1997; Blignaut and Demana, 2002) and this research suggests that the same is true for SMEs in the waste sector of eThekwini. This trend is further supported by Dzansi and Pretorius (2009a) who argue that survival and growth issues are paramount in the mind of the SME owner-manager and environmental issues are rather an issue for government and legislation; environmentalism is not a major concern for most small businesses and it is unlikely that they will concern themselves much with such activities.

Many of the non-environmentally certified SMEs (eight of 11 SMEs) participate in waste management and recycling activities, either as their core activity or in addition to core activity. Many of the SMEs (five of 11 SMEs) identified the cost of electricity as a significant threat to the long term sustainability of their businesses, this is attributed to the use of industrial machinery and operations that work 24 hours a day, seven days a week. This was largely a concern for SME recyclers and the manufacturing SME who were investigating alternative power sources. This finding is supported by Viviers (2009) study on the SMEs of the Nelson Mandela Bay region that found that environmentally responsible activities practiced amongst the SMEs were limited to conserving electricity, recycling paper and replacing hazardous materials with more eco-friendly alternatives. The cost of diesel was identified as a threat to the long term sustainability of their businesses (four of 11 SMEs), and measures such as daily route planning and GPS tracking of vehicles were implemented to minimise fuel consumption and save on the cost of diesel. Some of the recycling SMEs (four of the 11 SMEs) were sourcing alternative raw materials for input into their products, and the manufacturing SME was re-using packaging material were possible. Some of the recycling SMEs (four of the 11 SMEs) were investing in new, innovative technologies to

increase the profitability and financial sustainability of their business such as a wash bay to increase the volume of post-consumer recyclables and incinerating the sludge waste to power cement kilns to reduce their hazardous waste to landfill (and associated costs). To a lesser degree the SMEs participate in reducing water consumption, pollution control, reduction in use of harmful chemicals, and air emissions management. The SME do not participate in environmental responsible activities relating to 'green building', extended producer responsibility, carbon emissions management and environmental reporting.

Corresponding to the lack of environmental reporting, some of the non-environmentally certified SMES (four of 11 SMEs) were not familiar with the concept of stakeholders and interaction with stakeholders was predominantly through memberships (six of 11 SMEs) with relevant industry bodies. Some of the recycler SMEs (two of the 11 SMEs) had been assisted by DEA with compliance issues for example effluent emission licences.

Many of the environmentally responsible activities were motivated by cost savings and mitigating threats to the long term survival of the business, not environmental responsibility nor desire to comply with environmental legislation. This finding is supported by Viviers and Venter's (2007) study on the attitudes regarding the importance of CSR, who found that SME owner-managers in the Nelson Mandela Bay region placed the greatest importance on their economic responsibilities followed by philanthropic responsibilities.

There appears to be little, if any, pressure on these SMEs to practice environmental responsibility, not one of the SMEs reported pressure to comply with environmental legislation. Studies (Hillary, 1999, 2000 and 2004; OECD, 2007; Daddi *et al*, 2010; Heras and Arana, 2010; Lewis and Cassells, 2009) have demonstrated that SMEs compliance with environmental legislation is severely lacking as SMEs are often ignorant of the legislation that governs their activities or do not know enough about environmental legislation to ensure that they are compliant. In two cases the SMEs reported pressure from their customers (larger businesses that they supply); in one case, environmental certification was being pursued, in the other case, IPR, despite pressure from their largest customer they do not feel pressure to improve their environmental performance, but admitted that they were aware that this could change in the near future. Evidence from this research suggests that SMEs from the eThekwini waste sector are not responding to legislative or supply chain pressure to practice environmental responsibility.

Few of the SMEs expressed interest in pursuing an environmental certification as this was not a priority for the business, stating that their primary goal is profit and environmental responsibility is not high on the list of priorities in a small business. This trend is supported by previous research (EU, 2007b; Zorpas, 2010) that found that owner-managers of SMEs are preoccupied with short-term survival of the enterprise, economic consideration are critical for SMEs, and many SMEs may not see social and environmental issues as immediately relevant to their business.

SMEs are largely ill-informed regarding the benefits of environmental management; this represents both a barrier to implementation of environmental responsibility and to enhancing firm and operational performance (Hillary, 2004). Few of the SMEs (four of the 11 SMEs) expressed a desire to improve their environmental performance and credentials, but are limited by a lack of financial and human resources and limited knowledge regarding environmental responsibility. Some remarked that they would like to improve their environmental performance but were not sure what to do. This is typical of SMEs who are often characterised by constrained human resources and a lack of technical expertise in environmental management i.e. difficulties in understanding, interpreting and applying the EMS (Biondi *et al*, 2000). This lack of resources is further evident in SMEs that did not participate in this research, for example, Sims Recycling declined to participate as they are a small business with few staff and did not have time to participate. One of the most consistently cited barriers for SMEs to engaging with environmental management is a lack of time; SME owner-managers are overburden with tasks and investing time in economic survival rather than environmental management (Luetkenhorst, 2004; Pimenova and Van der Vors, 2004; Lepoutre and Heene, 2006; Viviers, 2009; Lewis and Cassells, 2010; Loucks *et al*, 2010;). Financial and human resources are the major barriers impeding environmental responsibility in SMEs (Hillary, 2004), SMEs are often characterised by constrained financial resources (Pimenova and Van der Vors, 2004; Lewis and Cassells, 2010) and SMEs view the adoption of environmentally responsible practices as costly and fail to recognise that environmental management could lead to improved profitability (Viviers, 2009; Ladzani and Seeletse, 2012). Evidence from this research suggests that a lack of financial and human resources, limited knowledge regarding environmental responsibility and the benefits of incorporating CSR is a major barrier to the implementation of environmental responsibility for SMEs.

6.19 Environmentally and non-environmentally certified SMEs

While there are many dissimilarities between the environmentally and non-environmentally certified SMEs regarding environmentally responsible practices, the SMEs reported opportunities, benefits and limitations in common. The most common obstacle mentioned by all SMEs focused on resource constraints. Environmentally certified SMEs report that limited budgetary resources prevent further improvement in environmental performance and the non-environmentally certified SMEs identified both financial and personnel restraints. Personnel restraints were described as the business not being able to employ dedicated environmental personnel due to budgetary constraints, or current personnel were overburdened and cannot take on extra duties, or current personnel do not have environmental knowledge. This finding is support by studies (Hillary, 2004; Pimenova and Van der Vors, 2004; Lewis and Cassells, 2010) that have shown that financial and human resources are the major barriers impeding EMS implementation in SMEs and SMEs are often characterised by constrained financial resources and there are direct and indirect costs associated the adoption of an EMS; the costs incurred obtaining third-party verification, costs relating to EMS implementation and costs relating to the necessary technical measures to ensure the improvement in environmental performance (Biondi *et al*, 2000). The difficulties that SMEs experience in fully understanding and satisfying environmental management requirements are mostly due to their lack of technical expertise in environmental management i.e. difficulties in understanding, interpreting and applying the EMS (Biondi *et al,* 2000).

An equally common reported obstacle by the SMEs is that the public and business do not understand, or are apathetic towards environmental issues. In the case of SMEs selling a recycled product, in addition to this lack of awareness, customers perceive that 'green' products have a stigma of being more expensive. The SMEs remonstrated that typically cost is the determining factor in a sale and time is wasted educating customers about the environmental benefits of their products, which the customer does not value. Cyclocor illustrate this frustration that SMEs encounter with this issue and the Director of Cyclocor states that "*we cannot sell our recycled roof tiles as a green product even though it is a green product. Our product fulfils all the green objectives but cannot use this to our advantage*". SMEs that collect post-consumer waste experience difficulties with the general lack of awareness about environmental issues and report that the public are not educated regarding recycling and do not separate and clean their waste for recycling. A specific case

was reported by E-Mode who found that large business that claim to value environmental responsibility support non-complaint competitors that offer a reduced cost. This finding is supported by other South African studies (Oelofse and Strydom, 2010; Anderson *et al*, 2013), which found that the pro-environmental consciousness in South Africa is very young and that limited post-consumer separation at source and recycling occur. Although recycling rates in South Africa are improving, it is still far from what it should be to significantly reduce waste disposal to landfill. Oelofse and Strydom (2010) suggest that to increase recycling rates in South Africa, efforts should focus on post-consumer recycling by households, and that if supported by environmental awareness and convenience, the quality of recyclate recovered and household recycling behaviour could improve. There is evidence to support the finding from this research that industry is unaware of the benefits of good waste management and environmental practice; Godfrey *et al*, (2013) found that a major barrier for good waste management in private companies is insufficient waste knowledge. The National Waste management Strategy has eight goals, one of which is to "*ensure that people are aware of the impact of waste on their health, well-being and the environment*" (DEA, 2011: 7) through 80% of municipalities and schools implementing local awareness campaigns by 2016 and suggests that municipalities will be incentivised for their efforts. The NWMS also specifies that; "*civil society must participate in waste awareness campaigns*" (DEA, 2011: 9) and that "*industry has an important role to play in educating consumers about appropriate disposal of products*" (DEA, 2011: 28)

Another common obstacle mentioned by SMEs focused on difficulty with South African waste legislation and the responsible authorities. The SMEs experienced difficulties in gaining assistance from the Department of Environmental Affairs where they encountered apathy from the Department, poor administration, a poor understanding of the regulations amongst the government officials, and high staff turnover prolonging the licencing process. The SMEs reported that the legislation itself was difficult to interpret and to keep up-to-date with the frequent changes to the regulations. This is clearly illustrated in the case of NSR where it took seven years and the assistance of three different environmental consultancies and an environmental lawyer to obtain a waste licence. NSR report that the difficulties they experienced in obtaining their waste licence, and associated cost of consultants and lawyers, has prevented further growth of their business. A specific case was reported by Cyclocor who experienced difficulties with environmental consultants who they perceived as more interested in profit than providing good advice. Studies (OECD, 2007; Lewis and Cassells, 2009; Daddi *et al*, 2010; Heras and Arana, 2010; Iraldo *et al*, 2010; Zarpos, 2010) have

shown that SMEs are often ignorant about the legislation that governs their activities or do not know enough of environmental legislation to ensure that they are compliant. Moreover, the proliferation of, and multiple amendments to, environmental law create confusion and make it difficult to understand what compliance involves and small businesses cannot keep up with the volume of regulations that are produced by government authorities (OECD, 2007; Zarpos, 2010). This trend is evident in the SMEs from the eThekwini waste sector. Compounding the issue is the lack of capacity within the South African state to effectively implement and enforce certain policy fields, particularly environmental (Hönke *et al*, 2008) and waste related regulation (Fiehn and Ball, 2005), and there is a lack of communication through appropriate structures from the legislature's side motivating environmental legislation (Coleman, 1997; Blignaut and Demana, 2002). Godfrey *et al* (2013) found that government bureaucracy was raised as a dominant issue by private waste businesses in preventing good waste management practice. The waste sector is managed under a bureaucracy of legal requirements such as environmental impact assessments, permits and licences and strict enforcement is applied to the private waste sector. The private waste sector want to implement good waste management practice, however they are often constrained by facility permit conditions (Godfrey *et al,* 2013), in particular the very slow amendment to permit conditions or the issuing of new licences.

The most common benefit of environmental responsibility mentioned by both the environmentally and non-environmentally certified SMEs (nine of 15 SMEs) was reputational benefits. In the case of the environmentally certified SMEs, the uptake of environmentally responsible business practices has resulted in a positive image for their businesses which has given the SMEs a competitive advantage and played a role in securing business with larger companies, particularly companies that have the same values. The non-environmentally certified SMEs perceived that as they provide an environmentally responsible service/product (recycling of sale of a recycled product) they are regarded as being environmentally responsible and this is considered favourably by other businesses and the public. Previous studies (Biondi *et al*, 2000; Pimenova and Van der Vors, 2004; OECD, 2007) have found that an improved 'environmental image' is an important perceived benefit of environmental responsibility amongst SMEs. The competitive advantage gained by adopting an environmental practices can result in business opportunities such as preferred supplier status, positive environmental profile and customer satisfaction. The non-environmentally certified SMEs are profiting from the benefits of a positive environmental

image due to the nature of their business, rather than their actual environmental performance.

Two SMEs, E-Mode and AP and D, both whose core business is the recovery of hazardous (primarily solvent) waste, perceived that they offer an extended producer responsibility EPR service to industry, cleaning up manufacturer's hazardous waste. They contend that, as such, the manufacturers could pay a fee assist with the environmental legislative costs of small business that ultimately clean up the manufacturers waste. They suggest formalisation of the recycling industry to prevent manufacturers using the services of non-complaint small business. This is a possibility as the Waste Act establishes EPR as a regulatory mechanism for bringing about waste reduction in South Africa, through the minimisation, reuse and recycling of waste products (DEAT, 2009; DEA, 2010). EPR measures defined by the Waste Act include measures that extend financial or physical responsibility for a product to the post-consumer stage of the product, for example financial arrangements for any fund that has been established to promote the reduction, reuse, recycling and recovery of waste. The Waste Act has made provision for the submission of voluntary industry waste management plans to the Minister for particular waste streams, these are typically undertaken by industry, are usually aimed at post-consumer waste (DEA, 2011) and can include financial responsibility, and institutional arrangements (Dittke, 2010; Baloyi, 2011; DEA, 2011). Under the provisions of the Waste Act, both E-Mode and AP and D are able to submit voluntary industry waste management plans stipulating manufacturer's financial responsibility for recycling of their post-consumer waste.

6.20 Social responsibility in SMEs

Although not a focus of this research, it was found that SMEs are familiar with the concept of 'social responsibility' and understood the concept to mean supporting non-profit organisations. Many of the SMEs (11 of the 15) supported local non-profit organisations at their request, or on an *ad hoc* basis. Some of the SMEs are long-term supporters of preferred non-profit organisations. One of the recycler SMEs, Neowood, have found that demonstrating their social impact has had a positive result with prospective customers and on their competitiveness in the market, significantly more so than demonstrating environmental responsibility. Previous South African studies have found a similar trend; the work of (Dzansi and Pretorius (2009a) and Dzansi (2011) found that South African small business tend to focus on the human aspects of CSR and that customer, employee, and

community issues are important social responsibility activities for the small businesses. This trend could be attributed to supply chain pressure to comply with B-BBEE requirements; the Broad Based Black Economic Empowerment (B-BBEE) Act 53 of 2003 aims to correct racial imbalances, but also strives to promote social investment and the empowerment of communities, essentially compelling companies to have a social conscience (Esser and Dekker, 2008). The Codes of Good Practice provide a standard framework for the measurement of B-BBEE across all sectors of the economy (DTI, 2007); organisation with an annual revenue of less than R5 million are exempted from compliance with the Codes (Exempted Micro-Enterprises), those with a turnover between R5 and R35 million are subject to a more lenient scorecard (Qualifying Small Enterprises) and organisations with a turnover above R35 million are compelled to comply with the score-card (DTI, 2007). The Codes specifically set about defining the seven measurable scorecard elements of which one is Socio-Economic Development (SED) and organisations can contirbute monetary or non-monetary contributions to the value of 1% of their net profit after tax to earn 5 points on their scorecard in the case of generic scorecard and 25 points (of a total 100 points) in the case of Qualifying Small Enterprises (DTI, 2007). The socio-economic development element of the scorecard is especially impactful in on the socio-economic upliftment of the greater community (Esser and Dekker, 2008). The Act is structured in such a manner as to ensure that B-BBEE will have a 'knock-on' effect throughout the business supply chain and ultimately businesses will in itself become drivers of B-BBEE in the businesses of their suppliers (Esser and Dekker, 2008).

SMEs experience pressure, from their clients, to transform, as the clients look to procure from empowered companies to meet their own empowerment requirements. Clients therefore give their SME suppliers an ultimatum to transform or risk losing their business (Bouche and Booysen, 2005a and b).

The B-BBEE Act is structured to ensure that B-BBEE will have a 'knock-on' effect throughout the business supply chain (Esser and Dekker, 2008) and evidence from this research suggests that SMEs from the eThekwini waste sector are responding to this supply chain pressure to comply with B-BBEE. SMEs that participated in this research were predominantly Qualifying Small Enterprises, implying that to comply with B-BBEE requirements they could considerably improve their score through SED contributions, and this may explain the predominance of donations to non-profit organisations and the SMEs associating the concept of 'socially responsibility' with supporting non-profit organisations.

Contradictory evidence from this research suggests that SMEs from the eThekwini waste sector are not responding to legislative or supply chain pressure to practice environmental responsibility and are not responding to environmental legislative requirements (described earlier, 6.18 Environmental responsibility in non-environmentally certified SMEs). However, SMEs do in fact respond to legislative and supply chain pressure, as they are responding to B-BBEE requirements within the supply chain however, pressure relating environmental responsibility is not translating down the supply chain. This implies that if an environmental element were incorporated in the B-BBEE Act, or if environmental legislation were structured in such a manner as to have a 'knock-on' effect throughout the business supply chain, this could be an effective means of driving SMEs to participate in environmental responsibility.

One of the SMEs had encountered difficulties with BBBEE requirements. It is a white owned, family business and the cost and the general requirements of the legislation have been difficult for the business to overcome. Other studies have found that SMEs encounter difficulties with B-BBEE, their lack of understanding of B-BBEE is an obstacle and compliance translates into administrative and economic costs that affect their performance (Sanchez, 2008).

6.21 Waste sector findings

The non-environmentally certified SMEs perceive that due to the service they offer, the collection and/or recycling of waste, or the manufacture of a product produced from recycled post-consumer waste, that they are environmentally responsible. However, they demonstrate limited understanding of, and commitment to, environmental responsibility. It is therefore difficult to establish possible opportunities, limitations and benefits that the non-environmentally certified SMEs may experience from environmentally responsible practices and findings from this research pertaining to the non-environmentally certified SMEs translated into the general opportunities, limitations and benefits that relate broadly to the waste sector.

The primary difficulty for many of the waste sector SMEs (five of 11 SMEs) is competition in the market for recyclable materials. Recyclers and traders of recyclable materials encountered competition in the market for post-consumer recyclables that ultimately caused 'price wars' and the price of recyclables was constantly fluctuating. Some of the recycler

SMEs (three of the 11 SMEs) have difficulty sourcing the volumes of post-consumer recyclables that they require to keep their businesses profitable, particularly post-consumer polystyrene, e-waste plastic and polypropylene. One trader, CHM Enterprises, noted that they have to travel long distances to source value recyclables. This finding is supported by Godfrey *et al* (2013) who found that a difficulty for some private waste companies included availability of waste for recycling. This finding is in stark contrast to the findings of Oelefse's (2012) assessment of the municipal waste stream in South Africa in 2011 where some 4.75 million tonnes of mainline recyclables was recorded as part of the municipal waste stream, the majority of which was being disposed of at municipal landfills. This suggests that there is a significant volume of recyclable waste that is not available to the waste sector for recycling, rather it is being landfilled. This is contrary to the philosophy of the Waste Act and the government's efforts, specifically the NWMS and the Green Economy Accords, commitments to the creation of employment and the promotion of small business within the waste sector, and the Polokwane Declaration's goal of "zero waste by 2022" (The Polokwane Declaration, 2001:1). Evidence from this research (7.2 Environmental responsibility in the supply chain) suggests that SMEs are an important component of the waste management value chain in the waste sector supporting the government's vision, however measures need to be put in place to allow the waste sector access to the recyclables that are currently landfilled.

