

EDINBURGH NAPIER UNIVERSITY

# Perceptions of context, contribution, challenges and critical success factors in the adoption of sustainability footprints by Scottish SMEs

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A thesis submitted in partial fulfilment of the requirements of Edinburgh Napier University,  
for the award of Doctor of Philosophy

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## **Abstract**

This research explores perceptions of the context, contribution, challenges and critical success factors in the adoption of sustainability footprint strategy amongst Scottish SMEs. Critics of sustainability footprint measurement insist that by nature it records historical impact and does not incorporate the views of future generations and are a luxury for most firms except those achieving near monopolistic profits.

Recent UK greenhouse gas policy initiatives are specifically targeted at large organisations and do not provide the institutional support required to assist SME's in greenhouse gas emissions reporting. Despite overwhelming evidence as to the benefits of sustainability footprint tools such as carbon footprints very few companies set emissions targets. Surprisingly still there is limited research conducted as to the benefits of sustainability footprint tools to SMEs and their perceptions as to its contribution to business success.

Interviewees highlight that case study Scottish SMEs are driven to implement sustainability footprints to pre-empt future *GHG legislation, process improvement, cost reduction, senior management commitment, emissions reduction, CSR* and *waste reduction*. However the emphasis on GHG emissions has contributed to “*carbon myopia*” an exclusive focus on carbon footprint measurement.

This research supports the view of *senior management commitment* as critical to the success of sustainability footprint measurement initiatives but policymakers also have an enabling role by ensuring *fair competition, access to grants, mandatory*

*guidelines for SMEs, tax incentives, fines, legislation, emissions league table and carbon reporting as a pre-qualification criteria for government tenders.*

Scottish SME interviewees adopt a *sustainability negative* perceptual orientation suggesting barriers to placing sustainability on the agenda such as *implementation cost, lack of knowledge, sustainability competing with other issues on the agenda, time constraints, the transience of sustainability, inability to recoup carbon footprint costs, failure to recognise benefits, generational issues and communication.*

Scottish SME case studies however reveal an ambivalent “love hate” relationship amongst interviewees with sustainability which varies depending on the proximity of the individual to the economic, social or environmental issue. Thereby underlining the importance of management’s ability to influence stakeholders to remain *sustainability positive* in orientation through training, instruction and supervision that promotes sustainable behaviour.

The *Sustainable Strategic Growth Framework* is proposed as a solution to the Sustainability/CSR Dilemma and to align employee behaviour with sustainability objectives.

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## **Glossary of abbreviated terms**

CSR	Corporate Social Responsibility
ESG	Environmental and Social Governance
ISO	International Organisation for Standardisation
TPS	Toyota Production System
CQI	Chartered Quality Institute
RBV	Resource Based View
OECD	Organisation for Economic Co-operation and Development
GRI	Global Reporting Initiative
CERES	Coalition of Environmentally Responsible Economies
CDP	Carbon Disclosure Project
INCR	Investor Network on Climate Risk
GCC	Global Climate Coalition
EMAS	Eco-Management and Audit Scheme
FTSE	Financial Times Stock Exchange
IST	Integrative Sustainability Triangle
ILO	International Labour Organisation
OECD	Organisation for Economic Co-operation and Development
NRBV	Natural Resource Based View of the Firm
WWF	World Wild Life Fund
GWP	Global warming potential
CO <sub>2</sub>	carbon dioxide
CH <sub>4</sub>	Methane
N <sub>2</sub> O	nitrous oxide
HFCs	hydrofluorocarbons
PFCs	perfluorocarbons
SF <sub>6</sub>	Sulphur hexafluoride
DEFRA	Department for the Environment Food and Rural Affairs
CRC	Carbon Reduction Commitment



EU ETS European Emissions Trading Scheme

EPCs Energy Efficiency Certificates

DECs Display Energy Certificates

LCA Life Cycle Analysis

LCI Life Cycle Inventory analysis

LCIA Life Cycle Impact Assessment

KgCO<sub>2</sub> kilogram of carbon dioxide

TCO<sub>2</sub>e carbon dioxide equivalent per ton

SA8000 Social Accountability 8000

AA1000 Accountability 1000

EFA Ecological Footprint Analysis

SEPA Scottish Environmental Protection Agency

CO<sub>2</sub>e carbon dioxide equivalent

SME Small to medium size enterprise

LCEGS Low carbon, environmental, goods and services sector

USP Unique selling proposition

KPI Key Performance Indicator

WWF World Wildlife Fund

VIBES Vision in Business for the Environment Award Scheme

PBE Pro biodiversity Enterprise

## **Chapter 1 Introduction**

## 1.0 Background

This research seeks to explore perceptions of the context, contribution, challenges and critical success factors in the adoption of sustainability footprint methodology by Scottish SMEs. The evolution of the use of sustainability footprint tools is firmly rooted in the adoption of corporate social responsibility (CSR) and wider sustainability theory by businesses. Although some commentators may perceive sustainability as an autonomous management concept, this sentiment is not yet universal amongst business leaders and academics. Therefore, it is useful to review sustainability footprint methodology within the context of contemporary management theory models and existing knowledge involving sustainability and CSR.

Sustainability Footprints are strategic options for SMEs to embed sustainability; tools such as carbon footprint reporting are voluntary initiatives of which implementation costs are considered prohibitive except for those firms with near-monopolistic profits (Hicks 2010). Research studies also infer that sustainability footprints by nature record historical impact and do not incorporate the views of future generations (Holland 2003)

The lack of utility of sustainability indices such as the Global Reporting Index as an indicator of an organization's state of sustainability or absence of sustainability and *the difficulty in quantifying the benefits of sustainability footprints* has seen its limited adoption by SMEs (Demos 2006; Gray 2012).

The use of carbon footprint methodology has been the subject of recent surveys and reports from both governmental and non-governmental sources. Significantly,

research into sustainability footprint tools has focused on larger organizations with limited research into sustainability footprint reporting in SMEs (CDP 2010, Aragón-Correa et.al. 2008 pg. 90, Bradford 2008, Revell and Blackburn 2007). However the use of water footprint and social footprint methodologies has been less well documented. Contemporary research reveals that the success of best practice initiatives, for example, carbon footprint measurement, seems to benefit from the organization having capability (Done 2011).

SMEs are also faced with a conundrum of short- versus long-term aims within the constraints of limited resources when adopting best practice initiatives, the value of which must be judged by the achievement, deployment, and overall sustainability of the capability generated by the initiative with implementation decisions being affected by the ability of management to apply sustainability models that have been “*over engineered*” precluding their suitability to the operational SME context (Done 2011; Hendrichs and Busch 2012).

This has contributed to an emphasis on “quick wins” when the long-term success of best practice initiatives requires ongoing support (Done 2011). Performance measurement tools such as carbon footprint reporting are voluntary activities as small businesses are not required to participate in carbon trading schemes such as the European Union Emissions Trading Scheme nor are they unduly influenced by pressure from institutional investors (Hendrichs and Busch 2012). In the absence of direct grants or legal pressures to pursue sustainability initiatives, SMEs can be encouraged by the increased spending on energy, environmental, and sustainability initiatives by large customers despite recent global economic challenges and as such

may be influenced to adopt sustainable business practices (British Safety Council 2012).

The issue of identifying accurate costs involved with the development of sustainability footprint initiatives has been a research topic of recent studies (CDP 2010). Cost differences varied depending on the *size of the organisation, pay scales of personnel* involved in sustainable footprint measurement, *reporting scope, organisational policy, use of external verification, the influence of senior management and level of integration*.

Critically, firms appear unable to quantify the benefits of sustainable footprint reporting. It is envisaged that the pursuit of the research aim and objectives will go some way in closing the gap in our understanding of the application of sustainability footprint initiatives and its perceived impact on Scottish SMEs.

### **1.1 Research Aim and Objectives**

The formative beginnings of this research and the preceding rationale have contributed to the pursuit of the research aim which is to:

*Develop a conceptual framework within which perceptions of sustainability footprints can be understood and sustainability footprint methodology utilized within Scottish SMEs.*

To address my overarching research aim the following two research objectives have been identified:

1. To critically analyse the context, perceptions of contribution of sustainability footprint tools to Scottish SMEs.

2. To identify the challenges and Critical Success Factors (CSFs) in the use of sustainability footprint methodology within Scottish SMEs.

## **1.2 Methodology**

Philosophically an *interpretivist approach* was adopted whereby sustainability footprint data in itself is considered useful but its true value is derived when individuals interpret sustainability footprint data and adopt behaviours or make decisions which are inherently sustainable (Ackerman, 2011). The *ontological* stance of *constructionism* complements the *epistemological* position of *interpretivism* acknowledging sustainability footprints and its application is evolving with its interpretation being influenced by individual perspectives (Papert, 1980). Therefore in this context the observation and interpretations of the actions of decision makers are as important as the phenomena being studied. Perceptions of sustainability footprints are evaluated in this research through case studies of four Scottish SMEs operating in the tourism and engineering sectors respectively. Interviews with 18 individuals were analysed; comprising 3 policymaking advisers, 12 employees from two engineering sector firms in roles ranging from Director to Administrator and 3 employees from two tourism/leisure sector companies. Perceptions of sustainability footprint measurement were presented in four main enquiry themes *Innovation Impact*, *Cost Impact*, *Environmental Impact* and *Stakeholder Impact* (Ellram, 1996; Yin, 2003) (Lash and Wellington, 2007; Porter, 2006) (Krysiak, 2009; Teece, 1987; Winter, 1987; Hart 1995) (McElroy et al., 2008; Porter, 2011)

The triangulation of secondary data such as Corporate Social Responsibility Reports and Environmental Audits are used to corroborate whether perceptions of Sustainability Footprint contributes to improved performance to create a picture in

words of SME perceptions (Murillo and Lozano, 2006; Arenas et. al., 2009; Amaratunga et. al., 2001).