Furthermore the volume of recyclables in the market is seasonal and this affects some of the SMEs (two of the 11 SMEs) ability to plan and budget. The fluctuating cost of diesel also presented difficulties for the SMEs (three of the 11 SMEs) as the collection of recyclables is reliant on a transport infrastructure and the constantly changing cost of diesel can negatively affect the profitability of a small business. A similar trend of fluctuating prices and competition is evident in the scrap metal business. The scrap metal dealers report that the price of metal is set by the London Metals Exchange and is dependent on the exchange rate, both which change daily resulting in the price of scrap metal constantly fluctuating. Group Wreck also state that the scrap industry is highly competitive and if a competitor is buying scrap for a few cents more than Group Wreck's price, the seller will sell to the competitor. A second scrap dealer, declined to participate in the research as they perceive that the scrap metal business is 'sensitive' and as such they were not willing to share any information. Official reports of 'price fixing' in the case of scrap metal are notable; during 2008 South Africa's Competition Tribunal imposed a R145-million fine on recycling firm, the New Reclamation Group for its involvement in collusion and price fixing in the ferrous and

nonferrous scrap metal markets (Webb, 2008). Recycling in South Africa is subject to market forces and vastly fluctuating prices paid on either local or international markets for recycling items (Freeman and Mgingqizana, 2002). Lavee *et al*, (2009) suggest that the effect of price uncertainty of recyclables may be the reason that waste recycling is not as widely adopted as anticipated and the 'cost of uncertainty,' has negative effect on the level of waste recycling.

There is further evidence of competition in the waste sector, some of the SMEs that were approached to participate in this research declined for reasons such as in the case of plastic recycler where it is company policy not to divulge any information about the company and a waste management company who did participate in the research were not willing to divulge any information relating the types and volumes of waste they process nor the companies that they outsource their recycling as they perceive that the waste industry is very competitive and were not willing to risk information being shared with competitors. It is notable that the organisations use the services of some of the same sub-contractors. This suggests that sub-contractors for certain waste streams are limited and waste sector is relatively small, resulting in competition between the waste service providers.

In contrast to the difficulties with sourcing recyclable volumes, fluctuation in cost and seasonality of recyclable, the large manufacturing organisations are making a profit from the sale of their recyclable materials to waste management companies. ABI generate approximately 458 tonnes of recyclables per month and make a profit of, for example R85 777.72 during November 2012, on the sale of their recyclable materials to a waste management company. Glass recycling amounts to an additional approximately 419 tonnes per month and approximately R174 000 profit from sale of glass for recycling. Afripak generate approximately 35 tonnes of recyclables per month and make a profit of, for example R24 000 during June 2012, on the sale of their recyclable materials to a waste management company. This supports the findings of Oelofse and Strydom (2010) who found that financial incentives for industry are the main drivers for the growth of the South African recycling industry. This is particularly evident within private industry that prioritise the generation of maximum income, profit and return on investment in the management of waste (Godfrey *et al*, 2013). This is contrary to the findings of Chapple *et al* (2006) in the European context, where CSR in the case of waste reduction is costly to the firm and the provision of waste reduction as a CSR activity is dependent on how much consumers,

members of the supply chain, and other stakeholders, value the activity of waste minimisation.

Findings from this research suggest that although the private sectors and private waste companies are profiting from waste management, the SMEs down the supply chain that ultimately process the waste, are experiencing difficulties with availability of recyclables and profitability. As described earlier (7.4 Environmental responsibility in non-environmentally certified SMEs) EPR measures extend to the financial or physical responsibility for a product to the post-consumer stage of the product, for example financial arrangements. This suggests that an alternative approach is possible under the provisions of the Waste Act; instead of the large organisations deriving profit from their recyclables, the funds could be diverted to assist the recycling of their post-consumer recyclable, further down the supply chain. A relevant finding of this research is the trend of outsourcing within the waste sector, a consequence of which is in an extended waste management value chain; the waste companies and many of the SMEs are waste traders that simply collect and sell recyclables, which can be sold to a number of waste traders before final sale to a recycler. This is further evidence of a highly competitive waste industry in the eThekwini municipal area and possibly, a re-structure of the value chain could potentially enhance the profitability of SMEs in the waste sector. In developing countries, extended waste management value chains are not uncommon and typically four types of agents are involved in the collection and recovery of waste; waste pickers that recover waste from dumps and landfill, street waste pickers that recover materials from waste on the streets or communal bins, itinerant waste buyers who go from door to door collecting sorted dry recyclable materials from householders, and municipal waste collectors that recover material from vehicles transporting MSW to disposal sites (Wilson *et al*, 2006). Some variation on the four basic categories may occur but in all instances the primary motivation is the income that can be earned from the collected waste. The degree to which a particular material is recycled depends on income levels, the existence of local and national markets, need for secondary raw materials, level of financial and regulatory governmental intervention and the prices of virgin materials (Wilson *et al,* 2006).

The waste sector SMEs identified that, in the waste sector, there is the opportunity for growth of their businesses; waste is ubiquitous and there is opportunity to expand the business into other regions, and the continuous demand for recyclables from recyclers and waste trader up the supply chain implies further growth opportunities. The SMEs reason that

as many businesses, and a large proportion of the public do not separate their waste for recycling, improved education and awareness would result in more recyclables being available in the market. This would result in the growth of their businesses, and less litter and waste going to landfill. Evidence from this (7.5 Environmentally and non-environmentally certified SMEs) and other (Oelofse and Strydom, 2010; Godfrey *et al*, 2013) research suggests that the public and business are ill-informed regarding environmental issues, particularly the environmental benefits of responsible waste management and recycling. As suggested by Oelofse and Strydom (2010) and Godfrey *et al*, (2013), to increase recycling rates in South Africa, efforts should focus on post-consumer recycling by households and the private sector to increase the quality of recyclate recovered and increasing environmental awareness and convenience is necessary. The fruition of the NWMS goals, particularly goal eight, "ensure that people are aware of the impact of waste on their health, well-being and the environment" (DEA, 2011: 7) through local awareness campaigns by 2016, would similarly increase the quality and volumes of recyclate.

Few of the recycler SMEs (two of the 11 SMEs) perceive that recycled plastic products have the potential to out-compete products made from virgin materials, having positive environmental and social benefits. Few of the SMEs identified benefits of the waste sector (three of the 11 SMEs), one SME noted that by collecting waste, less waste is sent to landfill, benefitting the environment. Another noted that many recyclable materials have value and unemployed persons can earn an income from scavenging for recyclables.

Findings of the eThekwini waste sector are not unexpected as management of municipal solid waste is challenging, particularly in developing countries where issues associated with poor management of municipal solid waste include uncontrolled disposal, inadequate waste collection systems and low recycling rates (Periathamby, 2011). Increasingly, EPR frameworks are being adopted as a preferred policy approach to promote cost-effective diversion and recovery of post-consumer solid waste (Wagner, 2013). Sharing responsibilities across the product chain and in society is an inherent part of EPR and effective EPR implementation depends on the participation of all the actors in the product chain (OECD, 2001). The German packaging ordinance is an example of a successfully legislated extended producer responsibility that resulted in benefits such as reducing waste, encouraging the redesign of packaging to be more environmentally sustainable, and increasing refilling and recycling (Nakajima and Vanderburg, 2006). To be successful, EPR policy and programmes must be designed so that responsibility is appropriately shared

without diminishing incentives placed on producer's to reduce the products environmental impacts at the post-consumer stage (OED, 2001). Key to increasing the amount of waste recovered is the setting of targets (OECD, 2001) and the maximized convenience of the collection system to enhance public participation (Freeman and Mgingqizana, 2002; Wagner, 2013). Categories of convenience include; increased consumer knowledge, consumer proximity to a collection site, opportunity to drop-off materials, the draw of the collection site, and the ease of the process (Wagner, 2013). In the eThekwini context, essential factors to consider in the sustainability of a recycling scheme include; markets for sale of the waste item which must be located close to the source of the recyclable materials, suitability of the scheme for the particular type of waste stream, quantities and quality of the recyclable items available in the waste stream, and sufficient secondary markets, which will absorb the items made from the recyclable waste, for resale to the public (Freeman and Mgingqizana, 2002). Furthermore, where the cost of landfilling is favourable, the impact of a potential levy on the waste landfilled, could reduce the gap between the costs of landfilling and the other alternative waste-treatment options. Such a levy would result in changes to public perception and the attitude of waste management. Recycling rates can be increased by the introduction of the necessary financial incentives to stimulate the development of markets for recovered materials from the materials recovery facilities and provide a more stable market price (Daskalopoulos and Probert, 1998). This implies that an EPR mechanism with defined targets and incentives, public education, and a landfill levy could be effective mechanisms to increase the rate of recycling in the South African context.

CHAPTER 8
CONCLUSION

This chapter presents the conclusions drawn from the results and discussion. The aim and objectives of the research are revisited followed by an overall concluding statement.

8.1 Aim and objective revisited

The study's aim is to investigate the role that SMEs play in extended producer responsibility from an environmental responsibility perspective in waste management and recycling. To achieve this purpose, the specific objectives of the study are to:

- review the environmental and extended producer responsibility of business, from a waste management and recycling perspective;
- investigate the outsourcing of waste management and recycling to SMEs;
- examine how and why SMEs are engaging in environmental responsibility;
- determine the methods that SME's use to monitor their environmental responsibility efforts; and
- critically assess environmental responsibility in the supply chain.

Objective 1: review the environmental and extended producer responsibility of business, from a waste management and recycling perspective

The manufacturing organisations outsource the waste management function to waste management companies, all of whom demonstrated commitment to environmental responsibility either through environmental certifications or group SHE polices and requirements. There is evidence that manufacturing organisations rely on the waste management companies to audit their downstream waste contractors for environmental compliance however, there is a poor uptake of environmental responsibility downstream in the supply chain. The disconnect appears to occur at the waste management company level; waste management companies are professing to audit SME sub-contractors for environmental compliance with environmental regulations and management practices, yet there is little evidence of environmental responsibility in the SMEs in their supply chains. Even although the manufacturing organisations are outsourcing and auditing waste management companies for environmental practices, under the provision of the Waste Act, particularly extended producer responsibility, the manufacturing organisations responsibility extends further downstream to the SMEs that ultimately process their waste.

Objective 2: **investigate the outsourcing of waste management and recycling to SMEs**

This research found that there is a trend of outsourcing of waste management and recycling activities amongst the organisations. Larger organisations outsource the waste management function to waste companies that are entirely reliant on sub-contractors for the recovery, recycling and refurbishment of waste, indeed it is evident that SMEs are an important component of the waste management, waste recovery and recycling value chain in the eThekwini waste sector.

Objective 3: examine how and why SMEs are engaging in environmental responsibility

Most SMEs in the eThekwini waste sector do not participate in environmentally responsible business practices, the few that are, participating are ISO 14001 certified. There are many dissimilarities between the environmentally and non-environmentally certified SMEs regarding environmentally responsible practices, but some shared constraints and benefits were identified; limited financial and human resources, public apathy towards environmental issues and local legislative bureaucracy are the major barriers impeding EMS implementation in SMEs. Benefits of environmental responsibility included reputational benefits and an associated competitive advantage

There is a trend amongst the non-environmentally certified SMEs to associate the term 'environmental responsibility' with waste management activities, and SMEs perceive that they are environmentally responsible as their business activities are waste management activities. They exhibit a poor understanding of environmental responsibility, a lack of awareness of impinging environmental legislation and their environmental impacts, and a poor up-take of environmentally responsible activities. Environmentally responsible activities were motivated by cost savings and mitigating threats to the long-term survival of the business, specifically in terms of reducing electricity and transport costs. This is attributed to SMEs placing the greatest importance on the economic survival of their business and environmentalism not being a major concern for most small businesses. Few of the non-environmentally certified SMEs expressed an interest in environmental responsibility however a lack of financial and human resources, limited knowledge regarding environmental responsibility and the benefits of incorporating environmental practices is a major barrier to the implementation of environmental responsibility.

The environmentally certified SMEs are ISO 14001 certified and meet the requirements of an effective environmental management system; an environmental policy and have procedures in place to ensure compliance with applicable legal requirements. The environmentally certified SMEs appear to be responding to pressure to ensure legal compliance of waste operations; particularly as they are waste management and hazardous waste management companies. There is evidence of some supply chain pressure. The most significant difficulty that the SMEs experience with ISO 14001 certification is limited financial resources; the cost of ISO 14001 certification and compliance with environmental legislation. The SMEs listed three major benefits of ISO 14001 certification; continued improvement of the SMEs environmental performance, benefits relating to improved company culture and staff welfare, and improved environmental legal compliance. Opportunities of ISO 14001 certification were identified as improving and expanding business practices.

Objective 4: determine the methods that SME's use to monitor their environmental responsibility efforts

The non-environmentally certified SMEs have not identified the impacts of their business operations on the environment, and do not have monitoring procedures in place. They do monitor activities that have economic implications for their business such as the cost of electricity and fuel. The environmentally certified SMEs are ISO 14001 certified and meet the requirements of an effective environmental management system; the setting of environmental objectives and targets, implementing programmes to achieve these objectives, monitoring and measuring effectiveness and reviewing the system to improve overall environmental performance.

Objective 5: critically assess environmental responsibility in the supply chain

Reliance on the participation of numerous SMEs can help improve or harm environmental performance within the supply chain, particularly in the waste sector context where legislation governing waste management is becoming more stringent and industry is expected to take responsibility for the waste generated throughout the life cycle of a product. Larger organisations are responding to this and audit their waste contractors for compliance with environmental, health and safety (SHE) regulations and management practices, and the effectiveness thereof. Waste companies are concerned with, and under pressure, to ensure legal compliance of waste operations resulting in a strong organisational culture towards implementing good waste management practice in the South African waste

sector (Godfrey *et al,* 2013). Waste companies are conducting SHE audits on their SME sub-contracts and the SME sub-contracts report evidence of these audits, yet, many of the SME sub-contracts were found to have a limited understanding of, and commitment to, environmental responsibility suggesting that SMEs are not responding to this supply chain pressure and environmental responsibility does not appear to be translating down the supply chain. It was found that SMEs are not responding to environmental legislation and regulation and it is presumed that those that are in the business of the recovery of hazardous waste are subject to more stringent legal requirements.

Unexpected finding 1: social responsibility in SMEs

Social responsibility was not a focus of this research however it was found that SMEs are familiar with the concept 'social responsibility' and understood the concept to mean supporting non-profit organisations. Evidence from this research suggests that SMEs from the eThekwini waste sector are responding to this supply chain pressure to comply with B-BBEE requirements This implies that an effective means of driving SMEs to participate in environmental responsibility may be through the supply chain and the inclusion of an environmental element in the B-BBEE Act, or to structure environmental legislation in such a manner as to have a 'knock-on' effect throughout the business supply chain.

Unexpected finding 2: waste sector findings

The non-environmentally certified SMEs described the opportunities, limitations and benefits that relate broadly to the waste sector. The primary difficulty is competition in the market for recyclable materials that ultimately caused 'price wars' and the price of recyclables constantly fluctuating. Other difficulties included the sourcing of the volumes of post-consumer recyclables required to keep their businesses profitable, the seasonal nature of the availability of recyclable materials and the fluctuating cost of diesel. The waste sector SMEs identified that the potential growth of their businesses as an opportunity of the waste sector largely due to the ubiquitous nature of waste. However, the availability of recyclable waste is a significant obstacle as large volumes mainline recyclables are disposed of at municipal landfills (Oelefse, 2012). This has been attributed to the public and business being ill-informed regarding environmental issues, particularly the environmental benefits of responsible waste management and recycling (Oelefse, 2012; Godfrey *et al*, 2013).

The bureaucracy of legal requirements of the waste sector is an equally significant barrier for the SMEs who report difficulties with interpreting and understanding the legislation,

keeping abreast of the prolific amendments to legislation, and difficulties with the Department of Environmental Affairs. The financial costs of the legislative requirements are burdensome for small business and possibly, under the provisions of the Waste Act, the SMEs could potentially submit voluntary industry waste management plans stipulating manufactures financial responsibility for recycling of their post-consumer waste, particularly the legislative compliance costs for small business.

There is evidence to suggest that the eThekwini waste sector is highly competitive and that the waste value chain is affecting the profitability of SMEs. These difficulties need to be addressed, possibly though an EPR mechanism with defined targets and incentives, public education, and a landfill levy, if the government's vision of the creation of employment and the promotion of small business within the waste sector in South Africa are to be realised.

8.2 Concluding remarks

Recently government have highlighted the role that SMEs play in sustainable development and the green economy in South Africa, particularly in the waste sector (DBSA, 2001; EDDRSA, 2011). The waste sector is supported by a large informal recycling sector (Oelofse and Strydom, 2010) and job creation initiatives have resulted from the reclamation, recycling and reuse of waste, which has increased income in the poorer sector of the population, and the recycling of waste reduces the use of virgin material and leads to saving resources thereby benefitting the environment (Fiehn and Ball, 2005). The South African Green Economy Accord (EDDRSA, 2011) highlights that in recycling, there are significant opportunities for the creation of small enterprises aimed at beneficiating waste at landfill sites. The findings of this research support the perception that the waste sector has a role to play in sustainable development in South Africa. It is evident from this research that SMEs are supporting the waste sector, they are an important portion of the waste management, waste recovery and recycling value chain, in fact SMEs are largely undertaking the actual recycling of waste, in addition unemployed persons can earn an income from scavenging for recyclables. Given that the majority of mainline recyclables are being disposed of at municipal landfills (Oelefse, 2012) implies that there is potential for growth of this informal sector, both SMEs and informal scavenging that will provide a livelihood for poor individuals. However, sustainable development encompasses three essential aspects, economic growth, environmental responsibility, and social justice (Banerjee, 2009). While evidence from this research indicates that the waste sector is contributing to economic growth, waste

management is increasing profit for the private sector, private waste companies and SMEs, and social development through the creation of employment and income earning opportunities for unemployed persons, the environmental aspect is unconvincing. One could argue that the waste sector is environmentally responsible 'by default' as the diversion of waste from landfill and the collection and/or recycling of waste, or the manufacture of a product produced from recycled post-consumer waste which is environmentally preferable to the disposal of waste in landfill (for example, EU, 2001; DEAT, 2000b; Magram, 2011) and that the waste sector is under pressure, to ensure legal compliance of waste operations (Godfrey *et al*, 2013). However, a significant portion of the waste sector SMEs exhibit a poor understanding and up-take of environmental responsibility and do not have measures in place to ensure compliance with environmental legislation. In addition, these SMEs do not appear to be under pressure to engage in environmental responsibility, either from a supply chain nor a legislative perspective. This is predominantly due to larger organisations not practicing ERP as defined by the Waste Act and weak enforcement of environmental legislation (according to the findings of this research). This certainly has implications for the waste sector in the 'green' economy.

Some SMEs are responding to legislative, and to a lesser degree, supply chain pressure, and are opting for the ISO 14001 certification. These SMEs are participating in environmentally responsible business practices and reaping the rewards thereof, such as reputational benefits, improved environmental legal compliance and environmental performance. There is evidence to suggest that SMEs are responding to the B-BBEE Act in the supply chain and engaging in social responsible activities. This is encouraging as it implies that SMEs, even in the face of difficulties such as limited resources and limited CSR knowledge, can positively engage in, and reap the benefits of CSR.

Although specific to the waste sector, this research supports the finding of previous studies on environmental responsibility in SMEs in South Africa; environmental awareness levels amongst South African SMEs is low, there is a general problem of low awareness of environmental legislation (Coleman, 1997; Blignaut and Demana, 2002) and South Africa needs to improve the environmental performance of its SME sector (Josipovic, 2005). There is a need for strategies to address the environmental problems of small business and more detailed studies are required to identify specific policy mechanisms for sound environmental management in SMEs (Coleman, 1997).

This research suggests that the waste sector serves as a mechanism for achieving sustainable development in South Africa, through the creation of employment and the promotion of small business within the waste sector.

REFERENCES

ABI (Amalgamated Beverage Industries). 2007. Amalgamated Beverage Industries website. Available at http://www.abi.co.za/ [Accessed 18 December 2012].

Afripak. 2009. Afripak website. Available at http://www.afripack.co.za/ [Accessed June 2012].

Agan, Y., Acar, M.F. and A. Borodin. In press. Drivers of environmental processes and their impact on performance: A Study of Turkish SMEs. *Journal of Cleaner Production.*

Alessandria, T.M., Black, S.S. and W.E. Jackson. Black Economic Empowerment Transactions in South Africa: Understanding When Corporate Social Responsibility May Create or Destroy Value. *Long Range Planning*. 44: 229-249.

Al-Khatib, I.A., Monou, M., Abu Zahra, A.S.F., Shaheen, H.Q., D. Kassinos. 2010. Solid waste characterization, quantification and management practices in developing countries. A case study: Nablus district – Palestine. *Journal of Environmental Management*. 91: 1131–1138.

Anderson, B.A., Romani, J.H., Wentzel, M. and H.E. Philips. 2013. *Recycling behaviour among urban South Africas: The role of race and social status*. Population Studies Center Research Report 13-790. Population Studies Center, University of Michigan.

Andiç, E, Yurt, O. and T. Baltacıoluğelu. 2012. Green supply chains: Efforts and potential applications for the Turkish market. *Resources, Conservation and Recycling*. 58: 50– 68.

Ángel del Brío, J. and B. Junquera. 2003. A review of the literature on environmental innovation management in SMEs: implications for public policies. *Technovation*. 23: 939–948.

AP and D (Anchor Pail and Drum Reconditioners). 2012. Anchor Pail and Drum Reconditioners website. Available at http://anchordrums.co.za/ [Accessed 2 November 2012].

APEIS RISPO. 2006. Strategic Policy Options Database. Improving environmental performance of small and medium-sized enterprises (SMEs). Available at: http://enviroscope.iges.or.jp/contents/cgi-bin/rispo/index_spo.cgi?mode=pa_selectandid_pa=PA0003 [Accessed 25 June 2012].

Aragón-Correa, J.A., Hurtado-Torres, N., Sanjay Sharma, S., Garciá-Morales, V.J. 2008. Environmental strategy and performance in small firms: a resource-based perspective. *Journal of Environmental Management*. 86: 88-103.

Arbor, J. and P. Quartey. 2010. Issues in SME Development in Ghana and South Africa. *International Research Journal of Finance and Economics*. 39: 218-228.

Arimura, T.H., Darnall, N. and H. Katayama. 2011. Is ISO1 4001 a gateway to more advanced voluntary action? The case of green supply chain management. *Journal of Environmental Economics and Management.* 61:170–182.

Baden, D.A., Harwood, I.A. and D.G. Woodward. 2008. The effect of buyer pressure on suppliers in SMEs to demonstrate CSR practices: An added incentive or counterproductive? *European Management Journal.* 27: 429– 441.

Ball, J. 2006. *Waste management in developing countries: seven characteristics and seven principles*. Proceedings WASTE 2006. Sustainable Waste and Resource Management Stratford-upon-Avon, 19–21 September 2006, pp. 687–696.

Baloyi, O. 2011. The Waste Act Made Easy. A User Friendly Guide to the National

Environmental Waste Act 2008 (No. 59 of 2008). South Africa, Pretoria.

Banerjee, B. 2009. *Corporate Environmental Management. A Study with Reference to India*. Learning Private Limited, New Delhi. 125pp.

Barbour, R. 2008. A Student Guide to the Craft of Doing Qualitative Research. Sage Publications, London. 319pp.

Battaglia, M., Bianchi, L., Frey, M. and F. Iraldo. 2010. An Innovative Model to Promote CSR among SMEs Operating in Industrial Clusters: Evidence from an EU Project. *Corporate Social Responsibility and Environmental Management.* 17: 133-141.

Battisti, M. and M. Perry. 2011. Walking the Talk? Environmental Responsibility from the Perspective of Small-Business Owners. *Corporate Social Responsibility and Environmental Management*. 18, 172–185.

Baucus, M.S. and P.L. Corchan. 2009. An overview of empirical research on ethics and entrepreneurial firms within the United States. *African Journal of Business Ethics*. 4 (2): 56-68.

Beede, D.N. and D.E. Bloom. 1995. The Economics of Municipal Solid Waste. *The World Bank Research Observer*. 10 (2): 113-150.

Berry, A., von Blottnitz, M., Cassim, R., Kesper, A., Rajaratnam, B. and D.E. van Seventer. 2002. *The Economics of SMEs in South Africa. Trade and Industrial Policy Strategies (TIPS).* Available at http://www.tips.org.za/node/204 [Accessed 25 March 2013].

Bezuidenhout, A., Fig, D., Hamann, R. and R. Omar. 2007. *Political Economy*. In Fig, D (editor). 2007 *Staking their Claims. Corporate Social and Environmental Responsibility in South Africa*. University of KwaZulu-Natal, Scottsville. 13-94pp.

Biondi, V., Frey, M. and F. Iraldo. 2000. Environmental Management Systems and SMEs: Motivations, Opportunities and Barriers Related to EMAS and ISO 14001 Implementation. *Greener Management International*. 29: 55-79.

BIS (Department for Business Innovation and Skills). 2012. *Business population estimates for the UK and regions 2012*. 17 October 2012. Available at http://www.fsb.org.uk/stats [Accessed 18 March 2013].

Bist, M. 2007. ISO 14001 and EMAS in Small and Medium-Sized Enterprises – Obstacles to Implement these Environmental Management Approaches in SMEs and How to Improve the Potential of these Approaches for the Usage in SMEs. *IMRE Journal*. 1 (2): 1- 11.

Blight, G. and C. Mbande. 1998. *Solid Waste Management Problems in Developing Countries. In: Thomas-Hope, E. Solid Waste Management.* Critical Issues for Developing Countries. Canoe Press, Jamaica. Pp 11-26.

Blignaut, J.N. and T. Demana. 2002. *Does it Profit SMEs to Care about the Environment? Trade and Industrial Policy Strategies (TIPS) 2002 Annual Forum at Glenburn Lodge, Muldersdrift.* Available at: www.tips.org.za/node/224 [Accessed 25 April 2013].

Blowfield, M. and J.G. Frynas. 2005. Critical Perspectives on Corporate Social Responsibility in the Developing World. *Royal Institute of International Affairs.* 81(3): 499-513.

Blundel, R., Monaghan, A. and C. Thomas. 2013. SMEs and environmental responsibility: a policy perspective. *Business Ethics: A European Review*. In press.

Bontoux, L. and F. Leone. 1997. *The Legal Definition of Waste and its Impact on Waste Management in Europe.* A Report Prepared by the Institute for Prospective Technological Studies for the Committee for Environment, Public Health and Consumer Protection of the

European Parliament. European Commission – Joint Research Centre, Spain.

Borcosi, A.C. 2012. *Influence of environmental law on environmental management of the Romanian SMEs.* Proceedings of the International Multidisciplinary Scientific GeoConference. 4: 1023–1030.

Bosman, C. 2009. Chapter 18*. Integrated Waste Manage*ment. In Strydom, H.A and N. D. King (editors). 2009. *Fuggle and Rabie's Environmental Management*. Second Edition. Juta Law, Cape Town. pp 699-745.

Botkin, D.B. and E.A. Keller. 2010. *Environmental Science. Earth as a living Planet*. Seventh Edition. John Wiley and Sons, USA. 665pp.

Bouche, J. and L. Booysen. 2005a. Facing the unknown: Introducing BEE into SMMEs*. Management Today*. 21(4): 46- 47.

Bouche, J. and L. Booysen. 2005b*.* Black empowerment and SMEs: benefits, innovative mechanisms and recommendations. *Management Today*. 21(5): 57-597.

Brammer, S., Hoejmose, S. and K. Marchant. 2011. *Environmental Management in SMEs in the UK: Practices, Pressures and Perceived Benefits*. Business Strategy and the Environment. 21 (7): 423–434.

BRC (British Retail Consortium Global Standards). 2012. *Global Standards. 2012. British Retail Consortium Global Standards website*. Available at http://www.brcglobalstandards.com [Accessed 29 November 2012].

Brisson, I. 1993. Packaging waste and the environment: economics and policy. *Resources, Conservation and Recycling*. 8: 183-292.

Bryne, K. 2001. *Bath Advanced Science*. *Environmental Science. Second Edition*. Nelson Thornes Ltd, Cheltenham. 344pp.

Burger, D (editor). 2010/11. *Pocket Guide to South Africa 2010/11*. South African Government Website. Available at: http://www.info.gov.za/aboutsa/economy.htm [Accessed 27 March 2013].

CAIA (Chemical Allied Industries Association). 2010. *Chemical Allied Industries Association website*. Available at http://www.caia.co.za [Accessed 3 November 2012].

Cambra-Fierro, J., Hart, S. and Y. Polo-Redondo. 2008. Environmental Respect: Ethics or Simply Business? A Study in the Small and Medium Enterprise (SME) Context. *Journal of Business Ethics.* 82:645–656.

Campos, L.M.S. 2012. Environmental management systems (EMS) for small companies: A study in Southern Brazil. Journal of Cleaner Production. 32: 141-148.

Carbon Trust. 2005*. The UK Climate Change Programme: Potential evolution for business and the public sector*. Carbon Trust, UK. Available at: http://www.carbontrust.com/resources/reports/advice/uk-climate-change-programme-potential-evolution [Accessed 18 April 2013].

Cassell, C. 2009. *Interviews in organisational research*. In: Buchanan, D.A. and A. Bryman. 2009. *The Sage Handbook of Organisational Research Methods*. Sage Publications, London. Pp 500-515.

Cassells, S.M. and K.V. Lewis. 2011. SMEs and Environmental Responsibility: Do Actions Reflect Attitudes? *Corporate Social Responsibility and Environmental Management.* 18: 186-199.

Cassells, S.M., Lewis, K.V. and A. Findlater. 2011*.* SMEs and ISO 14001 adoption: A New

Zealand perspective. *Small Enterprise Research*. 18 (1): 19–32.

Castka, P., Bamber. C. and J. M. Sharp. 2005*. Implementing Effective Corporate Social Responsibility and Corporate Governance.* A Framework. British Standards Institution and the High Performance Organisation Ltd, London.

Chapple, W., Paul, C.J.M and R. Harris. 2005. Manufacturing and Corporate Environmental Responsibility: Cost Implications of Voluntary Waste Minimisation. *Structural Change and Economic Dynamics.* 16: 347–373.

Christie, M., Rowe, P., Perry, C. and J. Chamard. 2000. *Implementation of realism in case study research methodology*. In: Douglas, E (editor). Proceedings of Entrepreneurial SMEs. Engines for growth in the millennium. International Council for Small Business. World Conference ICSB, Brisbane, Qld., 7–10 June.

Church. J. 2009. A South African Perspective on Balancing Interests: Economic, Environmental and Social. *Journal of the Australasian Law Teachers Association*. 2 (1and2): 65-72.

Ciliberti, F., Pontrandolfo, P. and B. Scozzi. 2008. Investigating corporate social responsibility in supply chains: a SME perspective*. Journal of Cleaner Production*. 16: 1579–1588.

Cobbinah, N. 2010. The National Waste Management Strategy Making Mzantsi Beautiful. In: De Wet, H. The Environmental Handbook. A Guide to Green Business in South Africa. Trialogue, Cape Town. pp 30-31.

Coca-Cola Sustainability Report online. 2012. *Coca-Cola 2011/2012 Sustainability Report*. Released November 7, 2012, The Coca-Cola Company. Available at http://www.coca-colacompany.com/sustainabilityreport [Accessed 19 December 2012].

Coffey, M. and A. Coad . 2010*. Collection of Municipal Solid Waste in Developing Countries. United Nations Human Settlements Programme (UN-HABITAT).* Available at http://www.unhabitat.org/pmss/searchResults.aspx?sort=relevanceandpage=searchandsearchField=titleandsearchstring=wasteandx=28andy=12 [Accessed 20 February 2013].

Cohen, N. and P. Robbins. 2011. *Green Business. An A-Z Guide*. Sage Publications, London. 589pp.

Coleman, A. 1997. *Chapter 6. Small Business Management. A case study from the Western Cape automotive sector*. Pp 145-175. In: Bethlehem, L. and M. Goldblatt (editors). *The Bottom Line*. *Industry and the Environment in South Africa*. University of Cape Town Press, Rondebosch.

Collect-a-Can. 2012. *Collect-a-Can website*. Available at http://www.collectacan.co.za/ [Accessed 15 December 2012].

Collins, E., Dickie, C. and P. Weber. 2009. A New Zealand and Australian overview of ethics and sustainability in SMEs. *African Journal of Business Ethics*. 4 (2): 48-55.

Conglianese, C. and J. Nash. 2001. *Regulating from the Inside: Can Environmental Management Systems Achieve Policy Goals? Resources for the Future*, Washington, D.C. 240pp.

Coppaa, M. and K. Srirameshb. 2013. Corporate social responsibility among SMEs in Italy. *Public Relations Review*. 39: 30– 39.

Cổtè, R.P., Lopez, J., Marche, S., Perron, G.M. and R. Wright. 2008*.* Influences, practices and opportunities for environmental supply chain management in Nova Scotia SMEs*. Journal of Cleaner Production*. 16: 1561–1570.

Coutino De Arruda. 2009. Ethics and corporate social responsibility in Latin American small and medium-sized enterprises. Challenging development. *African Journal of Business Ethics*. 4 (2): 37-47.

Crocker, R.E. 2012. SME Perceptions of Low Carbon Options: Drivers, Barriers and Business Sector Differences. *Earth and E-nvironment*. 7: 232-259

Cronholm, S and A. Hjalmarsson. 2011. Experiences from Sequential Use of Mixed Methods. *The Electronic Journal of Business Research Methods.* 9 (2): 87-95.

Cross, J. 2010. Waste Management Update. In: De Wet, H. The Environmental Handbook. A Guide to Green Business in South Africa. Trialogue, Cape Town. pp 30-31.

CSIR Building and Construction Technology. 2005. *Guidelines for Human Settlement Planning and Design*. Volume I. CSIR, Pretoria.

Curzio, A.Q., Prosperetti, L. and R. Zoboli. 1994. *Developments in Environmental Economics*. Volume 5. The Management of Municipal Solid Waste in Europe. Economic, Technological and Environmental Perspectives. Elsevier, New York. 248pp.

Cyclocor [online]. *Cyclocor website*. Available at http://www.cyclocor.co.za/ [Accessed 15 November 2012].

Daddi, T., Testaa, F. and F. Iraldoa. 2010. A cluster-based approach as an effective way to implement the Environmental Compliance Assistance Programme: evidence from some good practices. *Local Environment.* 15 (1): 73–82.

Dahlsrud, A. 2006. How corporate social responsibility is defined: an analysis of 37 definitions. *Corporate Social Responsibility and Environmental Management*. 15(1): 1-13.

Daile, A.J. 2009. Government support for small, micro and medium enterprises (SMEs) as a venture for business and economic development in South Africa. *Conference paper presented at the IAABD 10th annual conference, Pretoria.*

Daniel, S and A.G. Sam. 2010. *Research Methodology*. Kalpaz Publications, India. 256pp.

Darnall, N., Henriques, I. and P. Sadorsky. 2009. Adopting Proactive Environmental Strategy: The Influence of Stakeholders and Firm Size. *Journal of Management Studies*. 47 (6): 1072-1094.

Daskalopoulos, E. and O.B.S.D. Probert. 1998. An integrated approach to municipal solid waste management. *Resources, Conservation and Recycling*. 24: 33–50.

Davis, G. and J.H. Song. 2006. Biodegradable packaging based on raw materials from crops and their impact on waste management. *Industrial Crops and Products*. 23: 147–161.

DBSA (Development Bank South Africa). 2011. *Development Planning Division Working Paper Series No. 24. Programmes in support of transitioning South Africa to a green economy*. Development Bank of Southern Africa, Halfway House.

DC Plastics. 2010. *DC Plastic Recyclers PTY LTD website*. Available at http://www.dcplastics.co.za/ [Accessed 9 December 2012].

De Bruijn, T.J.N.M. and P.S. Hofman. 2001. Pollution Prevention in Small and Medium-Sized Enterprises Evoking Structural Changes through Partnerships. *Greener Management International*. 30: 71-82.

DEA (Department of Environmental Affairs) [online]. *The National Waste Management Strategy website*. Available at: http://www.wastepolicy.co.za/nwms-about/index.htm [Accessed 10 January 2013]

DEA (Department of Environmental Affairs). 2011. *National Waste Management Strategy*.

Department of Environmental Affairs, Pretoria.

DEA (Department of Environmental Affairs). 2011b. *Addressing Challenges with Waste Service Provision in South Africa*. Draft Municipal Waste Sector Plan. Notice 182 of 2011. Department of Environmental Affairs, Pretoria.

DEA (Department of Environmental Affairs). 2011c. *The Waste Act made Easy. A User Friendly Guide to the National Environmental Waste Act 2008 (Act 59 of 2008*). April 2011. Department of Environmental Affairs, Pretoria.

DEA (Department of Environmental Affairs). 2012a. *2012 South Africa Environment Outlook. Chapter 9. Waste Management.* Draft 2 Version 3. April 2012. Department of Environmental Affairs, Pretoria.