### **1.3 Thesis Structure**

The thesis comprises seven chapters including the introductory chapter. Outlined below is a brief overview of the contents of each chapter:

*Chapter 1 Introduction* provides the rationale and business critical issues arising from the adoption of sustainability footprints by SMEs. The aim and objectives are clarified as well as the layout the thesis carefully outlined.

*Chapter 2 Literature Review* explores the history of sustainability and highlights critical academic research in Sustainability and CSR that influence the development and adoption of sustainability footprints such as carbon footprint.

*Chapter 3 Methodology* discusses the philosophy, approaches and tools adopted to ensure achievement of the research aim and objectives.

*Chapter 4 Findings-Scottish Policymaking Context* discusses the influence of stimuli from the external environment such as government, regulatory bodies and nongovernmental organisations as a result of the policies enacted or promoted by these institutions that contribute to the adoption of sustainability footprints by Scottish SMEs. Advisers from three key institutions namely Scottish Government, Scottish Environmental Protection Agency (SEPA) and Scottish Business in the Community were interviewed regarding institutional actions to implement emissions reporting and their perceptions as to the contribution of sustainability footprints to Scottish SMEs.

*Chapter 5 Findings- Scottish SME Case studies* presents interviewee perceptions regarding the context, contribution, challenges, and critical success factors in the use of sustainability footprint tools specifically carbon footprint measurement within case studies of four Scottish SMEs viz:

**Capital Cooling** an award winning SME competing within the European Refrigeration and Air Conditioning market. The **Log House People** a family business that builds bespoke low carbon log homes. **Moffat Golf Club** a traditional moorland golf course that was designed on sustainability principles and **Rabbie's Trail Burners** a company that is considered a pioneer in low carbon tourism whilst providing visitors with a bespoke friendly tour guide service catering to small groups.

*Chapter 6 Analysis and Discussion* critically reviews the findings to determine the convergence and divergence from existing academic literature identified in the literature review.

*Chapter 7 Conclusion* discusses key research findings in relation to the achievement of the research objectives with research limitations being highlighted as well opportunities for further research identified.



## **Chapter 2 Literature Review**

## 2.0 Introduction

This chapter reviews CSR and sustainability footprint definitions, approaches and policy in relation to the SME sector.

The risk of irreversible climate change arising from greenhouse gas emissions generated by economic activities of organisations is a growing concern to governments globally (World Energy Outlook, 2011). This has led to the enactment of various environmental regulations and the inclusion of emissions data in CSR/ Sustainability Reports (USEPA 2009, Fluorinated Greenhouse Gas Regulations, 2009 and SEC, 2010). CSR and Sustainability are prevailing management topics in board rooms across the world and are yardsticks used by investors to determine the effectiveness of a firm's Environmental and Social Governance (ESG) (McKinsey, 2009). The use of carbon footprints and other methodologies to measure ecological and social impact is part of a long continuum as humanity attempts to understand and measure the effects of rapid industrialisation within what is geologically defined as the *anthropocene* era on the well-being of humans and our impact on the natural world within which we live (Economist, 2011). The sceptre of irreversible climate change and the lack of human ability to adapt have led to the use of sustainability indicators such as the carbon footprint as benchmarks of organisational commitment to good ESG (International Institute for Sustainable Development, 2010). This increasing use of carbon footprint by organisations has spawned a number of certification schemes and businesses offering consultancy services designed to measure or "footprint" carbon and social impact. With considerable investment by organisations in terms of both financial resources and non-financial resources such as management time in carbon footprint and social footprint measurement there is a need for research to explore the impact of using such non-financial tools on

corporate performance. This trend in corporate spending on environmental and sustainability initiatives such as the carbon footprint is set to increase grow in the UK by 16% a year between 2012 with proposed mandatory greenhouse gas emissions reporting for companies listed on the London Stock Exchange 2016 (UK Sustainable Business Spending 2010-15) (Jowitt, 2012).

The prevalence of carbon footprint data in CSR/Sustainability Reports may create the impression that businesses voluntarily adopted CSR principles however the history of CSR/Sustainability and the use of methodologies such as carbon footprints to measure ecological impact presents an alternative version of historical events.

## **2.1 Definitions and historical context**

To understand the emergence of carbon footprint and other metrics as key performance indicators (KPI) necessitates an exploration of its role within the historical context of CSR and Sustainability.

Sustainability theories can be grouped into three categories in that sustainability refers to *artefacts* which can be entities as in the case of tangible products or *constructs* as in the case of processes, sustainability is also goal orientated when viewed from the lens of *absolute* success based on a comparison between polar extremes what is sustainable or non-sustainable and *relative* success which uses an incremental approach to improvement targeting. The interaction of the artefact with its ecological and social environment forms the *static* perspective where the environment itself is static or a *dynamic* perspective whereby the artefact adapts to environmental changes (Faber et al. 2005).

The review of existing research and definitions of Sustainability and CSR highlighted that Sustainability/CSR research mirrors the development and application of Sustainability/CSR best practice by practitioners as illustrated by the *Sustainability/CSR Best Practice Timeline* (Figure 2.1).

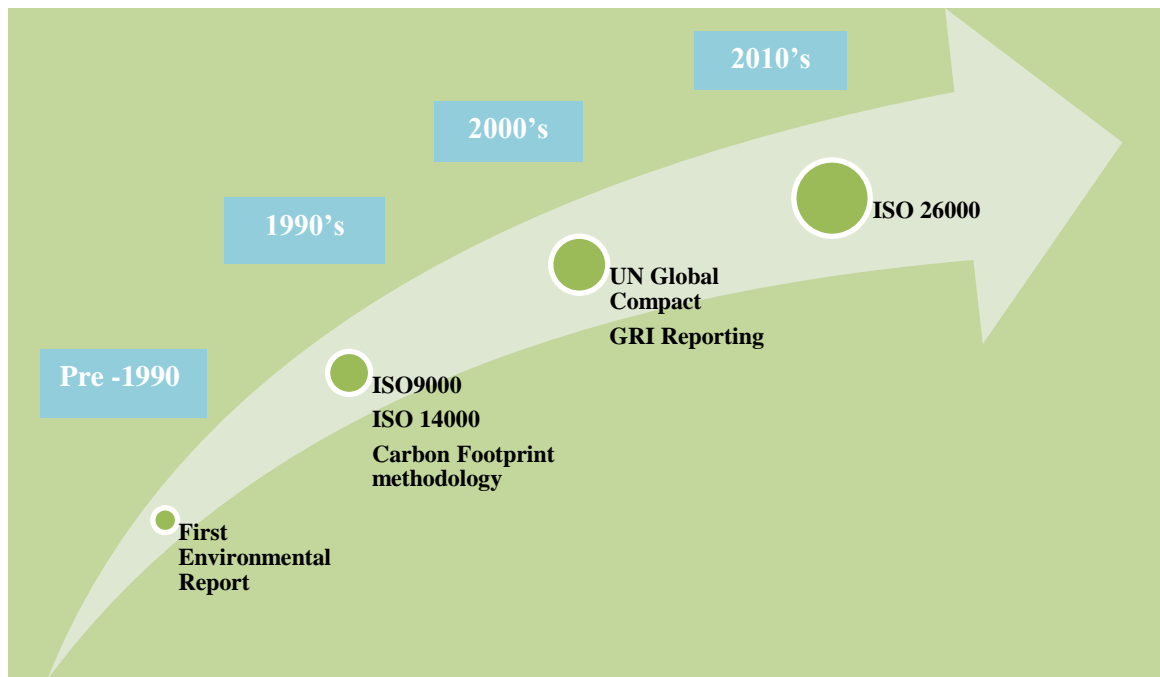


Figure 2.1 Sustainability/CSR Best Practice Timeline source: Author

Using the *Sustainability/CSR Best Practice Timeline* research literature that has influenced modern approaches to sustainability implementation can be collated and its influence on business strategy understood. Therefore based on this trend the development of Sustainability/CSR definitions and research can be grouped into four main evolutionary transitions beginning with “first awakenings” in the Pre-1990’s period to present day integration of Sustainability/CSR within corporate strategy indicative of the ISO 26000 as illustrated in the *Sustainability/CSR Evolutionary Model* (Figure 2.2). The *Sustainability/CSR Evolutionary Model* consists of four distinct phases:

1. **Sustainability/CSR Awareness** - fundamental research and definitions which have influenced or defined sustainability and CSR. This period is identified by the development of Environmental Reporting by practitioners.
2. **Sustainability/CSR Aspect Management** – definitions and research reviewed sustainability in terms of its components the social, economic and environmental. Reflecting practitioner emphasis on ISO9000 Quality Management Systems, ISO 14000 Environmental Management System certification and the use of carbon footprint methodology.
3. **Sustainability/CSR Adoption** – research and definitions explored implementation initiatives encapsulated in the context of Environmental Social Governance (ESG). Within this period business began focusing their efforts on using voluntary reporting schemes to confirm their commitment to ESG principles amongst their various stakeholder groups.
4. **Sustainability/CSR Strategic Integration** – research and definitions focus on the integration of economic, finance and risk management theory to name a few in order to provide a strategic view as Sustainability/CSR concept moves from the periphery of best practice to the realm of corporate strategy. This period is benchmarked by the introduction of the ISO26000 standard.



Figure 2.2 Sustainability/CSR Evolutionary Model source: Author

Using this model it is now possible to explore the historical context within which Sustainability/CSR definitions and initiatives were conceptualised.