DEA (Department of Environmental Affairs). 2012b. Minister of Water and Environmental Affairs Publishes The National Waste Information Regulations. *Waste Information Today*. 18: 1-2. Available at http://www.sawic.org.za/documents/1618.pdf [Accessed 27 February 2013].

DEA (Department of Environmental Affairs). 2012c*. National Waste Information Baseline Report*. Department of Environmental Affairs, Pretoria.

DEA (Department of Environmental Affairs) [online]. The National Waste Management Strategy website. Available at: http://www.wastepolicy.co.za/nwms-about/index.htm [Accessed 27 December 2012].

DEAT (Department of Environmental Affairs and Tourism). 1999. *State of the Environment South Africa*. Department of Environmental Affairs and Tourism, Pretoria.

DEAT (Department of Environmental Affairs and Tourism). 2000a. White Paper on Integrated Pollution and Waste Management for South Africa. A Policy on Pollution Prevention, Waste Minimisation, Impact Management and Remediation. Government Gazette Vol.417, No.20978, 17 March 2000. General Notice 227 of 2000.

DEAT (Department of Environmental Affairs and Tourism). 2000b. *Starter Document for Waste Recycling: A Framework for Sustainable Post-Consumer Recycling in South Africa*, Department of Environment Affairs and Tourism, Pretoria, May 2000.

DEAT (Department of Environmental Affairs and Tourism). 2000c. Background Document of Post-Consumer Recycling in South Africa and Internationally, Starter Document for Waste Recycling, Programme for the Implementation of the National Waste Management Strategy, Department of Environmental Affairs and Tourism, Pretoria

DEAT (Department of Environmental Affairs and Tourism). 2004*. National Cleaner Production Strategy*. Draft Document for Comment – National and Regional Workshops. 8 November 2004. Available at: http://www.info.gov.za/view/DownloadFileAction?id=70148 [Accessed 8 December 2013].

DEAT (Department of Environmental Affairs and Tourism). 2005a. *National Waste Management Strategy Implementation South Africa: Review of Industrial Waste Exchange*, Report number 12/9/6 Annexure G, 4 April 2005.

DEAT (Department of Environmental Affairs and Tourism). 2005b*. National Waste Management Strategy Implementation South Africa: Recycling Extended Producer Responsibility*, Report number 12/9/6 Annexure F, 3 May 2005.

DEAT (Department of Environmental Affairs and Tourism). 2005c. *National Waste Management Strategy Implementation South Africa: Recycling*. Waste Stream Analysis and Prioritisation for Recycling. Report number 12/9/6 Annexure H, 4 April 2004.

DEAT (Department of Environmental Affairs and Tourism). 2005c*. Working with waste. Guideline on recycling of solid waste*. Department of Environmental Affairs and Tourism, South Africa.

DEAT (Department of Environmental Affairs and Tourism). 2006. *South Africa Environment Outlook. A report on the state of the environment*. Department of Environmental Affairs and Tourism, Pretoria.

DEAT (Department of Environmental Affairs and Tourism). 2007*. Assessment of the status of waste service delivery and capacity at the local government level*. Report prepared by PDG. Available at: http://www.info.gov.za/view/DownloadFileAction?id=72546 [Accessed 27 December 2012].

DEAT (Department of Environmental Affairs and Tourism). 2009a. *A Framework for the National Waste Management*. Strategy Draft version for review. Pretoria, South Africa.

DEAT (Department of Environmental Affairs and Tourism). 2009b*. Producer Responsibility and Consumer Awareness*. Department of Environmental Affairs and Tourism, Pretoria.

DEAT (Department of Environmental Affairs and Tourism). 2009c*. National Waste Management Strategy- Phase 2 Research. Summary of key strategic issues to inform NWMS*. Department of Environmental Affairs and Tourism, Pretoria.

Denzin, N.K. and Y.S Lincoln. 2005. *Introduction. The Discipline and Practice of Qualitative Research*. In: Denzin, N.K. and Y.S Lincoln (editors). *The Sage Handbook of Qualitative Research*. *Third Edition*. Sage Publications, United Kingdom. Pp 1-32.

Devi, J.T. and K. Hemant. 2009. Corporate Social Responsibility Perceptive of Small and Medium Enterprises (SME) – A Case Study of Mauritius. *Advances in Management*. 2 (12): 44-53.

Dewees, D.N. and M.J. Hare. 1998. Economic Analysis of Packaging Waste Reduction. *Canadian Public Policy*. 24 (4) 453-470.

Dikgang, J., Leiman, A. and M. Visser. 2012*.* Analysis of the plastic-bag levy in South Africa. *Resources, Conservation and Recycling*. 66: 59– 65.

Dittke, M. 2010. Chapter 20. A Short Overview of Current Waste Management Legislation in South Africa. In: Emery, R (editor). 2010. The Waste Revolution Handbook South Africa. Volume I. Alive2Green, Cape Town. pp 29-31.

DTI (Department of Trade and Industry). 2005. *Integrated Small-Enterprise-Development Strategy*. *Unlocking the potential of South African entrepreneurs*. Department of Trade and Industry South Africa, Pretoria.

DTI (Department of Trade and Industry). 2007. *Broad-Based Black Economic Empowerment Act (53/2003): Codes of Good Practice in Black Economic Empowerment*. Government Gazette No. 29617. Department of Trade and Industry, Pretoria.

DTI (Department of Trade and Industry). 2011/2012. *South Africa: Investor's Handbook 2011/2012*. DTI South Africa, Pretoria.

DTI (The Department of Trade and Industry). August 2008. *Annual Review of Small Business in South Africa 2005-2007*. Department of Trade and Industry, Pretoria.

DTI (The Department of Trade and Industry). March 1995. *White Paper on National Strategy for the Development and Promotion of Small Business in South Africa*. Notice 213 of 1995 Parliament of the Republic of South Africa, Cape Town. Available at: http://www.info.gov.za/whitepapers/1995/smallbus.htm [Accessed 25 March 2013].

DTI (The Department of Trade and Industry). November 2004. *Review of Ten Years of Small Business Support in South Africa 1994 – 2004*. Enterprise Development Unit, Department of Trade and Industry, Pretoria.

DTI (The Department of Trade and Industry). October 2003*. The Integrated Small Business Development Strategy in South Africa*. Enterprise Development Unit, Department of Trade and Industry, Pretoria.

Dummett, K. 2006. Drivers For Corporate Environmental Responsibility (CER). *Environment, Development and Sustainability*. 8: 375–389.

Durban Metropolitan. 1999*. Durban Metro State of the Environment and Development*. http://www.ceroi.net/reports/durban/index.htm [Accessed 1 August 2012].

DWAF (Department of Water Affairs and Forestry). 1998. *Waste Generation ins South Africa: Baseline Studies*. Waste Management Series. Department of Water Affairs and Forestry, Pretoria.

DWAF (Department of Water Affairs and Forestry). 1998b. *Minimum Requirements Waste Management Guideline Series Volume 2.* Department of Water Affairs and Forestry, Pretoria.

Dzansi, D.Y. and M. Pretorius. 2009a. Addressing and measuring small business social responsibility in the African context: a stakeholder framework. *Social Responsibility Journal*. 5 (2): 245-256.

Dzansi, D.Y. and M. Pretorius. 2009b. The development and structural confirmation of an instrument for measuring the social responsibility of small and micro businesses in the African context. *Social Responsibility Journal.* 5 (4): 450-463.

Dzansi, D.Y. 2008. The social responsibility of SMEs : the case for a framework and measurement instrument for the African context. *Interim*. 7(2): 15-26.

Dzansi, D.Y. 2011. Social responsibility of small businesses in a typical rural African setting: Some insights from a South African study*. African Journal of Business Management*. 5 (14): 5710-5723.

Dzansi, D.Y. and M. Pretorius. 2007*.* A framework for measuring business social responsibility in micro and small business. *Interim Interdisciplinary Journal.* 6(2): 75-96.

Dzansi,D.Y. and M. Pretorius. 2009. Addressing and measuring small business social responsibility in the African context: a stakeholder framework. *Social Responsibility Journal.* 5(2): 245-256.

ECOTEC Research and Consulting. 2000. *Report on SMEs and the environment. Analysis of the replies given by 6 European Union Member States to a European Commission's questionnaire on Small and Medium-Sized Enterprises (SMEs) and the Environment.* European Commission, Brussels.

EDDRSA (Economic Development Department Republic of South Africa). 2011. *New Growth Path Accord 4*. *Green Economy Accord*. Economic Development Department Republic of South Africa, South Africa.

Edwards, A.J. 2004. ISO 14001 Environmental Certification Step by Step: Revised Edition. Elsevier Butterworth-Heinemann, Oxford. 246pp.

Ejaz, N., Akhtar, N., Nissra, H. and U. Ali Neem. 2011. *Environmental impacts of improper solid waste management in developing countries*. In: Brebbia, C.A (editor). *Sustainable World*. WIT Press, Unite Kingdom. 379 – 388pp.

El-Haggar, S.M. 2007. *Chapter 5. Sustainability of Municipal Solid Waste Management*. In:

Sustainable Industrial Design and Waste Management. *Cradle-to-cradle for Sustainable Development*. Elsevier, New York. 424pp.

Engeldow, S. 2010. Chapter 1. Waste Management or Resource Management. In: Emery, R (editor). 2010. The Waste Revolution Handbook South Africa. Volume I. Alive2Green, Cape Town. 29-31pp.

EnviroServ. [no date]. *EnviroServ Corporate Social Investment*. Available at: http://www.enviroserv.co.za/docs/social-responsibility/social-responsibility.pdf?sfvrsn=0 [Accessed 14 October 2012].

EnviroServ. 2011. *EnviroServ Sustainability Review*. Available at: http://www.enviroserv.co.za/docs/sustainability/sustainability.pdf?sfvrsn=0 [Accessed 14 October 2012].

EnviroServ. 2012. *EnviroServ website*. Available at: http://www.enviroserv.co.za/ [Accessed October 2012].

Eriksson, P. and A. Kovalainen. 2008. *Qualitative Methods in Business Research*. Sage Publications, London. 337pp.

Eskom. 2010. *Eskom IDM Funding Options.* Available at: http://www.eskomidm.co.za/funding-options [Accessed 18 July 2012].

Esser, I. and A. Dekker. 2008. The Dynamics of Corporate Governance in South Africa: Broad Based Black Economic Empowerment and the Enhancement of Good Corporate Governance Principles. *Journal of International Commercial Law and Technology*. 3 (3): 157-169.

eThekwini Municipality. 2004. *Integrated Waste Management Plan for eThekwini Municipality*. August 2004. Available at: http://www.durban.gov.za/Documents/CityServices/Cleansing%20and%20Solid%20Waste/Integrated_Waste_Management_Plan.pdf [Accessed 27 December 2012].

eThekwini Municipality. 2008. *eThekwini Municipality State of the Environment Report. Headline Indicators Report. 2007/8 Municipal financial year.* Environmental Management Department Development Planning Environment and management Department. Available at: http://www.durban.gov.za/City_Services/development_planning_management/environmental_planning_climate_protection/Publications/Documents/SOE%20Headline%20indicators%20report%202007%202008.pdf [Accessed 27 December 2012].

eThekwini Municipality. 2012. *eThekwini Municipality. Draft Integrated Development Plan. 5 Year Plan: 2012/13 to 2016/17*. Available at: http://www.durban.gov.za/Resource_Centre/IDP/Documents/11085_1.PDF [Accessed 27 December 2012].

EU (Commission of the European Communities). 2001. *Green Paper. Promoting a European framework for Corporate Social Responsibility*. Brussels, 18.7.2001. COM (2001) 366 final. Available at: http://europa.eu/documentation/official-docs/green-papers/index_en.htm#2002 [Accessed 12 December 2012].

EU (European Commission) 2001. *Waste Management Options and Climate Change. Final report to the European Commission,* DG Environment. Available from: ec.europa.eu/environment/waste/studies/pdf/climate_change.pdf [Accessed 17 March 2013].

EU (European Commission) Directorate-General for Enterprise and Industry. 2007b. Opportunity and Responsibility. How to help more small business to integrate social and

environmental issues into what they do. Available at:

http://ec.europa.eu/enterprise/policies/sustainable-business/files/csr/documents/eg_report_and_key_messages/key_messages_en.pdf [Accessed 14 January 2013].

EU (European Commission). 2007. *Small clean and competitive – a programme to help small and medium-sized enterprises comply with environmental legislation* [online]. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of Regions, COM (2007) 379 final. Available at: http://ec.europa.eu/environment/sme/programme/programme_en.htm [Accessed 14 January 2013].

Eua-anant, P., Ayuwa, D. and B. Promphakping. 2011. Relations Between Positive Impacts of CSR, External Support, CSR Knowledge and the Degree of CSR Practices in Thai Small and Medium Enterprises. *International Business and Economics Research Journal*. 10 (11): 17-26.

EUROPEN (The European Organisation for Packaging and the Environment). 2012. *European and National Legislation on Packaging and the Environment.* European, Belgium.

EUROSTAT. 2013. *European commission EUROSTAT website*. Available at http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/ [Accessed 22 March 2012].

Falasca-Zamponi, S. 2011. *Waste and Consumption: Capitalism, the Environment, and the Life of Things.* Routledge, New York. 66pp.

Farquhar, J.D. 2012. *Case Study Research for Business*. Sage Publications, London. 134pp.

Fassin, Y. 2008. SMEs and the fallacy of formalising CSR. *Business Ethics: A European Review*. 17 (4): 364-378.

Fenwick, T. 2010. Learning to practice social responsibility in small business: challenges and conflicts. *Journal of Global Responsibility.* 1 (1): 149 – 169.

Fernández-Viñé, M.B., Gómez-Navarro, T. and S.F. Capuz-Rizo. 2010. *Eco-efficiency in the SMEs of Venezuela.* Current status and future perspectives*. Journal of Cleaner Production.* 18: 736–746.

Fiehn, H. and J. Ball. 2005. Integrated waste management: background research paper produced for the South Africa Environment Outlook report on behalf of the Department of Environmental Affairs and Tourism. Jarrod Ball and Associates.

Fig, D. 2005. Manufacturing amnesia: Corporate Social Responsibility in South Africa. *International Affairs*. 81 (1): 599-617.

Fig, D. 2007. The context of corporate environmental responsibility. In: Fig, D. Staking their claims. Corporate social and environmental responsibility in South Africa. University of KwaZulu-Natal Press, South Africa. 1-94pp.

FinScope. 2010. *FinScope South Africa Small Business Survey 2010.* FinMark Trust. Available at: http://www.finmark.org.za/ [Accessed 27 March 2013].

Fishbein, B.K. 1994. Germany, Garbage and the Green Dot: Challenging a Throwaway Society. Inform, New York. 172 pp.

Fitzgerald, L and S. Dopson. 2009. Comparative case study designs. Their utility and development. In: Buchanan, D.A. and A. Bryman. 2009. The Sage Handbook of Organisational Research Methods. Sage Publications, London. 465-483pp.

Flick, U. 2009. *An Introduction to Qualitative Research*. Fourth edition. Sage Publications, London. 505pp.

Forstater, M., MacGillivray, A. and Raynard, P. in cooperation with the UNIDO Private Sector Development Branch. 2006*. Responsible Trade and market Access: Opportunities or Obstacles for SMEs in Developing Countries?* United Nations Industrial Development Organization (UNIDO), Vienna, Austria.

Fourie, A. 2004. Editorial. Municipal solid waste management as a luxury item*. Waste Management.* 26:801–802.

Fox, T. 2005. Small and Medium-Sized Enterprises (SMEs) and Corporate Social Responsibility: A Discussion Paper. International Institute for Environment and Development. Available at: http://pubs.iied.org/G02266.html?k=smallandmediumsizedenterprises [Accessed 5 February, 2013].

Freeman, S and N. Mgingqizana. 2009. *Integrating Economic Development, Social Justice and Ecological Sustainability: A Case of Sustainable Development in the Waste Industry, eThekwini Unicity, Durban*. In: van Rensburg, E.J. (managing editor). *Environmental Education, Ethics and Action in Southern Africa*. Humans Sciences Research Council, Pretoria

Freemantle, A (editor). 2008. *The Sustainable Business Handbook*. Trialogue. Cape Town. 118pp.

Friedman, A.L. and S. Miles. 2001*.* SMEs and the environment: two case studies. *Eco-Management and Auditing.* 8 (4): 200-209.

Frost, A. 2011. Going Green: Prospects For SMEs to Attain ISO 14001 and the Challenges they Face in the Process. PhD thesis, Aston University.

Gadenne, D.L., Kennedy, J. and C. McKeiver. 2008. An Empirical Study of Environmental Awareness and Practices in SMEs. *Journal of Business Ethics*. 84:45–63.

Gagnon, Y. 2010. *The Case Study as Research method. A Practical Handbook*. Presses de'Luniversitè' de Quèbec, Canada. 117pp.

Garaya, L and X. Font. 2012. Doing good to do well? Corporate social responsibility reasons, practices and impacts in small and medium accommodation enterprises. *International Journal of Hospitality Management.* 31: 329– 337.

Gillham, B. 2000. *Real World Research. Case Study Research Methods*. Continuum, New York. 105pp.

Goddard, W. and S. Melville. 2007. *Research Methodology: An Introduction*. Juta and Co., Landsdowne. 149pp.

Godfrey, L., Scott, D. and C. Trois. 2013. Caught between the global economy and local bureaucracy: the barriers to good waste management practice in South Africa. *Waste Management and Research*. 31: 295–305.

Godfrey, L., Scott, D., Difford, M. and C. Trois. 2012. Part II – The effect of data on waste behaviour: The South African waste information system. Waste Management. 32: 2163–2176.

Godfrey, L., Scott, D., Difford, M. and C. Trois. 2012a. Part I – The role of waste data in building knowledge: The South African waste information system. Waste Management. 32: 2154-2162.

Group Wreck. 2012. *Group Wreck International website*. Available at:

http://www.gwinf.co.za/index.html [Accessed 30 October 2012].

Guerrero, L.A., Mass, G. and W. Hogland. 2013. Solid waste management challenges for cities in developing countries. *Waste Management*. 33: 220–232.

Gunnigham, N. 2009. Shaping Corporate Environmental Performance: A Review. *Environmental Policy and Governance*. 19: 215–231.

Gupta, S. and P. Khanna. 2011. Corporate Social Responsibility: An Analysis in SMEs at Faridabad Region. *International Journal of Multidisciplinary Research*. 1 (8): 261-278.

Halila,F. 2007. Networks as a Means of Supporting the Adoption of Organizational Innovations in SMEs: The Case of Environmental Management Systems (EMSs) Based on ISO 14001*. Corporate Social Responsibility and Environmental Management*. 14, 167–181.

Hallinan, P. 2003. The SME battle against environmental performance: The Hackefors model. *16th Annual Conference of Small Enterprise Association of Australia and New Zealand, 28 September – 1 October 2003*.

Halpert, A. 2001*.* Germany's solid waste disposal system: Shifting the responsibility. *Georgetown International Environmental Law Review*. 14 (1): 136-160.

Hamann, R. 2009. *Chapter 20. South Africa: The Role of History, Government, and Local Context*. In: Idowu, S. O. and W.L. Filho (editors). *Global Practices of Corporate Social Responsibility.* Springer, Berlin. 435-460pp.

Hanks, J. 2007. *Corporate Social Responsibility and the United Nations Global Compact in South Africa. Human Rights, Labour, Environment and Anti-Corruption*. National Business Initiative, Johannesburg.

Harper, R. 2013. Business Development Manager, Mpact Recycling. Personal Communication, 22 October 2012.

Harris, F (editor). 2004*. Global Environmental Issues*. John Wiley and Sons, England. 324pp.

Hart, S.L. 2007. *Beyond Green: Strategies for a Sustainable World.* In: Harvard Business School Press*. Ideas with Impact. Harvard Business Review on Green Business Strategy.* Harvard Business School Publishing Corporation, United States of America. 99-124pp.

Heras, A. and G. Arana. 2010*.* Alternative models for environmental management in SMEs: the case of Ekoscan vs. ISO 14001. *Journal of Cleaner Production.* 18: 726–735.

Heritage SA. 2012. *Heritage SA website*. Available at: http://www.heritagesa.co.za [Accessed 3 October 2012].

Hicks, C., Heidricha, O., McGovernb, T. and T. Donnelly. 2004. A functional model of supply chains and waste. *International Journal of Production Economics.* 89: 165–174.

Hillary, R. and P. Burr. 2011. *Evidence-based Study into the Benefits of EMSs for SMEs.* Department for Environment, Food and Rural Affairs (DEFRA), London. Available at: http://randd.defra.gov.uk/Default.aspx?Menu=MenuandModule=MoreandLocation=NoneandProjectID=16942andFromSearch=YandPublisher=1andSearchText=EV0440andSortString=ProjectCodeandSortOrder=AscandPaging=10#Description [Accessed 15 April 2013].

Hillary, R. 1999. Evaluation of Study Reports on the Barriers, Opportunities and Drivers for Small and Medium-sized Enterprises in the Adoption of Environmental Management Systems. A report submitted to: Department of Trade and Industry Environment Directorate.

Hillary, R. 2000. *Introduction*. In: Hillary, R. *Small and Medium Enterprises and the Environment.* Business Imperatives. Greenleaf Publishing, Sheffield. 11-23pp.

Hillary, R. 2004. Environmental management systems and the smaller enterprise. *Journal of*

Cleaner Production. 12: 561–569.

Hitchens, D., Birnie, E., Thompson, W., Triebswetter, U., Bertossi, P. and L. Messori. 2000. *Environmental Regulation and Competitive Advantage: A Study of Packaging Waste in the European Supply Chain.* Edward Elgar Publishing, Cheltenham. 379pp.

Hitchens, D., Clausen, J., Trainor, M., Keil, M. and S. Thankappan. 2003. Competitiveness, Environmental Performance and Management of SMEs. *Greener Management International*. 44: 45-57.

Hoggart, K., Lees, L. and A. Davies. 2002. *Researching Human Geography*. Arnold, Great Britain. 359pp.

Holtbrügge, D and C. Dögl. 2012. How international is corporate environmental responsibility? A *literature review. Journal of International Management*. 18: 180–195

Hönke, J., Kranz, N., Börzel, T.A. and A. Héritier. 2008. *Fostering Environmental Regulation? Corporate Social Responsibility in Countries with Weak Regulatory Capacities*. The Case of South Africa. SFB Working Paper Series N°9, DFG Collaborative Research Centre 700, Berlin.

Hoskin, P. 2011. Why business needs to green the supply chain. *University of Auckland Business Review.* 3 (1): 16-18.

Howe, J.C. and M.B. Gerrard (editors). 2010. *The Law of Green Buildings*. Regulatory and Legal Issues in Design, Construction, Operations and Financing. ABA Publishing, Chicago. 409pp.

Huang, C. and H. Ma. 2004. *A multidimensional environmental evaluation of packaging materials.* Science of the Total Environment. 324: 161–172.

Hugo, J. 2004. *Environmental Management. An Ecological Guide to Sustainable Living in Southern Africa.* 342pp. Ecoplan, Brooklyn Square.

Inmaculada, M., Aragón-Correa, J.A. and A. Rueda-Manzanares. 2010. Environmental strategy and exports in medium, small and micro-enterprises. *Journal of World Business*. 45: 266–275.

International Finance Corporation (IFC). 2010. *The SME Banking Knowledge Guide*. Second Edition. The World Back, Washington.

Iraldo, F., Testa, F. and M.Frey. 2010. *Environmental Management System and SMEs: EU Experience, Barriers and Perspectives.* In: Sarkar, S.M. (Editor). *Environmental Management*. Sciyo, Croatia. 1 -34 pp.

IRC (Integrated Reporting Committee). 2011. *Framework for Integrated Reporting and the Integrated Report.* Discussion Paper. 25 January 2011. Available at: www.sustainabilitysa.org [Accessed 10 July 2012].

ISO (International Organisation for Standardisation) [Online]. *International Organisation for Standardisation website*. Available at http://www.iso.org/ [Accessed 8 April 2013].

ISO (International Organisation for Standardisation). 2005. *The Global Use of Environmental Management System by Small and Medium Enterprises.* Executive Report from ISO/TC207/SC1/ Strategic SME Group. May 2005. Swedish Industry Association, Sweden. Available at: www.ubq-rj.com.br/cbqp%5CISO_Rep_EMS_SME2005.pdf [Accessed 17 April 2013].

Jackson, S. 1997. *The ISO 14001 Implementation Guide*. Creating an Integrated Management System. John Wiley and Son Inc., Canada. 281pp.

Jamali, D., Zanhour, M., Ksehishian, T. 2009. Peculiar strengths and relational attributes of

SMEs in the context of CSR. *Journal of Business Ethics.* 87: 355-77.

Jarvis, M. 2004. *Can Small Be Responsible? The Possibilities and Challenges of Corporate Social Responsibility among Small and Medium Enterprises*. January 19–February 8, 2004. *WB I Series On Corporate Responsibility, Accountability And Sustainable Competiveness*. The World Bank Institute Corporate Governance and Corporate Social Responsibility Program. Available at: info.worldbank.org/etools/docs/library/…/small_responsible.pdf [Accessed 29 March 2013].

Jenkins, H. 2004. A critique of conventional CSR theory: an SME perspective*. Journal of General Management*. 9 (4): 55-75.

Jenkins, H. 2006. Small business champions for corporate social responsibility. *Journal of Business Ethics.* 67: 241-56.

Jenkins, H. 2009*.* A 'business opportunity' model of corporate social responsibility for small- and medium-sized enterprises. *Business Ethics: A European Review*. 18 (1): 21-36.

Johnston, W.J., Leach, M.P. and A.H. Liu. 1999. Testing using Case Studies in Business-to-Business Research. *Industrial Marketing Management*. 28: 201-213.

Jonkutė, G., Staniškis, J.K and D. Dukauskaitė. 2011. Social Responsibility as a Tool to Achieve Sustainable Development in SMEs. Environmental Research, Engineering and Management*. 3 (57): 67 – 81.*

Josipovic, M. 2005. Improving environmental performance in the SME sector. A waste and water management assessment toolkit. *Resource* (the official journal of the Institute of Waste Management South Africa), August 2005, 19-23pp.

Karani, P. and S.M. Jewasikiewitz. 2007. Waste Management and Sustainable Development in South Africa. *Environment, Development and Sustainability*. 9:163–185.

Karvonen, M. 2000. Environmental accounting as a tool for SMEs in environmentally induced economic risk analysis. *Eco-Management and Auditing*. 7 (1): 21-28.

Kaseva, M.E. and S. E. Mbulingwe. 2005*.* Appraisal of solid waste collection following private sector involvement in Dar es Salaam city, Tanzania. *Habitat International*. 29: 353–366.

Kechiche, A. and R. Soparnot. 2012. CSR within SMEs: Literature Review. *International Business Research*. 5 (7): 97-104.

Kehbila, A.G., Ertel, J. and A .C. Brent. 2009. Strategic Corporate Environmental Management within the South African Automotive Industry: Motivations, Benefits, Hurdles. *Corporate Social Responsibility and Environmental Management*. 16: 310–323.

Kidd, M. 2008. *Environmental Law*. Juta and Company Ltd, Cape Town. 270pp.

Kidd, M. 2011. *Environmental Law*. Second Edition. Juta and Company Ltd, Cape Town. 191pp.

Kothari, C.R. 2006*. Research Methodology. Methods and Techniques*. Second edition. New Age International Publishers, New Delhi. 404pp.

Kovács, G. 2008. Corporate environmental responsibility in the supply chain. *Journal of Cleaner Production.* 16: 1571–1578.

KPMG. 2011. *KPMG International Survey of Corporate Responsibility Reporting 2011*. KPMG International, Switzerland. Available at www.kpmg.com [Accessed 20 May 2013].

Krauss, A., Rūtelionė, A. and Z. Piligrimienė. 2010. SME in search for feasible concepts for systematic social responsibility in times of crisis. *Economics and Management*. 15: 635-641.

Krishnamoorthy, B. 2005. *Environmental Management*. Prentice-Hall of India, New Dehli. 251pp.

Kumar, C.R. 2008*. Research Methodology*. APH Publishing Corporation, New Delhi. 148pp.

Kumar, R. 2005. Research Methodology. A step-by-step guide for beginners. Sage Publications, London. 332pp.

Kusyk, S.M., Lozano, J.M. 2007. Corporate responsibility in small and medium-sized enterprises SME social performance: a four-cell typology of key drivers and barriers on social issues and their implications for stakeholder theory. *Corporate Governance*. 7(4): 502-15.

Kvale, S. and S. Brinkmann. 2009. *Interviews. Learning the Craft of Qualitative Research Interviewing.* Sage Publications, London. 354pp.

Kwazulu-Natal Department of Agriculture and Environmental Affairs (KZNDEA). 2003. KwaZulu-Natal Policy on Waste Management. Prepared for the Department of Agriculture and Environmental Affairs by Phelamanga Projects. Available at: http://www.phelamanga.co.za/images/projects/14_kzn_waste_policy.pdf [Accessed 27 December 2012].

Labonne, J. and C.L. Conseil. 2006. *A Comparative Analysis of the Environmental Management, Performance and Innovation of SMEs and Larger Firms*. European Commission. Available at: http://ec.europa.eu/environment/sme/programme/programme_en.htm [Accessed 11 March 2013]

Ladzani, M.W. and S.M. Seeletse. 2012. Business social responsibility: how are SMEs doing in Gauteng, South Africa? *Social Responsibility Journal*. 8 (1): 87-99.

Lancaster, S. 2012. *Green Australia. A Snapshot*. Wakefield Press, Kent Town. 330pp.

Laurinkevičiūtė, A and Ž. Stasiškienė. 2010*.* Sustainable Development Decision-Making Model for Small and Medium Enterprises. *Environmental Research, Engineering and Management*. 2 (52): 14-24.

Lavee, D., Regev, U. and A. Zemel. 2009. The effect of recycling price uncertainty on municipal waste management choices. *Journal of Environmental Management*. 90:3599–3606.

Lee, K. 2009. Why and how to adopt green management into business organizations? The case study of Korean SMEs in manufacturing industry. *Management Decision*. 47 (7): 1101-1121.

Lee, L. T. 2011. The pivotal roles of corporate environment responsibility*. Industrial Management and Data Systems*. 112(3): 466 – 483.

Lee, S. 2008. Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives. *Supply Chain Management: An International Journal*. 13 (3): 185-198.

Lefebvre, E., Lefebvre. L. and S. Talbot. 2003*.* Determinants and impacts of environmental performance in SMEs. *RandD Management*. 33(3): 263–283.

Lemann, M.F. 2008*. Waste Management*. Peter Lang AG. International Academic Publishers, Switzerland. 387pp.

Lepoutre, J and A. Heene. 2006. Investigating the Impact of Firm Size on Small Business Social Responsibility: A Critical Review. *Journal of Business Ethics*. 67:257–273

Lewis, H. 2005*.* Defining product stewardship and sustainability in the Australian packaging

industry. *Environmental Science and Policy*. 8: 45–55.

Lewis, K., and Cassells, S. (2009*). Small firms and environmental responsibility: The potential for collaborative approaches.* Paper presented at The Asia Pacific Academy of Business in Society conference: Finding solutions to global problems through stakeholder engagement, new social partnerships and strategic alliances for a sustainable enterprise economy. Brisbane, Australia.

Lewis, K.V. and S.M. Cassells. 2010. Barriers and drivers for environmental practice uptake in SMEs: a New Zealand perspective. *International Journal Of Business Studies – Special Edition.* 18 (1): 7-21.

Liang, S. and W. Chang. 2008. An Empirical Study on Relationship between Green Supply Chain Management and SME Performance in China. *International Conference on Management Science and Engineering*, pp. 611-618.

Loucks, E.S., Martens, M.L. and C.H. Cho. 2010. Engaging small- and medium-sized businesses in sustainability. *Sustainability Accounting, Management and Policy Journal*. 1: 178-200.

Lozano-Olvera, G., Ojeda-Benitezb, B., Castro-Rodrigueza, J.R., Bravo-Zanoguerab, M. and A. Rodriguez-Diaz. 2008. Identification of waste packaging profiles using fuzzy logic. *Resources, Conservation and Recycling*. 52: 1022-1030.

Luetkenhorst, W. 2004. Corporate Social Responsibility and the Development Agenda The Case for Actively Involving Small and Medium Enterprises. *Intereconomics*, May/June 2004: 157-166.

Lui, H. and M. Fong. 2010. The Corporate Social Responsibility Orientation of Chinese Small and Medium Enterprises. Journal of Business Systems, Governance and Ethics. 5 (3): 33-50.

Lyon, T.P. and J.W. Maxwell. 2008. Corporate Social Responsibility and the Environment: A Theoretical Perspective. *Review of Environmental Economics and Policy*. 2(2): 240–260.

Ma, J. 2012. 2012 International Conference on Solid State Devices and Materials Science. A Study on the Models for Corporate Social Responsibility of Small and Medium Enterprises. *Physics Procedia.* 25: 435 – 442.

Magram, S.F. 2011. Worldwide solid waste recycling strategies: A review. *Indian Journal of Science and Technology.* 4 (6): 692-702.

Mahembe, E. 2011. *Literature review on small and medium enterprises' access to credit and support in South Africa.* National Credit Regulator (NCR). Pretoria, South Africa.

Makgae, M. 2011. Chapter 5. Key Areas in Waste Management: A South African Perspective. In: Integrated Waste Management – Volume II. InTech, Croatia. 69-82pp.

Marshall, C. 1998. *Economic instruments and the business use of energy*. Report for HM Treasury. London: The Stationary Office. Available from: http://www.hm-treasury.gov.uk/d/EconomicInstruments.pdf [Accessed 11 April 2013].

Marshall, R.E. and K. Farahbakhsh. In press. Systems approaches to integrated solid waste management in developing countries. *Waste Management.* 2013.

Marthinusen, A. 2010. *Chapter 2. Packaging*. In: Emery, R (editor). 2010. *The Waste Revolution Handbook South Africa*. *Volume I*. Alive2Green, Cape Town. 29-31pp.

Marthinusen, A. 2012. Executive Director, Packaging Council South Africa. Personal communication, 5 March 2012.

Marvasti, A.B. 2004. *Qualitative Research in Sociology*. Sage Publications, London. 160pp.

Masure, E. 2007. Why SMEs Invest in Environmental Measures: Sustainability Evidence from Small and Medium-Sized Printing Firms. *Business Strategy and the Environment*. 16: 190–201.

Matete, N. and C. Trois. 2008. Towards Zero Waste in emerging countries – A South African experience. *Waste Management.* 28: 1480–1492.

Mathibe, M.S. and J.H. van Zyl. 2011. The Impact Of Business Support Services To SMEs In South Africa. *International Business and Economics Research Journal*. 10 (11): 101-108.

Matten, D., and Moon, J. 2008. "Implicit" and "explicit" CSR: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of Management Review.* 33: 404–424.

Mazur,E. 2012*. European Commission Working Party on Integrating Environmental and Economic Policies. Green Transformation Of Small Businesses: Achieving And Going Beyond Environmental Requirements*. ORCD Publishing. Available at: http://www.oecd.org/ [Accessed 17 April 2013].

Mazurkiewicz, P. 2003. *CSR and Multi-stakeholder Dialogue – Towards Environmental Behavioural Change.* A Discussion Paper, DevComm, World Bank. Available at: http://siteresources.worldbank.org/EXTDEVCOMSUSDEVT/Resources/csrframework.pdf [Accessed 12 February 2013].

McKeiver, C. and D. Gadenne. 2005. Environmental Management Systems in Small and Medium Businesses. *International Small Business Journal.* 23 (5): 513–537.

MFI Mouldings and Frames [online]. *MFI Mouldings and Frames website*. Available at http://www.mfi-mouldings.co.za/ [Accessed 21 October 2012].

Mgingqizana, N. 2013. Education Officer, Durban Solid Waste Education and Waste Minimisation Office. Personal Communication, 5 February 2013.

Miles, M.B and A.M. Michael Huberman. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. Second edition. Sage Publications, London. 339pp.

Milojković, J. and V. Litovski. 2005. Concepts of computer take-back for sustainable end-of-life. *Working and Living Environmental Protection*. 2 (5): 363 – 372.

Moore, S.N. and S.L. Manring. 2009. Strategy development in small and medium-sized enterprises for sustainability and increased value creation. *Journal of Cleaner Production.* 17: 276–282.

Morsing, M and F. Perrinin. 2009. CSR in SMEs: do SMEs matter for the CSR agenda? *Business Ethics: A European Review.* 18 (1): 1-6.

Mpact. 2011. *Mpact Limited Integrated Report*. Available at: http://www.mpact.co.za/content/reports/IR11/downloads/mpact-integrated-report-2011.pdf [Accessed September 2012].

Mpact. 2012. *Mpact Limited website*. Available at: http://www.mpact.co.za/ [Accessed September 2012].

MRA. 2013. Metal *Recyclers Association website*. Available at: http://www.mra.co.za/ [Accessed 11 March 2013].

Mueller, M., dos Santos, V.G. and S. Seuring. 2009. The Contribution of Environmental and Social Standards Towards Ensuring Legitimacy in Supply Chain Governance. *Journal of Business Ethics.* 89:509–523.

Munasinghe, M.A.T.K. and A.P. Malkumari. 2012. Corporate Social Responsibility in Small

and Medium Enterprises (SME) in Sri Lanka. *Journal of Emerging Trends in Educational Research and Policy Studies.* 3 (2): 168-172.

Murillo, D., Lozano, J.M. 2006. SMEs and CSR: An Approach to CSR in their Own Words. *Journal of Business Ethics.* 67:227–240.

Murillo, D., Lozano, J.M. 2009. Pushing forward SME CSR through a network: an account from the Catalan model. *Business Ethics: A European Review*. 18 (1): 7-20.