### 2.1.1 Sustainability/CSR Awareness

Although a parallel concept to sustainability, CSR can be traced in its early manifestations in the book *The Philosophy of Management* that surmised that management should extend its objectives to include the welfare of labour, ethics, prosperity sharing with society to which it has a “communal responsibility” (Sheldon et al 2003). The measurement and understanding of an organisations social performance caught the attention of the accounting profession through a study of Fortune 500 companies in the early 1970’s which identified some dimensions of CSR as environment, equal opportunity, society, product, shareholders and information disclosure (Beresford, 1973, 1974, 1975, 1976).

Wartick and Cochran (1985) (Carroll 1979) infer **CSR performance** as the outcome of the timely interaction of the *principles of social responsibility, the process of social responsiveness economic, legal, ethical, discretionary expectations society and policies aimed at ameliorating a social issue*. Therefore CSR aligns corporate behaviour with accepted social norms, values and objectives (Sethi 1975).

Influential at this time was the publishing of the book *Silent Spring* which inspired a generation of environmental activists from mostly male dominated NGOs based in developed OECD countries that pressured North American firms in the 1970's who began generating Corporate Environmental Reports with Monsanto being the first company to report on its toxic emissions (Cerin, 2002b). Criticism of CSR as a management concept arose from within the academic community inferring that rational economic arguments of cost will always outweigh social concerns therefore removing any pretext for ethical considerations by the organisation when faced with purchasing or investment decisions (Leavitt 1958). Despite these biases NGOs evolved to include women in the decision making process and women's issues in the debate which contributed to the conceptual shift of CSR from being "good practice" by Transnational Corporations to explicit international standards such as the ISO 26000; an important contribution that cannot be readily dismissed (Segerlund, 2010). The emergence of Green Politics on the political landscape was another seismic shift in the debate on the environment especially in the European context (Porrirt et al. 1988). The Brundtland Commission (1987) definition has formed the core philosophy underpinning all sustainability and CSR approaches within the past twenty years influencing the development of triple bottom line approaches (Elkington 1999) (Savitz and Weber 2006). This definition may be useful in a broad

macroeconomic context but generally is incongruous with the profit maximisation imperative imposed by financial markets and institutions.

Other contributions to defining sustainability considered the total environmental impact or environmental burden of humanity on the planet which is expressed by the formula:

$$I (\text{Impact}) = P (\text{Population}) \times A (\text{Affluence}) \times T (\text{Technology})$$

(Ehrlich et al. 1971; Hart, 1997)

The shortcoming of this formulaic analysis is a narrow view of the potential of technology to assist humanity in reducing or eliminating the effects of harmful emissions either through efficient energy consumption or carbon sequestration.

The concept of Total Quality Environmental Management is an extension of earlier work conducted by Ohno (1988) the father of the Toyota Production System (TPS). The focus of the *Toyota Production System* is a relentless drive to eliminate waste and maximise value thereby reducing financial loss (Ohno, 1988).

### **2.1.2 Sustainability/CSR Aspect Management**

Although ground breaking the Brundtland Commission's definition of sustainability development mirrors the views of Hundloe (1997) who stated "*It is important to note that the separation of economics from the environment and from ethics is no longer appropriate*".

Florida (1996) described the tactical approaches to meet the challenge of embedding sustainability amongst manufacturing firms as being Total Quality Environmental Management – incremental environmental improvements are made using traditional



total quality management techniques and Worker Improvement in pollution prevention.

Within this period the normalisation of CSR was promulgated by academics working for business advocacy organisations such as the World Business Council for Sustainable Development that emphasises reliance on the efficiency of markets (Schmidheiny et al. 1996). Researchers such as Segerlund (2010) too eagerly assume that the normalisation of CSR is complete amongst transnational corporations and that this apparent normalisation translates across the wider economy. However, the incorporation or “normalisation” of CSR is yet to be realised if viewed in the context of recent high profile environmental disasters such as the BP oil spill in the Gulf of Mexico (Segerlund, 2010).

The ratification of the Eco-Management and Audit Scheme (EMAS) and ISO 14001 Environmental Management System in 1996 transformed the business imperatives from pollution prevention to the continuous improvement of environmental performance.

Increased emissions as a result of increased global consumption has impacted less affluent nations adversely due to shifting of manufacturing industries from the developed world to emerging economies, increasing support at the macroeconomic level for a sustainable global economy (Hart, 1997). At a microeconomic level there is limited sustainable innovation being conducted by business even though resource use in terms of ecological, capital and labour inputs are critical to continued economic activity (Elkins and Max-Neef, 1992). If globalisation and growth in emerging economies is to continue, business commitment is required to reduce carbon emissions and meet implied social obligations.

### **2.1.3 Sustainability/CSR Adoption**

Pridahm (2001) states the adoption of socially responsible investment approaches is gaining importance in investment management decisions. Later research conducted by Jayne and Skerratt (2003) confirms the ideas postulated by Pridahm in that environmental consideration is critical to investment decision making amongst fund managers. Sectors connected to fossil fuel consumption established special interests groups to lobby lawmakers against the enactment of greenhouse gas regulations notable the Global Climate Coalition (GCC) and the Climate Council whose activities were instrumental in derailing the development of carbon trading in the USA as well as American ratification of the Kyoto Protocol (Levey and Egan 2003) (Kolk et.al. 2008).

Another conceptual leap in sustainability and CSR management is the “Cradle to Cradle” approach developed by McDonough and Braungart (2002). The researchers focused on gearing product life cycles and supply chains towards continuous recycling of natural and biological nutrients (McDonough and Braungart, 2002). However the links between “cradle to cradle” approaches and profitability are yet to be proved.

### **2.1.4 Sustainability/CSR Strategic Integration**

Villalonga (2004) infers that sustainability is measured as the persistence of firm specific profits and is influenced by “intangibles” such as *reputation, corporate culture, brand image* and *technology*, with the strength of competitive positions being determined by level of investment in “intangibles”. Embodied within in this view is the concept of the *resource based view of the firm* (RBV) which states that

long run sustainability of competitive advantage is inextricably linked to the level of its “intangible” resources. Enlightened commentators such as Porritt organically extended the definition of sustainability by defining it as the capacity to continue in the future with sustainable development as the process whereby we move from the present to a more sustainable future (Porritt 2005).

Taking inspiration from earlier theories McElroy et al. (2008) developed the Binary Theory of Sustainability in which a firm’s sustainability is determined by scores on sustainability performance as either non-sustainable or sustainable. The use of this scalar dimension may lead to subjectivity in the practical applications; the absolute nature of the rankings may fail to identify incremental successes of the firms and falls into the fallacy that sustainability is a static goal.

In a recent extension of sustainability philosophy Krysiak defines sustainability as “*a framework for assessing the impact of present decisions on the situation of future individuals*” thereby acknowledging that future impacts cannot be predicted with absolute certainty. Krysiak argues for the incorporation of risk management principles into sustainability modelling in which the probability of harm is limited by a constant  $\alpha$  with an ideal state being  $\alpha=0\%$  (Krysiak, 2009).

John R. Ehrenfeld a prominent environmentalist proposed a new definition of sustainability “*as the possibility that human and other life will flourish on the planet forever*” (MIT, 2009). Similar views are expressed in the Chartered Quality Institute definition of quality management that stretches the boundary of loss to include the wider global society:

*Quality Management is an organisation-wide approach to understanding precisely what customers need and consistently delivering accurate solutions within budget, on time and with the minimum loss to society (CQI, 2013).*

The Chartered Quality Institute's "minimum loss" imperative does not externalise environmental and social factors arising from business operations but incorporates these elements as part an organisational product/service innovation to meet customer requirements (CQI 2013).

Schechterle and Senxian (2008) in a study into sustainability initiatives in supply chains of best in class companies identified three reasons for organizational pursuit of "green" initiatives as firstly "*desire to be a thought leader for green/sustainability*" secondly "*rising cost of energy/fuel*" and thirdly "*competitive advantage/differentiator*" (Schechterle and Senxian 2008).

As identified by Lash and Wellington (2007) regulatory risks abound as manifested in the likelihood of mandatory greenhouse gas reporting a statutory aspiration of the Climate Change Act 2008 with parliament set to ratifying its implementation in 2013. A recent study conducted by Amaeshi and Grayson (2008) found that information provided in Sustainability and CSR reports are yet to capture the confidence of institutional investors and that tools/metrics to measure ESG issues pertinent to investment decision making are yet to be developed.

In an attempt to develop a practical performance measurement system, McElroy et al. (2008) stated "The sustainable performance (S) of an organisation is a measure of either its social or ecological impacts (I) relative to its proportionate share of the supply of, or demand for, carrying capacity of related capitals (or C)" (McElroy et al. 2008 pg. 229). Even more controversial to environmental practitioners is the separation of the environmental concerns from the business case in that Massachusetts Institute of Technology and the Boston Consulting Group have identified top performing companies *Embracers* aligning their corporate strategy

with sustainability principles as opposed to *Cautious Adopters* - firms who view sustainability in terms of reduced costs i.e. eco-efficiency, material efficiency and risk mitigation (MIT 2011).

Achieving a high water mark with the launch of the voluntary reporting schemes focused on disclosing business climate related activities such as the Global Reporting Initiative (GRI) in 1997 established by the Coalition of Environmentally Responsible Economies (CERES) a US based NGO, with subsequent initiatives such as the Carbon Disclosure Project (CDP) in 2000 and the Investor Network on Climate Risk (INCR) in 2003 both driven by the financial investor community (Kolk et. al. 2008). The emergence of voluntary sustainability reporting schemes created an informal regulatory system that fostered compliance without the need for direct legislative action that has received enthusiastic business support mainly due to the fear of reputational damage arising from non-disclosure or poor performance (Kolk et. al. 2008).

This shift in societal mood was not readily sensed by every major trans-national corporation to improve working conditions as in the case of the targeting of Nike the global sportswear brand and their sub-contracted manufacturing sites mainly in Asia and the lobbying of DeBeers by Global Witness to stop trading in conflict diamonds (Lacy et al 2009).

Arising from the adoption of Environmental Management Systems was the generation of environmental reports which included the use of then new metrics of ecological and/or carbon footprint data as indicators to demonstrate sustainability performance within an SME context (White et. al. 2014). The effects of climate change such as drought, famine, deforestation and the identification of greenhouse

gases has made carbon footprint performance a regularly used non-financial performance indicator. The possibility of a commitment by world leaders to specific greenhouse gas emission targets was met with the disappointment of United Nation accord arising from the Copenhagen Climate Summit 2009 (UNFCCC 2009).

However the sustainability issues surrounding the consumption of fossil fuels returned to the global spotlight due to the environmental and human tragedy that was precipitated by the BP oil spill in the Gulf of Mexico. This unfortunate event has seen major industrialised nations make tangible progress to support initiatives to achieve global agreement to emissions reduction at the Cancun Climate Summit in 2010 (UNFCCC 2010).

## **2.2 The dilemma of Sustainability and Corporate Social Responsibility**

As humanity finally comes to terms with its symbiotic role within our planet's ecosystem it is faced with the dilemma of economic growth but at what cost? and is there a point at which sustainable development becomes unsustainable? (Eccles and Serafeim 2012)

Such questions are inherent to the continued interpretation of sustainability, CSR and its relevance to the changing business environment. However, it can be inferred from the literature that sustainability and CSR is influenced by three interoperable factors as illustrated in the *Sustainability Conceptualisation/CSR Diagram (Figure 2.3)*:

The *Philosophical Challenge* is the ethical framework within which we justify sustainable action or inaction (Bentham, 1789, 1982; Kay 1997; Van de Ven 2008; Bowie 1999; Porter and Van der Linde, 1995).

The *Cultural Challenge* is a framework of norms, values that are either nurtured or assimilated which manifests itself in the public sphere as societal norms or within businesses as the organisational culture (Welford 2005; Tschopp 2005; Maigan and Ralston 2002).

The *Strategic Challenge* is the interpretation of an organisation's goals to incorporate both the philosophical and cultural values to yield sustainable outcomes for both the business entity and society within the prevailing business context (O'Higgins 2010; Freeman 1999; York 2009; KPMG 2012; Hopkins 2010).



Figure 2.3 Sustainability/CSR Conceptualisation Diagram Source: Author

The pursuit of Sustainability and CSR involves a balancing act between organisational goals of profitability and stakeholder expectations for the organisation

to contribute to wider societal aims that go beyond *employment, legal compliance* and *good governance*. The dynamic of this balancing act for an organisation involving the assimilation of each challenge viz. *philosophical, cultural* and *strategic* is changing the way SMEs specifically and business in general view the role of the organisation and the role of management and staff as actors within this context (Csigéné 2014).

### **2.2.1 The Philosophical Challenge**

Managers are routinely faced with decisions which impact on the environment on a daily basis. This dilemma of profits or the environment (Porter and Van der Linde, 1995) is influenced by the ethical and social reference of the decision maker.

From a purely western perspective the realisation of this dilemma emerged with societal sensitivity to the degradation of the environment in the 1960's. The ascription of rights on non-human species by animal liberation activists however finds its early beginnings in Bentham's musings "The question is not, Can they reason? Nor Can they talk? But Can they suffer?" (Bentham, 1789, 1982) Kant a contemporary of Bentham argued for the treatment of humanity as the ends as opposed to the means (Kant, 1785, 1997). The difficulty that managers face is that they themselves are disconnected from the environment by the trappings of modernity. The disconnection of post-modern western society from nature affects not only views on the natural environment but also solutions to environmental issues such as carbon emissions and personal environmental impact i.e. individual carbon footprints. This malaise has contributed to the potential environmental consequence of irreversible climate change even though there is an immediate cessation of carbon emissions (CDP Project 2010c)



The present management utilitarian paradigm is focused on consequences mainly financial i.e. profit maximisation being the main purpose of management. Aristotle (c. 330 B.C., 1999) postulated that an individual is a sum of his or her habits; the pattern of actions over time reveals *telos* or purpose. Kay (1997) and Van de Ven (2008) view these phenomena as ‘personality’ with organisations developing set values and identity. These actions or signals are interpreted by stakeholders whose expectation of business behaviour includes positive actions by businesses to improve society (Cumming et.al. 2005; Wilkes, 2005). Business taking actions for the greater good or as Bowie (1999) postulates, when exercising corporate citizenship emerges due to an implied sense of moral duty and fairness that goes beyond the tax contributions of corporate entities. Therefore, the corporation is more than a legal entity but a social institution seeking the interests of a myriad of stakeholders both internal and external to the organisation seamlessly surmounting or traversing any boundaries should they exist (O’Higgins 2010). The environment “*the atmosphere, hydrosphere, lithosphere, ecosystem processes and all human and non-human life forms*” is a usually an overlooked silent stakeholder, as it is affected by the actions of corporate entities due consideration must be given to ensure its rejuvenation and renewal (Kolk and Pinkse, 2007; Driscoll and Starik, 2004 pg 26; Bendheim et.al. 1998; Gibson 2012).

The definition of *telos* or purpose is critical to strategic planning, therefore if the maxim of sustainable development is expressed as development that meets the needs of the present without compromising the ability of future generations to meet their own needs here arises the *Sustainability and CSR Dilemma* in the mind of the strategic planner i.e. profit maximization or sustainability. In the pursuit of purpose individuals and corporate entities legitimize their status with society by accepting the

values of society the absence of this alignment may cause the destruction of the firm (Lindblom, 1994). A factor of customer demand is their perception of the product's social and environmental sustainability in relation to their environmental expectations or viewpoints (Isaksson and Garvare, 2003).

The *philosophical challenge* therefore is to explore the range of “*living*” options (James, 1896, 1997) that would *optimize resource use, reduce harmful greenhouse gas emissions, benefit society and contribute to profit maximization*. In practical terms each option must propel the firm to a ‘desirable future state’ for all stake holders (Funk, 2003).

When viewed from the lens of benefit to society, value creation can be seen to also encompass *carbon footprint, corporate reputation, technological innovation, employee and customer satisfaction* (Hart and Milstein, 2009). This can be achieved through a combination of traditional financial metrics and other KPIs that reflect the environmental / ecological truths and externalities. Due to the universal acceptance of financial performance some commentators argue that the impact of sustainability and CSR initiatives should be expressed in terms of accounting measures to determine the profitability of these activities (Gladwin et al. 1995). The use of this approach will only capture financial risk without any incorporation of non-financial risks such as carbon emissions, safety and customer satisfaction which corporations such as BP to detriment have incurred spiralling financial costs and reputational damage arising from the oil spill in the Gulf of Mexico. Sustainability indicators by nature should be pertinent, understandable, and measurable reflecting the environmental impact of the product/service during its value creation process (Fiskel, McDaniel and Spitzley, 1998).

A recently published book the Three Secrets of Green Business – Unlocking competitive advantage in a low carbon economy (Kane, 2010), the author explains the concept of sustainability as an endpoint that is achieved by a thorough understanding of the economic, social and environmental operational context. The keys to sustainability are presented in the form of three secrets which are:

**Understand the Business Case** – *the environment is an opportunity*, **What to do** – *think solar, cyclic, safe and eco-efficient* and **How to do it** – *build a corporate culture that rewards continuous improvement and innovation.*

Kane's (2010) philosophy confines sustainability for organisations as defined target, however it is proposed in this thesis that sustainability is an ever changing goal that evolves with changes in technology as a business seeks to decarbonise and dematerialise its products and processes.

Peter Fisk's book People, Planet, Profit (Fisk, 2010) challenges readers to go beyond green i.e. reduce, recycle, reuse to “blue sky thinking” - rethinking the way businesses inspire, motivate its *People* to efficiently use the resources of the *Planet* to deliver sustainable *Profit* to its shareholders whilst reducing the externalities of resource use viz. carbon emissions. Although inspirational, Fisk does not provide a practical framework for action which is a major shortcoming of his analysis of the strategic options for global business.

Fisk (2010) however has aligned sustainability with a achieving a higher purpose whereby the role of business is not simply profit maximisation but making a difference to the lives of all its stakeholders. This vision of a higher purpose must be clearly defined and communicated by the leadership with the CEO and board of directors acting as catalysts for change. Leaders must consciously make courageous

strategic decisions to build sustainability into the core of their business. Matten and Crane (2005) conceptualise the higher purpose as the firm's corporate citizenship obligation due to the cross border nature of global business. It is readily accepted that the corporate entity has a social function but it may be delusionary to transcribe concepts of citizenship and rights to corporate entities that are transnational or transient through the sub-contracting of operations across borders, the most appropriate term would be *Global Corporate Citizenship* (Pies et al. 2010) especially when environmental aspects such as carbon emissions and embodied carbon are considered. The firm as corporate citizen is not congruent with prevailing financial systems which focus on organisational profitability as the primary determinant of success with aspects such as carbon emissions or social impacts considered as unavoidable externalities, and not direct product or service costs. Until these costs are fully understood and reflected in the pricing of goods and services, businesses may not be able to appreciate nor address the impact on the environment and affirm its commitment to society. Even though this lack of congruency persists between corporate citizenship and the capitalist model due to the externalising of environmental and social costs, this does not indemnify the firm from financial loss due to ineffective social and environmental policies (Pies et al. 2010).