Muzenda, E. 2011. *Reflecting on Waste Management Strategies for South Africa*. Proceedings of the World Congress on Engineering and Computer Science. Vol II. October 19-21, 2011, San Francisco, USA.

Myers, M. 2009. *Qualitative Research in Business Management*. Sage Publications, London. 284pp.

Nahman, A., 2009. *Extended producer responsibility for packaging waste in South Africa: Current approaches and lessons learned*. Stellenbosch: Council for Scientific and Industrial Research.

Nahman, A. 2010. Extended producer responsibility for packaging waste in South Africa: Current approaches and lessons learned*. Resources, Conservation and Recycling*. 54: 155–162.

Nahman, A. 2011. Pricing landfill externalities: Emissions and disamenity costs in Cape Town, South Africa. *Waste Management*. 31: 2046–2056.

Nahmana, A. and L. Godfrey. 2010. Economic instruments for solid waste management in South Africa: Opportunities and constraints. *Resources, Conservation and Recycling*. 54: 521–531.

Nakajima, N. and W.H. Vanderburg. 2006. A Description and Analysis of the German Packaging Take-Back System. Bulletin of Science, Technology and Society. 26 (6): 510-517.

Natal Solvent Recovery. 2010. *Natal Solvent Recovery website*. Available at: http://www.natalsolvent.co.za/ [Accessed September 2012].

Natarajan, G.S. and D.A. Wyrick. 2011. *Framework for Implementing Sustainable Practices in SMEs in the United States.* Proceedings of the World Congress on Engineering.

National Small Business Act (102 of 1996). Pretoria: Government Gazette.

National Treasury. 2011. *Chapter 11. Solid Waste*. In*: Local Government Budgets and Expenditure Review*. Available at: http://www.treasury.gov.za/publications/igfr/2011/lg/default.aspx [Accessed 26 July 2012].

NatRegs. 2009*. Clear guidance on environmental regulations. SME-Environment Survey 2009: England*. Available at: http://www.netregs.org.uk/ [Accessed 17 April 201].

Nee, G.Y. 2011*.* Determining Factors for ISO14001 EMS Implementation among SMEs in Malaysia: A Resource Based View. *World Academy of Science, Engineering and Technology*. 59: 1294-1299.

Nel, J.G. and L.J. Kotzè. 2009. Chapter 1. Environmental Management: An Introduction. In Strydom, H.A and N. D. King (editors). 2009. Fuggle and Rabie's Environmental Management. Second Edition. Juta Law, Cape Town. 699-745pp.

Neowood [online]. *Neowood website*. Available at: http://www.neowood.co.za/ [Accessed September 2012].

Niblock-Siddle, K and L. Black. 2008. What about SMEs? *Corporate Citizen Magazine*. August

2008, Issue 34. 34-37pp.

Nnoroma, I.C. and O. Osibanjo. 2008. Overview of electronic waste (e-waste) management practices and legislations, and their poor applications in the developing countries. *Resources, Conservation and Recycling.* 52: 843–858.

OECD (Organisation for Economic Co-operation and Development). 1998. *Waste Management Policy Group. Final Guidance Document for Distinguishing Waste from Non-Waste*. Environment Directorate, Environment Policy Committee. ENV/EPOC/WMP (89)1/REV1. Available at: http://search.oecd.org/officialdocuments/displaydocumentpdf/?doclanguage=enandcote=env/epoc/wmp(98)1/rev1 [Accessed 29 May 2012]

OECD (Organisation for Economic Co-operation and Development). 2000. *Small and Medium-sized Enterprises: Local Strength, Global Reach.* OECD Policy Brief. Public Affairs and Communications Directorate. Available at: www.oecd.org/publications/Pol_brief/ [Accessed 29 May 2012]

OECD (Organisation for Economic Co-operation and Development). 2001. *Extended Producer Responsibility: A Guidance Manual for Governments*. OECD Publishing. France. Available at http://books.google.co.za/books?id=-Zpjyhcu7TMCandprintsec=frontcover#v=onepageandqandf=false [Accessed 23 March 2013].

OECD (Organisation for Economic Co-operation and Development). 2004. *Economics Aspects of Extended Producer Responsibility*. OECD Publishing. France.

OECD (Organisation for Economic Co-operation and Development). 2004b. Effective Policies for Small Business. A guide for the policy review process and strategic plans for micro, small and medium enterprise development. Available at: www.unido.org/fileadmin/media/.../pdf/Business.../l5hvghso.pdf.pdf [Accessed 26 March 2013].

OECD (Organisation for Economic Co-operation and Development). 2004c. Second OECD conference of ministers responsible for small and medium-sized enterprises (SMEs). Promoting entrepreneurship and innovative SMEs in a global economy: Towards a more responsible and inclusive globalisation. Istanbul, Turkey 3-5 June 2004. Facilitating SMEs access to international markets. OECD Publishing, France.

OECD (Organisation for Economic Co-operation and Development). 2006. *Working Group on Waste Prevention and Recycling.* EPR Policies and Product Design: Economic Theory and Selected Case Studies. 28 February 2006. Available at http://www.oecd.org/officialdocuments/displaydocumentpdf/?cote=env/epoc/wgwpr(2005)9/finalanddoclanguage=en [Accessed 1 August 2012].

OECD (Organisation for Economic Co-operation and Development). 2007. *Small Business and Environmental Compliance. Review and Possible Application of International Experience in Georgia*. Available at: http://www.oecd.org/dataoecd/2/22/42072908.pdf [Accessed 26 March 2013].

OECD (Organisation for Economic Co-operation and Development). 2011. *Invention and Transfer of Environmental Technologies*. OECD Studies on Environmental Innovation. OECD Publishing. 234pp.

OECD Policy Brief. June 2000. *Small and Medium-sized Enterprises: Local Strength, Global Reach*. Available at: http://www.oecd.org/dataoecd/3/30/1918307.pdf [Accessed 26 March 2013].

OECD. 2007. *Small Businesses and Environmental Compliance. Review and Possible Application of International Experience in Georgia*. OECD Publishing. Available at www.oecd.org/countries/georgia/42072908.pdf [Accessed 27 March 2013].

Oelofse, S.H.H. and W.F. Strydom. 2010. *The trigger to recycling in a developing country – in the absence of command-and-control instruments*. In: *Proceedings Waste 2010: Waste and resource Management – putting strategy into practice. Stratfordupon-Avon, Warwickshire, England, 28-29 September 2010.*

Oelofse, S.H.H. 2012*. I*ndicative quantities of recyclable materials disposed of at municipal landfills in 2011. *4th CSIR Biennial Conference: Real problems relevant solutions*, CSIR, Pretoria, 9-10 October 2012.

Oelofse, S.H.H. and L. Godfrey. 2008*.* Defining waste in South Africa: Moving beyond the age of 'waste'. *South African Journal of Science*. 104: 242-246.

Packaging World [online]. *Packaging World website*. Available at: http://www.packagingworld.co.za/ [Accessed 28 November 2012].

PACSA (Packaging Council of South Africa). 2011. *Packaging And Paper Industry Waste Management Plan.* Submitted by the Packaging Council of South Africa, August 2011. Available at: www.pacsa.co.za/pictures/pdfs/IndWMP.pdf [Accessed 22 December 2012].

PACSA (Packaging Council of South Africa). 2012. *Packaging Council of South Africa website*. http://www.pacsa.co.za/ [Accessed 4 March 2013]

Painter-Morland, M and L.J. Spence. 2009. Introduction: Business ethics in small and medium enterprises. *African Journal of Business Ethics*. 4(2): 1-6.

Painter-Morland, M. and K. Dobie. 2009. Ethics and sustainability within SMEs in Sub-Saharan Africa: Enabling, constraining and contaminating relationships. *African Journal of Business Ethics.* 4 (2): 7-19.

Palmer, K. and M. Walls. 2002. RFF Report November 2002. *The Product Stewardship Movement Understanding Costs, Effectiveness, and The Role for Policy.* Resources for the Future, Washington D.C. 56 pp.

PAMSA (Paper Manufacturers Association of South Africa). 2013. *Paper Manufacturers Association of South Africa website*. Available at: http://www.thepaperstory.co.za/ [Accessed 3 March 2013].

Panneerselvam, R. 2006. *Research Methodology*. Prentice Hall of India, New Delhi. 642pp.

Perchard, D. 1994. Pira Reviews of Packaging. Background and developments in key packaging areas. Effects of environmental packaging legislation. Pira International, Surry.

Periathamby, A. 2011. *Chapter 8. Municipal Waste Management*. In: Letcher, T.M. and D.A.Vallero (editors). *Waste. A Handbook for Management*. Elsevier Academic Press, Burlington. Pp 109-126.

Perez-Sanchez, D., Barton, J.R. and D. Bower. 2003. Implementing environmental management in SMEs. *Corporate Social Responsibility and Environmental Management*. 10 (2): 67-77.

Perrini, F. 2006*.* SMEs and CSR Theory: Evidence and Implications from an Italian Perspective. *Journal of Business Ethics*. 67: 305-316.

Perrini, F., Russo, A., Tencati, A. 2007. CSR strategies of SMEs and large firms: evidence from Italy. Journal *of Business Ethics*. 74 (3): 285-300.

Perry-Davies, D (Publishing Editor). 2012. *The Enviropaedia*. Eco-Logical Publishing, Western

Cape. Also see www.enviropaedia.com

Pesonen, H. 2001. Environmental Management of Value Chains. Promoting Life-cycle Thinking in Industrial Networks. *Greener Management International*. 33: 45-58.

PETCO (PET Plastics Recycling South Africa) [online] *PETCO PET Plastics Recycling South Africa website*. Available at: http://www.petco.co.za/ [Accessed 6 March 2013].

PETCO. 2011. *PET Plastics Recycling South Africa Annual Report.* 2011 Review of PETCO Activities. Available at: https://www.petcodb.co.za/ag3nt/media/media_items/2012//1352713623.pdf [Accessed 6 March 2013].

Peter, C. (co-lead author), Swilling, M. (co-lead author), du Plooy, P., de Wit, M., Wakeford, J., Lanz, J., Haysom, G., Kelly, C., Turton, A., Brent, A., Mason-Jones, K., Hansen, Y., Cohen, B. 2010. *Greening the South African Growth Path: Challenges, Prospects and Trajectories*. Policy Report commissioned by the Development Bank of Southern Africa. Stellenbosch, Sustainability Institute.

PFSA (Plastics Federation of South Africa) [online]. *Plastics Federation of South Africa website*. Available at: http://www.plasticsinfo.co.za/ [Accessed 5 March 2013].

PFSA (Plastics Federation of South Africa). 2011/12. *Plastics Federation of South Africa Annual Report 2011/12*. *The Journey Continues*. Available at: http://www.plasticsinfo.co.za/images/4073.pdf [Accessed 5 March 2013].

Pimenova , P. and R. van der Vorst. 2004. The role of support programmes and policies in improving SMEs environmental performance in developed and transition economies. *Journal of Cleaner Production.* : 12: 549–559.

Polyco (The Polyolefin Recycling Company) [online]. *The Polyolefin Recycling Company website*. Available at: http://www.polyco.co.za/ [Accessed 7 March 2013].

Pongracz, E. 2007. The Environmental Impacts of Packaging. In: Kutz, M. 2001. Environmentally Conscious Materials and Chemicals Processing. John Wiley and Sons, New York. 327 -728pp.

Pongrȧcz. E. and V.J. Pohjola. 2004. Re-defining waste, the concept of ownership and the role of waste management. *Resources, Conservation and Recycling*. 40: 141-153.

Porter, R.C. 2002. *The Economics of Waste*. Resources for the Future, United States of America. 301pp.

Powell, J.C. and A. Craighill. 2000. *Chapter 18. Waste Management*. In: O'Riorden, T. (editor). 2000. *Environmental Science for Environmental Managers.* Pearson Education limited, United Kingdom. Pp 469-484.

PPCSA (Polystyrene Packaging Council of South Africa PPCSA) [online]. *Polystyrene Packaging Council of South Africa website*. Available at: http://www.polystyrenepackaging.co.za/ [Accessed 23 October 2012].

Prakash, A and M. Potoski. 2009. *The Voluntary Environmentalists: Green Clubs, ISO 14001, and Voluntary Environmental Regulations*. Cambridge University Press, Cambridge. 934pp.

PRASA (Paper Recycling Association Of South Africa) [online]. *Paper Recycling Association Of South Africa website*. Available at: http://www.prasa.co.za/ [Accessed 3 March 2013].

Pretorius, M and D.Y. Dzansi. 2007. A framework for measuring business social responsibility in micro and small business. *Interim: Interdisciplinary Journal*. 6 (2): 75 -96.

PSPC (Polystyrene Packaging Council) [online]. *Polystyrene Packaging Council website*.

Available at: http://www.polystyrenepackaging.co.za/ [Accessed 7 March 2013].

Purnell, G. 2009. *National Waste Quantification and the Waste Information System.* Department of Environmental Affairs and Tourism, Pretoria.

Rahman, M.N. A. 2012. The Effective Implementation of Global Supply Chain Management in Small to Medium-sized Companies in Malaysia: An Empirical Study. *International Journal of Management.* 29 (3): 274 – 287.

Rahman, N and C. Post. 2012. Measurement Issues in Environmental Corporate Social Responsibility (ECSR): Toward a Transparent, Reliable, and Construct Valid Instrument. *Journal of Business Ethics.* 105:307–319.

Raja Mohd Rasi, R.Z., Abdekhodaee, A. and R. Nagarajah. 2010. *Understanding Drivers for environmental practices in SMEs: A critical review.* Proceedings of the 5th IEEE International Conference on Management of Innovation and Technology (ICMIT2010), Singapore, 02-05 June 2010, 372-377pp.

Ramachandra, T.V. 2006. *Environmental Engineering Series. Management of Municipal Solid Waste*. T.E.R.I. Press, India. 322pp.

Rao, P., Castillo, O., Intal, P.S. and A. Sajid. 2006. Environmental Indicators for Small and Medium Enterprises in the Philippines: An Empirical Research. *Journal of Cleaner Production*. 14 (5): 505-515.

Raynard, P. and M. Forstater. 2002. *Corporate Social Responsibility. Implications for Small and Medium Enterprises in Developing Countries*. United Nations Industrial Development Organization (UNIDO), Vienna.

Raynard, P. and M. Forstater. 2002. *UNIDO and the World Summit on Sustainable Development. Corporate Social Responsibility. Implications for Small and Medium Enterprises in Developing Countries.* United Nations Industrial Development Organization, Vienna.:

RE-. 2012. *RE- website*. Available at: http://www.re-sa.co.za/site/default.asp [Accessed August 2012].

Reclam (The New Reclamation Group) [online]. *The New Reclamation Group website*. Available at: http://www.reclam.co.za/ [Accessed 15 December 2012].

Recycling and Economic Development Initiative of South Africa (REDISA) [online]. *Recycling and Economic Development Initiative of South website*. Available at: http://www.redisa.org.za/ [Accessed 24 March 2013].

Revell, A., Stokes, D. and Chen, H. 2010. Small businesses and the environment: turning over a new leaf? *Business Strategy and the Environment*. 19 (5): 273-288.

Robson, C. 2002. *Real World Research. Second Edition*. Blackwell Publishers, Oxford. 599pp.

RSA (Republic of South Africa). 1989. *Environmental Conservation Act*, Act 73 of 1989. Government Gazette, 1 June 1989.

RSA (Republic of South Africa). 1996. The National Small Business Act 12 of 1996.

RSA (Republic of South Africa). 2003. The National Small Business Amendment Act 26 of 2003.

RSA (Republic of South Africa). 2004. The National Small Business Amendment Act 9 of 2004.

RSA (Republic of South Africa). 2009: National Environmental Management: Waste Act, Act

59 of 2008.

RSA (The Republic of South Africa). 1996. Constitution of the Republic of South Africa Act, No. 108 of 1996.

RSA (The Republic of South Africa). 1998. National Environmental Management Act, No. 107 of 1998.

RSA. 1995. *National strategy for the development and promotion of small business in South Africa.* Government Gazette number 16317, 28 March 1995.

Rubin, A. and E. Babbie. 2010. *Essential Research Methods for Social Work*. Brooks/Cole Cengage Learning, USA. 370pp.

Rule, P. and V. John. 2011*. Your Guide to Case Study Research.* Van Schaik Publishers, Pretoria. 144pp.

Russo, A and A. Tencati. 2009. Formal vs. Informal CSR Strategies: Evidence from Italian Micro, Small, Medium-Sized, and Large Firms. *Journal of Business Ethics*. 85 (2): 339-353.

Rutherfoord, R., Blackburn, R.A. and L.J. Spence. 2000. Environmental management and the small firm: An international comparison. *International Journal of Entrepreneurial Behaviour and Research*. 6 (6): 310–325.

SA Paper Mills [online]. *South African Paper Mills website*. Available at: http://www.sapaper.co.za/ [accessed 11 November 2012].

SABMiller. 2012. *SABMiller Sustainable Development Summary Report 2012.* Available at: www.sabmiller.com/files/reports/2012_SD_report.pdf [Accessed 18 December 2012].

SABS (South African Bureau of Standards). 2004. SANS 14001: 2005 (second edition). ISO 14001:2004 (Edition 2). South African National Standard. Environmental management systems. Requirements with guidance for use. Standards South Africa, GroenKloof.

SABS (South African Bureau of Standards). 2010. South African Bureau of Standards website. Available at https://www.sabs.co.za/ [Accessed 3 November 20120].

SAICA (South African Institute of South African Accountants). 2008. *South African Institute of South African Accountants website*. Available at: https://www.saica.co.za/tabid/695/itemid/2344/An-integrated-report-is-a-new-requirement-for-list.aspx [Accessed 10 November 2012].

SAISI (South African Iron and Steel Institute). 2013. *South African Iron and Steel Institute website.* Available at: http://www.saisi.co.za/ [Accessed 11 March 2013].

SAIWC (South African Waste Information Centre) [online]. *South African Waste Information Centre website*. Available at: http://www.sawic.org.za/ [Accessed 9 January 2013].

Sanchez, D. 2008. *Transformation in small, medium and micro enterprises*. In: Habib, A. and K. Bentley (editors). *Racial redress and citizenship in South Africa*. HSRC Press, South Africa. 209-229pp.

Santos, M. 2011. CSR in SMEs: strategies, practices, motivations and obstacles. *Social Responsibility Journal.* 7 (3): 490-508.

Sasikumar, K. and S.G. Krishna. 2009. *Solid Waste Management*. Asoke K. Gosh Publishing, New Delhi.

SATRPCo (South African Tyre Recycling Process Company). 2011. *South African Tyre Recycling Process Company website.* Available at: http://www.rubbersa.com/ [Accessed 24 March 2013].

SAVA (Southern African Vinyls Association) [online]. Southern African Vinyls Association website. Available at: http://www.savinyls.co.za/ [Accessed 7 March 2013].