Porter and Kramer (2006) contend that CSR can only be incorporated into the boardroom agenda if social issues are understood in three main areas *Generic Social Issues* i.e. social issues which are not affected by the firm's operations, *Value Chain Societal Impacts* i.e. social issues which can be affected by a firm's operations and the *Social Dimensions of Competitive Context* i.e. social issues that affect the dynamics of the environment within which the firm operates. These researchers have identified and bundled the traditional perception of the firm's role as economic

engine, however due to the increasing size and influence of corporations and their capability to affect the lives of individuals globally as the recent financial crisis has revealed the firm cannot divorce itself from social responsibilities to its wider stakeholder audience in terms of providing social inclusion and stability as well as economic security.

Paramount of these social issues is poverty especially when caused by greenhouse gas emissions as a result of increased industrialisation and globalisation such as the effects of climate change e.g. floods, deforestation and desertification. The continued influence Judeo-Christian religious philosophy on the economies USA and EU in terms of the approach, language and tone of business courses and MBA programs cannot be readily discounted. Concern for the key role that business school education and its contribution to the development of future management leaders has led Sir Michael Rake to comment “Business Schools need to teach sustainability as an integral part of practical business and leadership skills. These things are critically important because the next generation of business leaders will really need to understand both the moral case, as well as the business opportunity. There is enormous potential for the business schools to create a properly integrated fully rounded approach and develop the research that underpins it” (Rake and Grayson, 2009 pg. 399).

Another philosophical challenge to sustainability is the “Friedman condition” (Marsden, 2000) that persists amongst senior management where many are not advocates of business being involved in poverty relief and agree with the prevailing philosophy of our global economy the *protestant work ethic* in that poverty is linked with laziness. Similar sentiments are also expounded by the “*Incompatibility Thesis*

*Mindset*” that suggests an incompatibility between market capitalism and concern for the environment (Gibson, 2012). Beliefs such as “*For ye have the poor always with you*” (Matthew 26:11) still resonate in European and North American societies and has contributed to apathy in business circles in regards to the plight of the poor especially in metropolitan areas. There is a tendency “to look the other way” due to the complicated issues surrounding poverty and the apparent inability to accurately measure poverty reduction initiatives (Boyle and Boguslaw, 2007). In parallel with the issue of poverty is gender equality with women in developed economies performing no better in this issue in that there is continued under representation of women in board rooms, trade unions and transnational organisations such as the IMF and World Bank (Lister, 2003). The persistence of gender inequality is one of the inefficiencies of the current capitalist model; the failure of society to leverage the full potential of its human resource provides business with another opportunity to release value.

*Factor Five* (Weizsacker von et al. 2010) explores the value creation potential of sustainability initiatives and builds on the legacy of the previous book *Factor Four* published some 15 years earlier. In visionary language it points business leaders to the potential of 80% reduction in environmental impact per unit of output. In their view the sustainability of business must be aligned with timely government intervention through incentives and taxes thus stimulating the adoption of technological innovations and sustainable best practices. Surprisingly, for western academics, the authors enthusiastically advocate the view that the visible hand of government is needed if the capitalist model is to incorporate the ecological truth in prices of goods and services, this price reflection will act as a catalyst to a new green wave of innovation (Weizsacker von et al. 2010). Unfortunately, the authors’ belief

in the divine hand of benign political structures enacting environmental and social regulation for the greater good may be misguided and is dependent on the actors i.e. the politicians themselves not being influenced by corporate lobbyist as in the United States or the ‘cash for honours’ scandal in United Kingdom (Guardian, 2014).

The transition to a resource efficient low carbon economy it is argued must be supported by a societal shift away from consumption to *sufficiency* and *stewardship* (Gibson, 2012). This concept of *sufficiency* concedes that resources are not infinite therefore there must be limits to greed, growth and consumption; importantly the latter three are not determinants of societal happiness (Hermosilla et. al 2009). The *sufficiency principle* appeals to an innate rationality for self-preservation but ignores opportunities for humanity to develop clean technology systems e.g. artificial trees and carbon sequestration to combat the effects of global emissions thereby aiding the transition to a low carbon future.

The low carbon transition will involve dialogue amongst stakeholders which is a cornerstone of CSR initiatives. Van Huijstee and Glasbergen (2008) identify four main philosophical approaches to engaging stakeholder opinions and support viz. Proactive dialogue involving the soliciting new ideas engaging stakeholders through a collaborative learning process, stakeholder relationship management as part of a wider business resilience strategy, to engage stakeholders as part of risk management planning and to gain competitive advantage by developing stakeholder dialogue channels and communication programs. In practice firms subsume stakeholder dialogue on sustainability issues as part of strategic management framework.

Although Van Hijstee and Glasbergen (2008) indicate that dialogue can be facilitated by use of consultants, this may construct another communication barrier for

stakeholders with any subsequent sustainability messages being perceived as corporate “spin” or a “green washing” exercise.

### **2.2.2 The Cultural Challenge**

Cultural and societal influences play an important part in the interpretation and adoption of CSR and sustainability practices. Societal norms in themselves are not homogenous within societies and across societies. Strategists are not emotionally devolved from pursuing sustainability as a strategic option but are prisoners to embedded social norms, societal values, background and the culture of the firm. The influence of these societal norms, values create blocks of opinions (Bendell and Kearins 2004) that stimulate the adoption of a particular course of action either through *supply chain pressures, benchmarking or customer demands* (Adams and Zutshi, 2004; Bond, 2005; Ogrizek, 2002). Maigan and Ralston (2002) gave early indication that CSR principles are not homogenous across borders. A supporting survey of European, North American and Asian organisations by Welford (2005) identified differences in the interpretation of CSR as being due to *social, cultural and institutional factors*. An interesting example is China whose ideas of CSR and sustainability are heavily influenced by western academia. Xu and Yang conducted a study into the indigenous characteristics of Chinese corporate responsibility and found that it is similar to Western approaches but emphasizes the following dimensions 1. Employment – increasing job opportunities, easing national employment burden and employing disabled individuals, 2. Good Faith – sound business ethics and honouring contractual obligations, 3. Social Stability and progress – patriotism, service to society and promotion of social progress (Xu and Yang 2009).



It is evident that Chinese approaches to CSR and sustainability are influenced by its socialist socio-political culture through values which the society considers important i.e. patriotism and employment. Unofficially Chinese folk wisdom provides the underlying ethical framework within which business decisions are evaluated (Szeto, 2011). It would be prejudiced to infer that a sense of communitarianism is isolated only to China but other countries such as Germany and Japan have adopted this consensus based approach which has shaped their CSR reporting as opposed to individualistic business systems relying on self-regulation that are more prevalent in the United States and the United Kingdom (Haake, 2002).

Cultural differences also affect consumer perceptions of sustainable products; in US markets sustainable products are associated with gentleness as opposed to strength creating a '*sustainability liability*' which can be improved by emphasising the product strengths (Luchs et al. 2010) similar sentiments were also expressed by consumers in UK study who also view sustainable products to be inherently inferior to unsustainable alternatives (DEFRA, 2008). The existence of '*sustainability liability*' for products and services in the Asian consumer market context is still to be explored. Some academics suggest that defining CSR may in itself yield little utility as concept of corporate responsibility differs between countries and may form part of the research question (Matten and Moon, 2008).

Transparency and the use of external verification are key issues in CSR and sustainability reporting in Japanese and European firms traditionally has been more explicit of their sustainability performance as compared to their American counterparts with the provision of a complaint mechanisms forming part of Japanese sustainability culture but is less prevalent in the European context (Kolk, 2008).

Not surprisingly 58% of Financial Times Stock Exchange (FTSE) 250 companies were willing to disclose their emissions performance to the Carbon Disclosure Project in 2008 (IEMA, 2008). In May 2001 France became the first country in the world to enact legislation requiring mandatory CSR reporting, confirming the European attitude to corporate disclosure (Tschopp, 2005). Australia's carbon tax is an attempt by its political class to align the country's development along a sustainable path as Australia is one of the world's highest greenhouse gas emitters due to the continued reliance on coal for energy generation (Guardian, 2011). The United Kingdom not to be left outdone has proposed mandatory greenhouse gas emissions reporting for companies listed on the London Stock Exchange (Jowitt, 2012). The impact on the supply chains especially SME suppliers within these supply chains is yet to be determined.

European firms also lead the way in seeking external verification of sustainability reports, a quarter of Japanese firms also seek external assurance of their reports with US companies being less likely to adopt such initiatives (Kolk, 2008).

Environmental policies and environmental reporting although regular featured as part of corporate communications is not weighted as heavily as labour related concerns such as pay and working conditions but is gaining ascendancy as a priority amongst decision makers largely fuelled by external communication in relation to climate change to which environmental issues such as greenhouse gas emissions are inextricably linked (Naeem and Welford, 2009).

### 2.2.3 The Strategic Challenge

Strategic choices adopted by firms are influenced by their perceived value or trade-off between pursuits of purely economic or social objectives. Critical to this argument is not that sustainability and social responsibility is good for business but who pays for it (Hopkins, 2010).

Based on this perceived trade-off firms adopt an orientation which O'Higgins (2010) describes as being *sceptical, pragmatic, engaged* and *idealistic*. Each form of orientation is not mutually exclusive as firms may adopt a combination of approaches in response to external stimuli (O'Higgins, 2010). There is an imperative for organisations to pursue sustainable development as a strategic option. York (2009) contends that a pragmatic approach be adopted which he assumes that will lead to decision making which incorporates environmental issues into the decision making process. Pragmatic strategic planning involves the acceptance of facts as truths to validate decision making. By extension strategists must acknowledge ecological truths and pursue strategies that mitigate against adverse impacts. The absence of acknowledgement of environmental impacts and constraints will only lead to decreasing competitive advantage (Freeman, 1999). For his philosophical framework York (2009) echoes earlier concepts that societal norms and values are embedded in its institutions and they form the nature of things (Dewey, 1934, 1989). If recent developments such as businesses optimising the carbon efficiency of their commercial assets and products, building new low carbon businesses and increasing environmental regulation, strategists may be left with very few options for long term growth apart from sustainability (Enkvist et al. 2008; White, 2009; Lacy et al. 2009). The use of sustainability in business strategy may be the "default" option with

continued the rise of “10 Mega Forces” i.e. *Climate Change, Energy & Fuel, Material Resource Scarcity, Water Scarcity, Population Growth, Urbanization, Wealth, Food Security, Ecosystem Decline, Deforestation* (KPMG, 2012).

Societal influences pervade both the evolution and adoption of sustainability and CSR. Firms generally react to stakeholder pressure by developing “green” approaches e.g. green marketing and environmental management to their business model to either solicit more business, improve customer satisfaction or gain the approval of influential stakeholders such as financial markets (Saha and Darnton, 2005). In most cases reactive responses by firms to environmental concerns to stakeholders may leave the organisation at a disadvantage when compared to more proactive competitors. A recent investigation into investing in sustainability initiatives suggests that it can create long term value (Bebbington 2001). Research into the factors which influence customers of MRI scanners indicate that sustainability as a selling proposition differentiates the product offering in the minds of target customers (Lindgreen, Antioico, Harness and Van der Sloot, 2008).

Alternatively, some commentators suggest that firms view a sustainability strategy from the lens of environmental strategy which is considered to comprise of three stages *Pollution Prevention, Product Stewardship* and *Clean Technology* (Hart, 1997) which is articulated with the addition of one more criteria the *Sustainability Vision*. Although useful for developing solutions to environmental aspects Hart’s stages does not fully satisfy the economic and social dimensions of sustainability nor develops a framework for sustainability strategy development.

In the case of CSR reports globalisation has changed the strategic tone of CEO letters appearing in annual reports of Swedish companies initially from a national

communitarian view of CSR to a more international self-regulating view of CSR (Tengblad and Ohlsson, 2010). Surprisingly Tengblad and Ohlsson (2010) identified that CSR initiatives outlined in CEO letters usually predate their popularity as a concept. The role of the Chief Executive Officer/strategist cannot be underestimated they provide the impetus for sustainability and CSR initiatives by making the case for change, translating this vision for sustainability into tangible actions and nurturing sustainable growth by expanding boundaries envisioning possible futures within the boundaries of present market understanding (Lueneburger and Goleman, 2010). Building the case of corporate sustainability must not only be the right thing to do morally - ethical case but also deliver financial and economic returns i.e. the business case. The challenge of the CEO is to fully understand the implications of poor social performance has on the firm's long term success and to communicate the importance of CSR and sustainability to functional managers (Epstein and Roy, 2001). The role of environmental leadership is a central determinant in the adoption of green and sustainable policies within an SME operational context (Boiral et. al. 2014). Firms led by managers at the *post conventionalist* stage of sustainability awareness exhibited closer collaboration with stakeholders, strategic focus, integration of goals and interests when compared with *green* and *passive SMEs* (Boiral et. al. 2014). The effectiveness of the articulation of the sustainability imperative will be determined by the ability of frontline managers to interpret and commit to sustainability and CSR goals in their operational decision making capacity. The clarity of articulation however is constrained by the long-time horizons associated with sustainability and CSR initiatives, which is plagued by difficulties in measuring the success or lack of as a result of selecting a particular strategic option (Epstein and Roy, 2001). To guide in the understanding of the impact of

sustainability and CSR initiatives on performance Epstein and Roy (2001) argue for a framework incorporating five components – *Corporate and Business unit strategy, sustainability actions, sustainability performance, stakeholder reactions* and *corporate financial performance* so that each component can be defined and their interrelationships between each component understood.

*Eco-Innovation* is an emerging concept which in the author's view can only flourish in an environment conditioned for change i.e. the focus of the market economy should be to achieve sustainability, rewarding eco- innovators and accounting for negative externalities arising from the inefficient use of resources (Hermosilla et.al. 2009). Secondly political solutions in the form of government policy, R&D subsidies, taxes and regulation aimed at the moving barriers to eco-innovation are seen as an enabling factor critical to the adoption and acceptance of eco-innovations (Hermosilla et.al. 2009) (Uhlener et. al. 2012).

Within these conditions the benefits of each dimension of Eco-Innovation such as *design, user, product-service* and *governance* can be leveraged. At an organisational level the stimulus for the adoption of eco-innovations was identified as top level management commitment to environmental performance. In the authors view Directors and CEOs of organisations provide leadership and resourcing to innovative strategic options from LCA, ISO 14001 and scorecards that increase competitiveness (*efficiency principle*) but is good for the environment (*effectiveness principle*) (Hermosilla et.al. 2009). There is a perceived bias towards the use of political instruments such as government policy to change the external business environment and not enough focus on practical models that can be applied to the strategic operations of business. The authors have adopted a policy oriented approach to their

application of eco-innovation as a tool in sustainability strategy which may alienate small and medium size enterprises (SME) who may wish to initiate sustainability programs. As SMEs have different overarching strategic issues such as *survival, staff motivation and retention and community relations* (Jenkins, 2009).

The implementation of sustainability and CSR in the service sector produces its own unique challenges. Heiskanen and Jalas (2003) categorised service eco-efficiency based upon their level of dematerialisation into four main groups: *Eco-design with service (functional) approach, Product-based services, Result-oriented services, Non-Material services*. Dematerialisation is an easily quantifiable goal for business but is short-sighted if not combined with the decarbonisation of global business.

Using anecdotal evidence Heiskanen and Jalas (2003) suggest that modest eco-efficiency gains are accrued by service innovations and that these efficiency gains do not generate immediate reductions in material consumption, value can be accrued by focusing upon making existing service offerings sustainable.

However research that explored significant differences in performance between the Dow Jones Sustainability Index and the Dow Jones Global Index indicates that the link between performance indicators and CSR/sustainability initiatives is negative with implementation expenses in the short term positioning firms at an economic disadvantage to other late adopter firms (Lopez Perez et.al. 2007). Bhattacharya and Sen (2004) observed that positive internal and external outcomes from investments in CSR are affected by *marketing strategy, industry sector e.g. tobacco, existing reputation, demographics, competitor CSR initiatives, segment characteristics and size*. Consumers in their view incorporate both product quality and CSR initiatives in

the purchasing decision with heightened sensitivities toward negative CSR information (Bhattacharya and Sen, 2004).

Not all researchers advocate the use of indexes as an indicator of a company's performance in regarding CSR due to the methodologies used in some indices; the pursuit of rankings in itself diverts from strategic objectives and denigrates CSR to a public relations exercise with little societal value. Instead Porter and Kramer (2006) propose the integration of business with society through understanding of the firm's *inside-out linkages* i.e. its impact on the wider society and *outside-in linkages* i.e. the influence of existing social norms and conditions, the objective of CSR being the creation of shared value for both the business and society by utilising value chain and Porter's Five Forces model. The strategic approach to CSR by organisations is seen to evolve along a continuum from *Responsive CSR* "Good Corporate Citizenship" to *Strategic CSR* using corporate social responsibility to consolidate or leverage its competitive position (Porter and Kramer, 2006). Van der Ven (2008) identify three strategic approaches to CSR – the *strategy of reputation protection and improvement*, the *strategy of building a virtuous brand* and *ethical product differentiation*, advocating subtle approaches to the communication of CSR initiatives such as the "silence speaks a thousand words" policy of the Dutch logistics company TNT. However their indifference to the usefulness of indices and measuring stakeholder satisfaction as useful benchmarks may leave organisations without any yardstick upon which to measure their progress and the benefits of their investment in CSR

Willis (2003) purports that the social screening of investments can benefit from the use of sustainability reporting guidelines such as the Global Reporting Initiative



(GRI) - the GRI is a voluntary reporting initiative that examines the environmental and social aspects of a firm's performance facilitating comparisons in performance within and across sectors. Willis (2003) however observed that due to the diverse stakeholders groups and information requirements it is imperative that managers of Socially Responsible Investments (SRI) use information found in reports to standards GRI such as the to supplement information collected from traditional media, online media sources, reports, questionnaires and interviews. The continued insistence by shareholders, customers, public and employees for companies to grow sustainably has propelled managers to pursue sustainability improvements through assimilating those factors that drive sustainability performance and develop the operations and structures to enhance corporate social performance (Christman, 2000; James, 2000; Wood, 1991).

To assist in the implementation of sustainability initiatives Jenkins (2009) proposes a 'business opportunity' model of CSR for SMEs which consists of a five step process involving *value setting, scoping, seeking corporate social opportunities, strategy development* and *benchmarking*. The 'business opportunity' model is very prescriptive and may mislead strategists into developing organisational values and vision in isolation without stakeholder engagement. Kleine and Hauff have developed the *Integrative Sustainability Triangle (IST)* a useful sustainability model based on the triple bottom line approach to sustainability and has been in the used by organisations in German state of Rhineland-Palatinate (Kleine and Hauff 2009). The *Integrative Sustainability Triangle* is highly theoretical which may lead to misinterpretation by management leaders who are not sustainability practitioners; this characteristic of the model makes it readily applicable to large organisations that may have the resources which in itself creates a barrier for its adoption by SMEs.