SBP. 2011. *Headline Report of SBP's SME Growth Index™. Priming the Soil Small Business in South Africa*. November 2011. SBP Business Environment Specialist, Johannesburg. Available at: www.sbp.org.za/ [Accessed 27 March 2013]

SBP. 2013. *Headline Report of SBP's SME Growth Index™. Easier, Harder for Small Business in South Africa.* January 2013. SBP Business Environment Specialist, Johannesburg. Available at: www.sbp.org.za/ [Accessed 27 March 2013].

Schaper, M. 2002. *'The Challenge of Environmental Responsibility and Sustainable Development: Implications for SME and Entrepreneurship Academics.* In: U. Füglistaller, U., Pleitner, H.J., Volery, T. and W. Weber (editors*). Radical Changes in the World: Will SMEs Soar or Crash?* St Gallen, Switzerland. 541-553pp.

Seiffert, M.E.B. 2008. Environmental impact evaluation using a cooperative model for implementing EMS (ISO 14001) in small and medium-sized enterprises. *Journal of Cleaner Production.* 16: 447-1461.

Sen, S. 2011*. Corporate social responsibility in small and medium enterprises: application of stakeholder theory and social capital theory*. DBA thesis, Southern Cross University, Lismore, NSW.

Seuring, S., Sarkis, J., Müller, M. and P. Roa. 2008. Sustainability and supply chain management - An introduction to the special issue. *Journal of Cleaner Production* 16 (15): 1545-1551.

Silbert and Co. 2011. *Silbert and Co. website*. Available at: http://www.silbert.co.za/ [Accessed 15 December 2012].

Silverman, D. 2010. *Doing Qualitative Research*. Third Edition. Sage Publications, London. 456pp.

Simpson, M., Taylor, N. and K. Barker.2004*.* Environmental Responsibility in SMEs: Does it Deliver Competitive Advantage? *Business Strategy and the Environment*. 13: 156–171.

Sims Recycling Solutions. 2012. *Sims Recycling Solutions website*. Available at: http://www.simsrecycling.com/ [Accessed 15 December 2012].

SIVEST, 2004. *A Report for the Assessment of Waste Disposal Sites in the Province of Kwazulu-Natal.* A Study Commissioned by The Provincial Planning and Development Commission (PPDC). 25 February 2004. Available at: http://www.sawic.org.za/documents/293.pdf [Accessed 27 December 2012].

Skinner, C. and G. Mersham. 2008. Corporate social responsibility in South Africa: emerging trends*. Society and Business Review*. 3 (3): 239-255.

Smith, E.E. and S. Perks. 2010. Evaluating SMEs Corporate Social Performance: A Stakeholder Perspective. *Journal of Contemporary Management.* 7: 71-93.

South African Breweries. 2012. *SAB (Pty) Ltd Sustainable Development Report 2012*,. Available at: http://www.sab.co.za/sablimited/action/media/downloadFile?media_fileid=1050 [Accessed 9 February 2013].

Spence, L.J. and M. Painter-Morland. 2009. *Chapter 1. Introduction: Global Perspectives on Ethics in Small and Medium-sized Enterprise*s. Pp 1-12. In: Spence, L.J. and M. Painter-Morland (editors). *Ethics in Small and Medium-sized Enterprises*. *A Global Commentary. The International Society of Business, Economics, and Ethics Book Series. Volume 2*. Springer,

Dordrecht.

Spence, L.J. 1999*. Does size matter? The state of the art in small business ethics. Business Ethics: A European Review*. 8 (3): 163-174.

Spence, L.J. 2006. CSR and Small Business in a European Policy Context: The Five "C"s of CSR and Small Business Research Agenda 2007. *Business and Society Review*. 112 (4): 533–552.

Spence, L.J. 2007. CSR and small business in a European policy context: the five 'C's of CSR and small business research agenda. *Business and Society Review*. 112 (4): 533-52.

Sprinkle, G.B. and L.A. Maines. 2010. The benefits and costs of corporate social responsibility. *Business Horizons*. 53: 445—453.

Srinivasan, V. 2009. CSR and ethics in MSMEs in India*. African Journal of Business Ethics*. 4 (2): 32-36.

Srivastava, S. 2007. Green supply-chain management: A state-of the-art literature review. *International Journal of Management Reviews*. 9 (1): 53–80.

Stake, R.E. 2005. *Case Studies*. In: Denzin, N.K. and Y.S Lincoln (editors). *The Sage Handbook of Qualitative Research*. Third Edition. Sage Publications, United Kingdom. 443-466pp.

Stana, E.J. 1994. Packaging and the Environment*. Natural Resources and Environment*. 9 (2): 16-19.

Starkey, R. 1998. *Environmental Issues Series. Environmental Management Tools for SMEs: A Handbook.* European Environment Agency, Denmark. 199pp.

Starkey, R. 2000. *Chapter 7. Environmental Management Tools. Some options for small and medium-sized enterprises*. In: Hillary, R. *Small and Medium-Sized Enterprises and the Environment: Business Imperatives*, Green Leaf Publishing, UK. 96-105pp.

STATSSA (Statistics South Africa). 2010. *Survey of Employers and the Self-employed.* Statistics South Africa, Pretoria.

Steven, R.J.L., Moustapha, M.M., Evelyn, P. and R.J. Stevenson. 2013. Analysis of the Emerging China Green Era and Its Influence on Small and Medium-Sized Enterprises Development: Review and Perspectives. *Journal of Sustainable Development*. 6 (4): 86-105.

Storey, D.J. 1994. *Understanding Small Business Sector*. International Thompson Business Press, London. 363pp.

Strange, K. 2002. *Overview of Waste Management Options: Their Efficacy and Acceptability*. In: Hester, R.E. and R.M. Harrison. *Environmental and Health Impact of Solid Waste Management Activities*. *18*. Issues in Environmental Science and Technology. The Royal Society of Chemistry, Cambridge. 1-52pp.

Studer, S. Tsnag, S., Welford, R. and P. Hills. 2008. SMEs and voluntary environmental initiatives: a study of stakeholders' perspectives in Hong Kong. *Journal of Environmental Planning and Management.* 51 (2): 285–301.

Suprawan, L, de Bussy Curtin, N and S. Dickinson. 2009*. Corporate Social Responsibility in the SME Sector: An Exploratory Investigation*. Available at: http://www.duplication.net.au/ANZMAC09/papers/ANZMAC2009-310.pdf [Accessed 5 February, 2013].

Sweeney, L. 2009. Corporate social responsibility in Ireland: barriers and opportunities experienced by SMEs when undertaking CSR. *Corporate Governance*. 7 (4): 516-523.

Talbolt, S., Lefebvre, E. and L. Lefebvre. 2007. Closed-loop supply chain activities and derived benefits in manufacturing SMEs. *Journal of Manufacturing Technology Management*. 18 (6): 627-658.

Terry, G. 2009. Green. *Why corporate leaders need to embrace sustainability to ensure profitability.* The South African Institute of Chartered Accountants, South Africa. 338pp.

The Glass Recycling Company (online) The Glass Recycling Company website. Available at http://www.theglassrecyclingcompany.co.za/ [Accessed 3 March 2013].

TGRC (The Glass Recycling Company). 2010/11. *The Glass Recycling Company Annual Review 2010/11*. Available at: http://www.theglassrecyclingcompany.co.za/index.php?option=com_contentandview=articleandid=5andItemid=73 [Accessed 3 March 2013].

The Polokwane Declaration on Waste Management, Northern Province, South Africa. 26 – 28 September 2001. Available at: http://www.zerowaste.co.nz/assets/international/polokawane.pdf [Accessed 18 November 2012].

The United States Environmental Protection Agency. July 2012. *The United States Environmental Protection Agency website. Glossary of terms*. Available at: http://www.epa.gov/wastes/conserve/tools/cpg/glossary.htm [Accessed 18 November 2012].

Tilley, F. 1999. Small-Firm Environmental Strategy. The UK Experience. *Greener Management International*. 25:1-24.

Tilley, F. 2000. Small firm environmental ethics how deep do they go? *Business Ethics: A European Review*. 9 (1): 31-41.

Tilley, R. 1999. Small-Firm Environmental Strategy: The UK Experience. *Greener Management International.* 25: 1-14.

Toms, J.S. 2000. *Environmental Management, Environmental Accounting and Financial Performance.* The Chartered Institute of Management Accountants, London. 76pp.

Twardowska, I. 2004. *Solid Waste: What is it?* In: Twardowska, I., Allen, H.E., Kettrup, A.A.F. and W.J. Lacy (editors). *Solid Waste: Assessment, Monitoring and Remediation.* Elsevier Ltd, Oxford. Pp 3-30.

Ucherek, M. 2003. Problems associated with ecological assessment of packaging. *International Journal of Sustainable Development and World Ecology*. 10 (1): 63-67.

Uhlaner, L.M., Berent-Braun, M.M, Jeurissen, R.J.M. and G. de Wit. 2012. Beyond Size: Predicting Engagement in Environmental Management Practices of Dutch SMEs. *Journal of Business Ethics.* 109 (4): 411-429.

UK Environment Agency. 2003. *NetRegs. SME-nvironment 2003. A survey to assess environmental behaviours among smaller UK businesses*. Available at: http://www.environment-agency.gov.uk/netregs/ [Accessed August 2012].

UNEP (United Nations Environment Programme). 2003. Small and medium-sized enterprises and sustainability: facts and figures. *UNEP Industry and Environment*. 26 (3): 4-6.

UNEP (United Nations Environment Programme). 2005. *Solid Waste Management. Volume I. United Nations Environment Programme*. Available at: www.unep.org [Accessed 10 January 2013].

United Sates Environmental Protection Agency (EPA). 2010. *Municipal Solid Waste*

Generation, Recycling, and Disposal in the United States: Facts and Figures for 2010. Available at: http://www.epa.gov/epawaste/nonhaz/municipal/msw99.htm [Accessed 21 March 2013]

Urban, B. and R. Naidoo. 2012. Business sustainability: empirical evidence on operational skills in SMEs in South Africa. *Journal of Small Business and Enterprise Development*. 19 (1): 146-163.

Van der Linde, M and L. Feris (editors). 2010. *Compendium of South African Environmental Legislation.* Second Edition. Pretoria University Law Press, Pretoria. 690pp.

Visser, W., Matten, D., Pohl, M. and N. Tolhurst. 2007. The A to Z of Corporate Social Responsibility: A Complete Reference Guide to Concepts, Codes and Organisations. Wiley and Sons, London. 470pp.

Vives, A. 2006. Social and Environmental Responsibility in Small and Medium Enterprises in Latin America. *The Journal of Corporate Citizenship*. 21: 39-50.

Viviers, S. and J.L. Venter. 2007. Corporate social responsibility – an SME perspective. *African Journal of Business Ethics.* 2 (1): 20-27.

Viviers, S. 2009. Going green: an SME perspective. *South African Journal of Entrepreneurship and Small Business Management*. 2 (1): 30-49.

Vogel, D. 2005. The Market for Virtue: The Potential And Limits of Corporate Social Responsibility. The Brookings Institution, Washington DC. 221pp.

Wagner, J. 2011. Incentivizing sustainable waste management. *Ecological Economics.* 70: 585–594.

Wagner, T.P. 2013. Examining the concept of convenient collection: An application to extended producer responsibility and product stewardship frameworks. *Waste Management*. 33: 499–507.

Walls M. 2006. *Extended producer responsibility and product design – economic theory and selected case studies*. RFF Discussion Paper 06-08. Washington, DC: Resources for the Future. Available at: http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=17436 [Accessed 23 March 2013]

Waste Plan. 2012. *Waste Plan website*. Available at: http://www.Waste Plan.co.za/ [Accessed August 2012].

Water Research Commission. 1996. *Evaluation of Solid Waste Practice in Developing Urban Areas in South Africa*. Report number 629/1/96. Palmer Development Group, Cape Town.

WBCSD (World Business Council for Sustainable Development). 1999. *Corporate Social Responsibility: Meeting Changing Expectations*. World Business Council for Sustainable Development: Geneva. Available at: http://oldwww.wbcsd.org/plugins/DocSearch/details.asp?type=DocDetandObjectId=Mjg2 [Accessed 5 February 2013].

WBCSD (World Business Council for Sustainable Development). 2001. *The Business Case for Sustainable Development. Making a Difference Towards the Johannesburg Summit 2002 and Beyond*. Available: http://www.wbcsd.org [Accessed 5 February, 2013].

Webb, M. 2008. Reclam fined R145m for price fixing. Engineering News 7th April 2008. Available at: http://www.engineeringnews.co.za/article/reclam-fined-r145m-for-price-fixing-2008-04-07 [Accessed 5 July 2013].

White, P.R., Franke, M. and P. Hindle. 1995. *Integrated Solid Waste Management*. *A Lifecycle Inventory*. Aspen Publishers, New York. 365pp.

Whitelaw, K. 2004. ISO 14001. *Environmental Systems Handbook*. *Second Edition*. Elsevier Butterworth-Heinemann, Burlington. 237pp.

Wiechers, H.N.S. 2010. Chapter 2. Waste Management in South Africa: Where are we and where are we going? In: Macfarlane, L (editor). 2010. The Waste Revolution Handbook South Africa. Volume II. Alive2Green, Cape Town. 25-33pp.

Wiechers, H.N.S., Borland, J. and M. Matsabu. 2002. Polokwane to practice. Paper presented at Wastecon 2002 held in Durban. Available at: http://www.dnw.co.za/documents.shtml [Accessed 18 November 2012].

Williams, H., van Hooydonk, A., Dingle, P. and D. Annandale. 2000. Developing tailored environmental management systems for small businesses. *Eco-Management and Auditing*. 7 (3): 106-113.

Williams, S. and A. Schaefer. 2012. Small and medium-sized enterprises and sustainability: managers' values and engagement with environmental and climate change issues. *Business Strategy and the Environment*. 22 (3): 173-186.

Williamson, D. and G. Lynch-Wood. 2001. *A new paradigm for SME environmental practice*. The TQM Magazine. 13 (6): 424-432.

Williamson, D., Lynch-Wood, G. and J. Ramsay. 2006. Drivers of Environmental Behaviour in Manufacturing SMEs and the Implications for CSR. *Journal of Business Ethics*. 67 (3): 317-330.

World Business Council for Sustainable Development. 2001. *The Business Case for Sustainable Development. Making a Difference Towards the Johannesburg Summit 2002 and Beyond.* Available at: http://www.wbcsd.org [Accessed 19 July 2012].

Worthington, I. and D. Patton. 2005. Strategic intent in the management of the green environment within SMEs. An Analysis of the UK Screen-printing Sector. *Long Range Planning*. 38: 197–212.

Worthington-Smith, R. 2009. *The Sustainability Handbook*. Sixth Edition. July 2009. Trialogue, Cape Town. 114 pp.

WWFSA (World Wildlife Fund South Africa) [online]. *World Wildlife Fund South Africa website.* Available at: http://www.wwf.org.za/ [Accessed October 2012].

Yin, R. 1994. *Case Study Research: Design and Methods*. Fourth Edition. Sage Publications, London. 240pp.

Yin, R.K. 2011. *Qualitative Research from Start to Finish*. The Guilford Press, New York. 348pp.

Yin, R.K. 2012. *Applications of Case Study Research*. Sage Publications, London. 232pp.

Zackrisson, M., Bengtsson, G. and C. Norberg. 2004. Measuring Your Company's Environmental Impact. Templates and tools for a complete initial ISO 14001 review. Earthscan, London. 79pp.

Zeng, S.X., Meng, X.H., Zeng, R.C., Tam, C.M., Tam, V.W.Y. and T. Jin. 2011. How environmental management driving forces affect environmental and economic performance of SMEs: a study in the Northern China district. *Journal of Cleaner Production*. 19: 1426-1437.

Zhang, G. and Z. Zhaob. 2012. 2012 International Conference on Applied Physics and

Industrial Engineering. Green Packaging Management of Logistics Enterprises. *Physics Procedia*. 24: 900 – 905.

Zhang, G., Bi, J. and B. Liu. 2009. Drivers and barriers to engage enterprises in environmental management initiatives in Suzhou Industrial Park, China. *Frontiers of Environmental Science and Engineering in China*. 3(2): 210–220.

Zikmund, W.G., Barryl, J.B., Carr, J.C. and M. Griffin. 2010. *Research in Business*. Ninth Edition. South-Western, USA. 670pp.

Zorpas, A. 2011. Environmental management systems as sustainable tools in the way of life for the SMEs and VSMEs. *Bioresource Technology*. 101: 1544–1557.

APPENDIX A: QUESTIONNAIRE LARGE BUSINESS

Questionnaire - BUSINESS

Business Environmental Responsibility is becoming more and more important. This questionnaire is constructed to get a better insight into the role that SMEs play in extended producer responsibility from an environmental responsibility perspective in waste management and recycling. The specific objectives of the study include:

- review the environmental and extended producer responsibility of business, from a waste management and recycling perspective;
- To investigate the outsourcing of waste management and recycling to SMEs
- To examine how and why SMEs are engaging in environmental responsibility
- To determine the methods that SME's use to monitor their environmental responsibility efforts
- Critically assess environmental responsibility in the supply chain

Results of the survey and further research will be incorporated in Master of Science dissertation titled "Environmental Responsibility in Small and Medium-Sized Companies in South Africa - A Waste Management Perspective".

Information will be kept anonymous and in strict confidence.

Section 1
Profile of company
The following questions aim to understand more about your company

1.1	Please describe your company's main operations:		
1.2	How long has your company been operating?	Less than 1 year	
		1 to 2 years	
		>2 to 3 years	
		>3 to 4 years	
		>4 to 5 years	
		>5 to 6 years	
		>6 to 7 years	
		>7 to 8 years	
		>8 to 9 years	

		> 9 to 10 years	
		More than 10 years	
1.3	What is your company's approximate annual turnover?	Less than R0.2 million	
		>R0.2 to R5 million	
		>R5 to R13 million	
		>R13 to R51 million	
1.4	How many full time employees does your company employ?	0 to 5	
		6 to 20	
		21 to 50	
		51 to 200	
1.5	How many of your staff are:	Female	
		Male	
		Black	
		Coloured	
		Indian	
		White	

Section 2
Understanding / perceptions of environmental responsibility
The following questions aim to understand more about your company's understanding of environmental responsibility

2.1	Are you familiar with the term 'environmental responsibility'?	Yes	
		No	
2.2	What is your understanding of the term?		
2.3	In general, do you perceive that a company has a responsibility to protect the environment?	Yes	
		No	
2.4	Do you perceive your company to be environmentally responsible?	Yes	
		No	
2.5	How did your company learn about environmentally responsible practices?		

Section 3
Commitment to environmental responsibility
The following questions aim to understand more about your company's commitment to environmental responsibility

3.1	Are senior management and the CEO involved in environmental decisions?	Yes	
		No	
3.1.1	Why / why not?		
3.2	Does your company have a designated environmental employee / representative?	Yes	
		No	
3.2.1	If yes, what is there designation?		

3.2.2	What are their core duties?		
3.2.3	How long has that position existed?	1 year	
		2 years	
		3 years	
		4 years	
		5 years	
		6 years	
		7 years	
		8 years	
		9 years	
		10 years	
		More than 10 years	
3.2.4	What are the educational qualifications of the employee in this role?	Matric	
		Certificate	
		Diploma	
		Undergraduate degree	
		Postgraduate degree	
		Other	

3.3	Does your company have an active environmental committee?	Yes	
		No	
3.4	Is environmental responsibility part of your company culture?	Yes	
		No	
3.4.1	If yes, how?		
3.5	Does your company have a budget for environmental projects?	Yes	
		No	
3.6	Does your company have an environmental certification?	Yes	
		No	
3.7	Does your company have an environmental policy?	Yes	
		No	
3.7.1	Does your company's environmental policy demonstrate commitment from your company's leadership?	Yes	
		No	
3.7.2	Is this policy communicated internally and / or externally?	Yes	
		No	
3.7.3	If yes, how?		

Section 4
Environmental responsibility activities

The following questions aim to understand more about your company's environmental responsibility activities			
4.1	Does your company have an environmental management system?	Yes	
		No	
4.2	Does your company have an environmental strategy?	Yes	
		No	
4.3	Have your company identified its environmental aspects and impacts?	Yes	
		No	
4.3.1	If so, how often are these reviewed?	Every 6 months	
		Annually	
		Every 2 years	
4.4	What is your company's biggest environmental impact? Please describe.		
4.5	Does your company engage in activities related to minimising your impact environment and can you describe these activities:		
4.5.1	Waste management (re-use, recycling, landfill) If yes, please describe	Yes	
		No	
4.5.2	Extended producer responsibility (take back system) If yes, please describe	Yes	
		No	
4.5.3	Pollution control / effluent emissions If yes, please describe	Yes	
		No	
4.5.4	Reducing water consumption If yes, please describe	Yes	
		No	
4.5.5	Energy management (reducing electricity consumption, use of renewable energy) If yes, please describe	Yes	
		No	
4.5.6	Carbon emissions management If yes, please describe	Yes	
		No	
4.5.7	Transport and travel If yes, please describe	Yes	
		No	
4.5.8	Fuel consumption for example, gas If yes, please describe	Yes	
		No	
4.5.9	Minimising the use of raw materials If yes, please describe	Yes	
		No	
4.5.10	Conserving natural resources for example, paper use, metals If yes, please describe	Yes	
		No	
4.5.11	Air emission management If yes, please describe	Yes	
		No	

4.5.12	Environmental reporting If yes, please describe	Yes	
		No	
4.5.13	Staff engagement If yes, please describe	Yes	
		No	
4.5.14	'Green' procurement / supply chain If yes, please describe	Yes	
		No	
4.5.15	'Green design' / building If yes, please describe	Yes	
		No	
4.5.16	Reduction in use of harmful chemicals / hazardous materials If yes, please describe	Yes	
		No	
4.5.17	Investment in 'green' technology / innovations If yes, please describe	Yes	
		No	
4.6	Other than these practices, does your company plan on implementing any new projects? If yes, please describe	Yes	
		No	
4.7	Does your company have a system for monitoring the success of these practices? If yes, please describe	Yes	
		No	
4.8	Have these practices resulted in any benefits to your company?	Yes	
		No	
4.9	Does your company set environmental targets?	Yes	
		No	
4.10	Does your company continually review the success of your environmental practices to ensure continual improvement?	Yes	
		No	
	How often?	Every 6 months	
		Annually	
		Every 2 years	
4.11	What systems does your company have in place to ensure compliance with environmental legislation?		

Thank you for your time and your participation

APPENDIX B: QUESTIONNAIRE SMEs

Questionnaire - SME

Business Environmental Responsibility is becoming more and more important. This questionnaire is constructed to get a better insight into the role that SMEs play in extended producer responsibility from an environmental responsibility perspective in waste management and recycling. The specific objectives of the study include:

- review the environmental and extended producer responsibility of business, from a waste management and recycling perspective;
- To investigate the outsourcing of waste management and recycling to SMEs
- To examine how and why SMEs are engaging in environmental responsibility
- To determine the methods that SME's use to monitor their environmental responsibility efforts
- Critically assess environmental responsibility in the supply chain

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1.2	How long has your company been operating?	Less than 1 year	
		1 to 2 years	
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		>3 to 4 years	
		>4 to 5 years	
		>5 to 6 years	
		>6 to 7 years	
		>7 to 8 years	
		>8 to 9 years	
		> 9 to 10 years	

		More than 10 years	
1.3	What is your company's approximate annual turnover?	Less than R0.2 million	
		>R0.2 to R5 million	
		>R5 to R13 million	
		>R13 to R51 million	
1.4	How many full time employees does your company employ?	0 to 5	
		6 to 20	
		21 to 50	
		51 to 200	
1.5	How many of your staff are:	Female	
		Male	
		Black	
		Coloured	
		Indian	
		White	

Section 2
Understanding / perceptions of environmental responsibility
The following questions aim to understand more about your company's understanding of environmental responsibility

2.1	Are you familiar with the term 'environmental responsibility'?	Yes	
		No	
2.2	What is your understanding of the term?		
2.3	In general, do you perceive that a company has a responsibility to protect the environment?	Yes	
		No	
2.4	Do you perceive your company to be environmentally responsible?	Yes	
		No	
2.5	How did your company learn about environmentally responsible practices?		

Section 3
Commitment to environmental responsibility
The following questions aim to understand more about your company's commitment to environmental responsibility

3.1	Are senior management and the CEO involved in environmental decisions?	Yes	
		No	
3.1.1	Why / why not?		
3.2	Does your company have a designated environmental employee / representative?	Yes	
		No	
3.2.1	If yes, what is there designation?		
3.2.2	What are their core duties?		

3.2.3	How long has that position existed?	1 year	
		2 years	
		3 years	
		4 years	
		5 years	
		6 years	
		7 years	
		8 years	
		9 years	
		10 years	
		More than 10 years	
3.2.4	What are the educational qualifications of the employee in this role?	Matric	
		Certificate	
		Diploma	
		Undergraduate degree	
		Postgraduate degree	
		Other	

3.3	Does your company have an active environmental committee?	Yes	
		No	
3.4	Is environmental responsibility part of your company culture?	Yes	
		No	
3.4.1	If yes, how?		
3.5	Does your company have a budget for environmental projects?	Yes	
		No	
3.6	Does your company have an environmental certification?	Yes	
		No	
3.7	Does your company have an environmental policy?	Yes	
		No	
3.7.1	Does your company's environmental policy demonstrate commitment from your company's leadership?	Yes	
		No	
3.7.2	Is this policy communicated internally and / or externally?	Yes	
		No	
3.7.3	If yes, how?		

Section 4
Environmental responsibility activities
The following questions aim to understand more about your company's environmental responsibility activities

4.1	Does your company have an environmental management system?	Yes	
		No	
4.2	Does your company have an environmental strategy?	Yes	

		No	
4.3	Have your company identified its environmental aspects and impacts?	Yes	
		No	
4.3.1	If so, how often are these reviewed?	Every 6 months	
		Annually	
		Every 2 years	
4.4	What is your company's biggest environmental impact? Please describe.		
4.5	Does your company engage in activities related to minimising your impact environment and can you describe these activities:		
4.5.1	Waste management (re-use, recycling, landfill) If yes, please describe	Yes	
		No	
4.5.2	Extended producer responsibility (take back system) If yes, please describe	Yes	
		No	
4.5.3	Pollution control / effluent emissions If yes, please describe	Yes	
		No	
4.5.4	Reducing water consumption If yes, please describe	Yes	
		No	
4.5.5	Energy management (reducing electricity consumption, use of renewable energy) If yes, please describe	Yes	
		No	
4.5.6	Carbon emissions management If yes, please describe	Yes	
		No	
4.5.7	Transport and travel If yes, please describe	Yes	
		No	
4.5.8	Fuel consumption for example, gas If yes, please describe	Yes	
		No	
4.5.9	Minimising the use of raw materials If yes, please describe	Yes	
		No	
4.5.10	Conserving natural resources for example, paper use, metals If yes, please describe	Yes	
		No	
4.5.11	Air emission management If yes, please describe	Yes	
		No	
4.5.12	Environmental reporting If yes, please describe	Yes	
		No	
4.5.13	Staff engagement	Yes	

	If yes, please describe	No	
4.5.14	'Green' procurement / supply chain If yes, please describe	Yes	
		No	
4.5.15	'Green design' / building If yes, please describe	Yes	
		No	
4.5.16	Reduction in use of harmful chemicals / hazardous materials If yes, please describe	Yes	
		No	
4.5.17	Investment in 'green' technology / innovations If yes, please describe	Yes	
		No	
4.6	Other than these practices, does your company plan on implementing any new projects? If yes, please describe	Yes	
		No	
4.7	Does your company have a system for monitoring the success of these practices? If yes, please describe	Yes	
		No	
4.8	Have these practices resulted in any benefits to your company?	Yes	
		No	
4.9	Does your company set environmental targets?	Yes	
		No	
4.10	Does your company continually review the success of your environmental practices to ensure continual improvement?	Yes	
		No	
	How often?	Every 6 months	
		Annually	
		Every 2 years	
4.11	What systems does your company have in place to ensure compliance with environmental legislation?		

Section 5
Barriers, opportunities and benefits
The following questions aim to understand more about the barriers, opportunities and benefits your company's has realised from your environmental responsibility activities

5.1	Why did you company establish environmental practices?		
5.2	Have these practices resulted in any benefits to your company? If yes, please explain	Yes	
		No	
5.3	What challenges has your company faced with these practices?		

5.4	What actions would help to overcome these challenges?
5.5	What do you perceive are the opportunities from working with environmental responsibility?
5.6	Do you perceive the size of your company has given you advantages or caused problems regarding environmental responsibility?
5.7	What barriers prevent your company from doing more than it already does?

Section 6
Stakeholder engagement
The following questions aim to understand more about how your company' engages with your stakeholders in terms of environmental responsibility

6.1	Is your company a member of any environmental organisations for example, WWF?	Yes	
		No	
6.2	Does your company engage with environmental organisations for example, NGO's, consultants, educational intuitions, government departments, to help with your company's environmental strategy? If yes, please describe	Yes	
		No	
6.3	Does your company collaborate with industry peers to learn and share best environmental practice?	Yes	
		No	
6.4	Which stakeholders have the largest influence on your environmental practices? Please list in order of priority.	Community	
		Customers	
		Employees	
		Government	
		NPOs	
		Suppliers	
6.5	Does your company communicate your environmental performance to stakeholders?	Yes	
		No	
6.6	Do you think it is important to communicate your environmental performance to stakeholders? Why / why not?	Yes	
		No	
6.7	Is your company aware of any environmental issues that trouble your surrounding community?	Yes	
		No	
6.8	Do you believe that your employees are affected by your company's engagement in environmental responsibility? If yes, how?	Yes	
		No	
6.9	Does your company support local environmental initiatives for example, sponsorship? If yes, please describe	Yes	
		No	

Thank you for your time and your participation

APPENDIX C: PARTICIPANT LETTER

DISCIPLINE OF GEOGRAPHY

SCHOOL OF AGRICULTURAL, EARTH and ENVIRONMENTAL SCIENCES

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29th AUGUST 2012

Re: Carla Higgs, MSc Research

Carla Higgs will be undertaking her Research Masters degree with us in Environmental Science, University of KwaZulu-Natal, her thesis is entitled: '*Environmental Responsibility in Small and Medium-Sized Enterprises in the South Africa - A Waste Management Perspective*'. The research will involve a number of questionnaires and follow-up interviews with yourself and members of your organisation. We really appreciate you spending the time with Carla and helping her develop what I think will be an exciting and useful piece of research. Not only is it close to her heart but will help her in her chosen career which I think is much better than a piece of research just 'sitting on the shelf' and we hope the results will be of benefit to the broader sector. However, due to the nature of her questions and research the issue of confidentiality and what can and cannot be reported is of concern to us. So I wish to confirm that the information is for her thesis and all information will be treated as confidential. Having said this we seek guidance from you as to the level of this confidentiality as the final thesis will be in the public domain and possible academic publications can result from the research. In some instances the University can withhold the thesis from the public domain for a period of five years or we can work closely with you in the

final preparation phase and you can make a decision regarding how the information is reported, i.e. leave out company / individual names.

My intention is to provide an enabling and rich research environment for Carla (of course not making it to easy!) and to work as closely as possible with her informants. So although this letter serves as a more 'formal' notification I would like to meet with you and Carla and discuss what works best for you in this situation.

Yours sincerely

Prof Trevor Hill
Geography

APPENDIX D: SUMMARY OF FINDINGS

Environmental criterion tested	JSE listed and large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
	(n=5)	Explanation	(n=4)	Explanation	(n=11)	Explanation
Understanding of environmental responsibility	5	One organisation recognised the compliance with environmental legislation in their description of CER. All five organisations described taking responsibility for their environmental impact.	4	None of the SMEs recognised the compliance with environmental legislation in their description of CER. All four SMEs described taking responsibility for their environmental impact. Two described CER in the context of a sustainable future.	9	This was largely attributed to the nature of the business, either the collection and/or recycling of waste, or the manufacture of a product produced from recycled post-consumer waste.
Commitment to environmental responsibility	5	Three of the large organisation are ISO 14001 certified. All are governed by corporate / group SHEQ policies, procedures and standards	4	The environmentally certified SMEs have environmental policies. This is a requirement of ISO 14001 certification.	0	
• Environmental policy		Larger corporations implement group / corporate environmental policies.	4	The environmentally certified SMEs were ISO 14001 certified, an environmental policy is a requirement of the certification.	0	None of the SMEs had environmental policies
• Environmental management system	5	Group policy requires the implementation of a group EMS.	4	ISO 14001 requires the development and implementation of an EMS.	0	

Environmental criterion tested	JSE listed and large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
	(n=5)	Explanation	(n=4)	Explanation	(n=11)	Explanation
• Environmental personnel	5	Larger organisations employ personnel (up to five personnel per organisation) responsible for environmental responsible practices.	4	ISO 14001 certified SMEs employ a single personnel to oversee ISO 14001 certification and environmental responsible practices.	0	Some of the SMEs have trained Health and Safety Representatives.
• System in place to ensure compliance with environmental legislation	5	Larger organisations use the services of environmental lawyers and employ legally qualified personnel to ensure legal compliance. Internal SHEQ audits ensure legal requirements are complied with throughout the group.	4	ISO 14001 certification requires compliance with environmental legal requirements. The SMEs maintained legislation registers. NSR outsource maintenance of the legislation register to an environmental lawyers, other rely on newsletter subscriptions and memberships.	1	Packaging World are British Retail Consortium certified and the certification requires a legislation register is maintained.
Commitment to improving environmental responsibility	5	Larger organisations are governed by group environmental performance requirements (except Waste Plan who commit to improved environmental performance voluntarily). All five of the larger organisations set and review environmental target annually.	4	ISO 14001 certification requires that environmental targets are set and monitored to ensure continual improvement of environmental performance. All four SMEs set and review environmental target annually. Environmental metrics are recorded an monitor monthly, to review progress against targets.	0	None of the SMEs were planning to implement any other or new environmental responsibility activities other than those described in this study.

Environmental criterion tested	JSE listed and large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
	(n=5)	Explanation	(n=4)	Explanation	(n=11)	Explanation
		Environmental metrics are recorded and monitor monthly, to review progress against targets.				
Impacts on environment	5	Larger organisations have formally identified the impacts of their business operation on the environment. This is a requirement of group / corporate standards	4	The environmentally certified SMEs have formally identified the impacts of their business operation on the environment. This is a requirement of ISO 14001 certification.	3	Three of the eleven non-environmentally certified SMEs have formally identified the impacts of their business operations on the environment.
Environmental responsibility activities	5	All five larger organisations participated in environmentally responsible activities. Larger organisations participate in waste management and recycling, staff training on environmental responsibility, reducing water consumption, energy management, environmental reporting,	4	All four of the SMEs participated in environmentally responsible activities. SMEs participate in waste management and recycling, electricity consumption reduction, environmental reporting, staff training and engagement and all four seek to continually improve their environmental performance and new environmentally responsible projects are frequently being identified.	9	Three of the non-environmentally certified SMEs did not participate in environmentally responsible activities. The remaining three participated primarily in waste management and recycling and electricity and fuel consumption reduction activities. These activities were largely motivated by costs savings.

Environmental criterion tested	JSE listed and large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
	(n=5)	Explanation	(n=4)	Explanation	(n=11)	Explanation
		'green' procurement and pollution control activities.				
Stakeholder engagement	Not applicable for the purposes of this study		4	The SMEs have had dealings with local authorities, environmental lawyers and consultants for the purpose of environmental compliance for example, waste licences. All are members of industry related bodies and train staff in environmental responsibility (empowering them and their peers to make environmentally responsible decisions). Two of the SMEs have initiated fora for environmental responsibility.	7	Four of the non-environmentally certified SMEs were not familiar with the concept of stakeholders. Others had dealing with local authorities around environmental compliance issues and some were member of industry related bodies.
Social responsibility			3	Support non-profit organisations an *ad hoc* basis. Green Office assist non-profit organisation, schools and spinal cord injured persons raise funds through empty printer cartridge collections and have and an active staff volunteer programme.	8	Social responsibility is largely through the support of local non-profit organisations at their request or on an *ad hoc* basis.
Opportunities from environmental responsibility			2	• Diversification of the business • Possible funding of SMEs in the waste sector by manufacturers	6	• Opportunity for growth of the business • Possible funding of SMEs in the waste sector by

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	(n=5)	Explanation	(n=4)	Explanation	(n=11)	Explanation
						manufacturers
Benefits from environmental responsibility	Not applicable for the purposes of this study		4	• Reputational benefits • Continual improvement of environmental performance • Environmental legal compliance • Staff benefits • Improved sustainability of the business	5	• Reputational benefits • Provide income for unemployed persons • Increased profitability of the business • Reduction of waste to landfill
Limitations in environmental responsibility			4	• High cost of environmental responsibility • Difficulties with South African waste legislation • Limited resources prevent the further improvement of environmental performance • Lack of awareness about environmental responsibility in the market • Difficulties with staff environmental awareness	11	• Limited knowledge about environmentally responsible practices • Limited resources prevent the implementation of environmentally responsible practices • Difficulty sourcing the volume of post-consumer recyclables • Competition in the market resulting in the price of recyclables constantly fluctuating • Fluctuating cost of diesel • Seasonal volumes of recyclables • Difficulties with legislation • Lack of awareness about environmental responsibility in the market Lack of

Environmental criterion tested	JSE listed and large organisations		Environmentally certified SMEs		Non-environmentally certified SMEs	
	(n=5)	Explanation	(n=4)	Explanation	(n=11)	Explanation
						awareness about environmental responsibility