Laszlo et. al. (2005) propose the adoption of a new approach to sustainability strategy by categorising shareholders as a separate group from stakeholders signifying only one potential growth options for firms through *sustainable value* creation to reduce the risks such as *customer de-selection, regulation, loss of market share, reputation damage, legal fines and penalties* arising from unsustainable business strategies. To create sustainable value organisations must pursue a disciplined three phased program involving *diagnosis, value creation and value capture* (Laszlo 2009) (Sustainability Value Partners, 2013)

#### **2.2.4 ISO 26000 – an international guide to Sustainability/CSR Strategy**

The ISO 26000 standard builds on the Brundtland definition of sustainable development by defining social responsibility as the responsibility of an organization for the impacts of its decisions and activities on society and the environment, through transparent and ethical behavior that contributes to sustainable development, including health and the welfare of society takes into account the expectations of stakeholders is in compliance with applicable law and consistent with international norms of behaviour; and is integrated throughout the organization and practised in its relationships (ISO, 2010).

This definition confirms the interconnectedness of social responsibility and sustainability as core operational concepts with the ISO 26000 standard. To incorporate social responsibility and sustainability within its business operations organisations are required to define their priorities in respect of the core subjects *Organisational governance, Human rights, Labour practices, The environment, Fair operating practices, Consumer issues, Community involvement and development* (ISO 2010).

## 2.2.5 BS8900 Standard – Guidance for managing Sustainable Development

This standard predates the ISO 26000 and provides a more intuitive approach for a business to implement sustainable development strategies. The BS 8900 Standard although adhering to the Brundtland definition expresses sustainable development as *“Sustainable development is about integrating the goals of a high quality of life, health and prosperity with social justice and maintaining the earth’s capacity to support life in all its diversity. These social, economic and environmental goals are interdependent and mutually reinforcing. Sustainable development can be treated as a way of expressing the broader expectations of society as a whole”* and was developed with a purpose of enabling organisations to achieve key outcomes such as strengthening relationships with key stakeholders, enhancing internal cohesion within organisations, developing trust and confidence by promoting transparency and good governance, stimulating stakeholder involvement through stakeholder engagement and the management of risks and opportunities (BSI, 2013 pg. 2).

Stakeholder identification is considered a critical activity that identifies relationships between the organisation and society, the organisation and its stakeholders and stakeholders and society. The BS 8900 standard states that sustainable development incorporates the following:

**Inclusivity** – the capability to benefit from all stakeholder views

**Integrity** – an operational ethos that promotes good corporate governance

**Stewardship** – the pursuit of sustainable resource management

**Transparency** – disclosure and communication of organisational operational practices

Organisations are encouraged to include additional principles that align with their sustainability objectives but emphasising the need for senior management commitment and leadership (BSI, 2013).

*A Sustainable Development Maturity Matrix* provides understanding of the evolutionary process of sustainable development within organisations illustrating a linear progression from minimal organisational involvement to full engagement on sustainable development issues (BSI, 2013).

### **2.3 Sustainability Footprints a Solution to the CSR/Sustainability Dilemma**

For more than a decade businesses have been producing Environmental Reports in some cases being gently coerced by national legislation (Kolk, 2005a, 2005b).

Environmental reports usually include indicators such as carbon footprint which is chosen because of its link to greenhouse emission reduction performance and climate change risks.

For clarity *Sustainability Footprints* are defined as *methodologies for assessing the social and environmental impact of the economic investment in a specific strategic option in relation to other strategic alternatives and their potential risk to the survival of future generations.*

Sustainability Footprints comprise the use of carbon footprint, water footprint, ecological footprint and the emerging concept of social footprints to evaluate the present non-financial consequences and future risk implications of strategic decisions. The metrics and tools utilised in the measurement of carbon footprint, water footprint, ecological footprint and social footprints are explored in *Appendix 1 Sustainability Footprints Metrics and Measurement tools.*

Previous attempts to define sustainability footprint by Amekudzi et.al (2008) passively implied the assimilation of ecological footprint methodology with *quality of life (QOL)* an all-encompassing concept which includes air quality, water quality

and soil quality. The scope embodied in the concept of *quality of life (QOL)* makes its adoption by business firms quite challenging.

Sustainability footprints utilise a full LCA approach in determining environmental impact of projects, products and processes. Adopting a lifecycle approach focuses efforts on material, water and carbon efficiency and prevents the reallocation of greenhouse gas emissions increases to other parts of the value chain (Balkau and Sonneman, 2010).

## **2.4 Conceptual Framework**

At a glance due to the origin of sustainability footprint concepts which were originally postulated by environmental scientists using positivist research approaches does not a naturally fit with qualitative approaches to determine perceptions of its impact. Despite this arising from a review of research literature it can be surmised that the implementation of sustainability footprint tools by organisations highlight the need to reduce *risk*, *manage resources* to achieve competitive advantage incorporating ESG concerns and *create shared value*.

### **2.4.1 Create Shared Value**

From an ontological perspective the increasing use of sustainability footprint tools by business indicative of the need of organisations to measure value creation. Porter (1985) introduced the concept of value chains, the emergence of sustainability as a new management paradigm has seen Porter et al (2006) revisit the value chain model and map the social and environmental impact of business. Porter et al (2006) (2011) argue for the adoption of Responsive CSR that incorporates good corporate citizenship and shared values by mitigating the harm arising from value chain

activities. This conversion of Porter's view from a narrow emphasis of shareholder value to a search for shared values is supported by other leading management thinkers and consultants (Caulkin, 2011). Although harnessing supply chain value is a technically challenging prospect for SMEs liaison with policymaking institutions can provide access to support to ensure that the benefits of sustainability/CSR are materialised (Torugsa et. al. 2013).

This extension of value chain philosophy to assist firms in developing CSR strategy places sustainability footprint tools such as carbon footprint, social footprint and water footprint as key indicators for measuring a diverse range of impacts ranging from emissions and waste, quality, water usage, packaging usage and employment policies (Ciasullo and Troisi 2013). Although satisfying the core principles of sustainability i.e. accounting for the needs of future generations, the limitations of value chain analysis confines its use to the operational context of the firm however when combined with sustainability footprint tools the firm can then select CSR initiatives that create shared value for both the firm and society. When viewed from this perspective the use of sustainability footprint tools to measure and drive corporate performance meets business and society's needs for shared value.

#### **2.4.2 Risk**

Inherent in the creation of shared value is needed from the perspective of business to reduce risk i.e. preventing the loss of its perceived legitimacy amongst its stakeholders. Krysiak (2009) illustrated the potential of using risk management approaches to sustainability but cautions against the sole use of risk management may limit our ability to improve the fate of future generations.

It can be argued that sustainability footprint tools are in themselves risk indicators of a firm's ability to manage its environmental and social responsibility. The challenge that society faces is the determination of what is acceptable risk in respect of the environmental and social impact on future generations. Inherent in the determining what is acceptable risk is the recognition of an element of uncertainty as future predictions are not consistently accurate.

As indices sustainability indicators provide benchmarks which although do not predict the future but enlighten the path towards sustainability process improvements. However Krysiak (2009) expresses doubts in the ability of risk management techniques to define "acceptable" risk with regards to protecting the ability of future generations to flourish. Lash and Wellington (2007) adopted a more intuitive approach to risk management by categorising sustainability footprint risk, specifically carbon footprint risk into six main groups *regulatory, supply chain, litigation, reputation, physical, product and technology*. Their categorisation of sustainability footprint risk must be viewed from the context of not only environmental impact but also from the impact on the firm's revenue stream and cost structure.

Porter (1980, 1985) identified the strategic connection between cost structure and revenue stream for business. He surmised that to gain competitive advantage a firm can chose a low cost approach or a differentiation through investing in brand development and niche marketing.

Although simplistic, Porter's strategies for competitive advantage has formed one of the pillars of the *resource based view* (RBV) in that effective competitive advantage leverages the firms Capabilities i.e. *Technology, Production, Design, Distribution,*

*Procurement and Service* to create a rare, valuable, non-substitutable product or service.

Sustainability Footprint methodology was developed so that techniques are replicable by firms, however strategies to improve an organisation's carbon, water or social footprint are both tacit and socially complex (Teece, 1987; Winter, 1987) requiring co-ordinated effort by varied personnel within an organisation. Hart (1995), (2010) postulated that infinite global economic growth is not feasible within the resource constraints of a finite planet.

### **2.4.3 Managing resource use - Natural Resource Based View**

To aid firms to survive in the long run he proposed three strategies pollution prevention, product stewardship and sustainable development which he defined as the Natural Resource Based View of the Firm (NRBV) (Finn et.al 2006). The use of Sustainability Footprint methodology by business fits within the framework of the Natural Resource Based View of the firm by not only as an indicator of the level of emissions to the environment but also the firms contribution to the development of society that extends beyond profit making imperative by optimising resource use. In order for Sustainability footprint measurement to be a success it must be integrated and embedded in the firm's culture in so creating a unique competitive position for the firm and contributing to organisational innovation (Perrine 2013) (Klewitz and Hansen 2014).

It must be noted that Hart (1995) postulations of the Natural Resource Based View precedes Rees and Wackernagel (1996) seminal work on environmental footprints which has spawned the use and development of sustainability footprints as a



reporting indices. Inadvertently influencing concepts such as Total Quality Environmental Management highlighting firms that have already embraced Total Quality Management can exploit the opportunities that accrue from pollution prevention strategies as opposed to the costly pollution control strategies (Klewitz and Hansen 2014). Researchers suggest that the adoption of sustainability/CSR practices such as carbon footprint measurement benefits from having prior capability (Torugsa et. al. 2013).

Hart (1995, 2010) cautions that firms may be focussed on maintaining these unique capabilities in so doing are chained to procedure adherence even though the competitive environment has evolved. This *embededness* is considered the downside of *interconnectedness* derived from the strategic progression from pollution prevention to sustainable development.

## **2.5 Sustainability Footprints and SMES**

There is no universally accepted definition of an SME, being described in the European Union as organisations of between 50 and 250 employees with a turnover of not more than 40 million Euro or a balance sheet of not more than 70 million. In North America SMEs are categorized as firms with 500 employees (Idoko et. al. 2013). SMEs are critical to economic development despite their perceived “pollution intensity” contributing 60% - 70% of all pollution (Idoko et. al. 2013). To compete SMEs adopt four potential configurations *profit, compliance, advantage, and environment* driven (Parker et. al. 2009) (Klewitz and Hansen 2014). SMEs exhibit the following characteristics that can have an impact on change initiatives such as sustainability footprint measurement:

- *Lack of strategic long-term planning and short-termism.*
- *Firefighting approach to solve day-to-day problems.*
- *Greater focus on operational and technical issues.*
- *Limited resources, i.e. time, financial, human.*
- *Command and control culture.*
- *Reacting to external stimuli.*
- *Tacit knowledge and informal decision making.*
- *Poor management skills as the SME grows*
- *Entrepreneurial orientation and opportunity seeking* (Ates and Bititci 2011 pg. 5603)
- Limited focus on environmentally friendly solutions (Uhlener et. al. 2012)
- Indifference to environmental impacts (Hillary 2000)
- “*Self-serving perceptions*” of sustainability initiatives based upon contribution to the bottom-line (Revell et.al. 2010 pg. 284)

Despite the configuration that is adopted SMEs are faced with the conundrum of determining what value can be derived from the pursuit of carbon footprint measurement as part of CSR/Sustainability Reporting which is in itself is a voluntary exercise whose costs are prohibitive except for those firms with near monopolistic profits (Hicks 2010, Hillary 2000). Critics of sustainability indices such as the Global Reporting Initiative fail to see its utility in providing clear indications to an organisations sustainability or unsustainable position (Gray and Bebbington 2007). The inability of scientists to give definitive advice on non-carbon impacts such as the inclusion of new chemicals to GHG inventories or methodologies to measure emissions from land as well as the various approaches to calculate GWP has prevented consensus on carbon footprint reporting (Ascui and Lovell 2011) (Bowen and Wittneben 2011) (Shine et. al. 2005). Uncertainties will be reduced and accuracy improved as scientific advancement continues however the attitudes to the sustainability of future generations will always be an unknown quantity (Bowen and Wittneben 2011). Scientific arguments aside critics state that footprints by nature record historical impact and do not aid in the SWOT analysis of the risk faced by firms arising from climate change or incorporate the views of future generations, the

application of tools such as LCA in carbon footprint measurement requires expertise which may be unavailable within SME organisations and voluntary carbon reporting presents challenges in terms of interpretation and consistency of information (Holland 2003) (Kolk et al. 2008) (Ascuí and Powell 2011). Although valid criticism of sustainability footprint methodology it is quite a limited perception of the process of footprint measurement which although cannot claim to speak for future generations, it reveals opportunities for organisations to reduce immediate impact either through resource optimisation, reduction or substitution with less harmful alternatives.

Specifically SMEs are driven to implement sustainability approaches because of voluntary engagement, stakeholders, legislation, resources, motivation, and knowledge but SME characteristics, resource availability and the owner-manager's personal motivation, and knowledge about eco-innovation act as barriers to adoption of sustainability initiatives (Walker et. al. 2008, Del Brío and Junquera 2003, Battisti and Perry 2011, Klewitz and Hansen 2014, Williams and Schaefer 2013). Within the UK despite SME perceptions of environmental initiatives as a cost, government regulation is considered a key driver for implementation (Uhlener et. al. 2012). However researchers have identified innovation orientation, financial benefits and the tangibility of the sector (Uhlener et. al. 2012).

SMEs are encouraged despite operational constraints to adopt a corporate sustainability approach that integrates scarce *tangible resources* e.g. financial capital and *intangible resources* e.g. human capital to implement business process that improve economic, social and environmental performance (Orth and Kohl 2013). Although the link between sustainability/CSR approaches and profit has not been

empirically such initiatives can improve cash flows and maximise profitability for SME investors (Torugsa et. al. 2013). In practice this involves the organisation of focused improvement team, increased energy efficiency and the involvement of all employees in sustainability strategy deployment (Burke and Gaughran 2007). However the adoption of sustainability initiatives is supported by an organisation having prior experience in the implementation of management systems such as the ISO 9001(Granly and Welo 2014)

The use of footprints as an impact indicator for large companies can also be reasonably extended to measure the impacts of SMEs, international trade, individual establishments and planning applications (Simmons and Chambers 1998, Berners-Lee et. al. 2011). Consumers may even begin to utilize carbon labels on consumable items such as food as a guide in purchasing discriminating against products with high carbon intensity (Edwards-Jones et al. 2009). The impact on such value judgments on the international trade cannot be underestimated even though initial research indicates that carbon labeling has negligible effects, however Edwards-Jones et al. state “Conversely, given the growing political and commercial importance of the climate change agenda it could be argued that carbon footprints will become the predominant factor influencing choice between alternative goods” (Edwards-Jones et al. 2009 pg. 488).

Potentially investors are capable of using existing carbon emissions data disclosed in reports to understand the environmental impact and climate change risks taking action by ‘carbon optimising’ portfolios through benchmarking and the use techniques such as ‘carbon overlay’ to balance a portfolios emissions performance (DEFRA 2010a, Thomas 2009). The emergence of share market indices e.g. FTSE

Carbon Disclosure Project Carbon Strategy Index which highlights the carbon risks of publicly listed companies which shows increasing investor incorporation of risk arising from unabated greenhouse gas emissions (CDP 2010c).

The development of the FTSE Carbon Disclosure Project Index is a response to investor requirements for  $\alpha$  i.e. new window(s) of potential value in companies, looking beyond emissions data to other factors such as the likelihood of emission regulation and the cost of emissions offsetting (Sullivan and Kozak 2009). There is no similar carbon disclosure reporting index within the SME sector. Critics of carbon footprint reporting suggest that despite the existence of reporting schemes there is limited evidence to infer that investors incorporate carbon risk in the decision making process (Ascui & Lovell 2011) (Kolk 2008). Although stipulated footprint data is not weighted heavily by reporting schemes in relation to other CSR/Sustainability Indices criteria as revealed in the following statement “the rankings don’t measure performance outcomes such as CO<sub>2</sub> emissions. Instead, they look at management practices: Does a company have procedures for listening to critics? Are its executives and board members accountable? Has it hired an external verifier?” (Demos 2006)

SMEs face no alternative but to participate in the experiment of carbon markets by developing carbon accounting systems mainly due to the NGO pressure to disclose sustainability performance, emergence of carbon trading, legal requirements such as the EU ETS, potential of future carbon regulation and increasing opportunities to offset carbon emissions (Bowen and Wittneben 2011) (Ascui and Powell 2011) (Kolk 2008). Recent research indicates that policymaking instruments such as

environmental law, taxes, and levies targeted at SMEs can act as a catalyst for the adoption of sustainable practices (Idoko et. al. 2013).

The use of financial markets are unable to address the main issues facing business in the 21<sup>st</sup> century, the legitimisation of the capitalist model, the decarbonisation of the global economy, the accounting of environmental externalities as a result of resource use or misuse, the free movement of labour and the global alignment of pay and working conditions. This view is supported by Cerin (2002a) who suggests a role for regulation as stimuli to produce radical change in environmental conditions and the standards of business conduct in relation to profit maximisation (Uhlener et. al. 2012). Business must account for profitability acknowledging its interrelationship with environmental impact and climate change which can be measured using the currency of greenhouse emissions CO<sub>2</sub>e and other sustainability footprints indicators. However, the proliferation of various reporting schemes and lack of external verification of GHG data has stifled the adoption of sustainability footprints. Verification of sustainability reports is a controversial issue which must be addressed if sustainability reports are to have any credence with the financial markets, SMEs or society at large, some researchers have observed that existing verification use consultancy approaches and without any interest to promote transparency (Ball et al. 2000).

Despite overwhelming evidence as to the benefits of sustainability footprint tools such as carbon footprints very few companies set emissions targets (McKinsey 2007). Environmental leaders such as Executive Director – Policy, Institute of Environmental Management and Assessment Martin Baxter state that “*The reality for many is that carbon and GHG emissions are a low or non-existent priority; the*

*subject doesn't feature as an issue in their business – even though reducing energy consumption is good for the bottom line and improves environmental performance. There is a significant challenge – to overcome the barriers that prevent these companies from minimising their impact and maximising the opportunity” (IEMA 2010 pg. 1).*

## **2.6 Conclusion**

The literature review into sustainability/CSR research reflects industry best practice initiatives with sustainability theory evolving in four phases, *Sustainability/CSR Awareness, Sustainability/CSR Aspect Management, Sustainability/CSR Adoption and Sustainability/CSR Strategic Integration*. Organisations are faced with overcoming the *philosophical, cultural and strategic* challenges in their efforts to resolve the sustainability/CSR dilemma of profits or the environment.

The sustainability/CSR dilemma is exacerbated by the emergence of mega forces e.g. *resource scarcity* that affect the ability of organisational long term survival.

Research literature identifies key critical success factors and specific challenges faced by SMEs in the adoption of sustainability footprints (*Table 2.2*).

<b>Critical Success Factors</b>	<b>Challenges</b>
Senior management commitment to CSR/Sustainability (Epstein and Roy 2001, Lueneburger and Goleman 2010, Battisti 2011)	Voluntary exercise (Hicks 2010)
Customer environmental expectations or viewpoints are a factor of demand (Isaksson and Garvare, 2003)	Lack of definitive advice on non-carbon impacts and the inclusion of new chemicals to GHG inventories (Ascui and Lovell 2011, Bowen and Wittneben 2011, Shine et. al. 2005)
Government support and incentives (Bradford and Fraser 2008)	Sustainability of future generations an unknown quantity (Bowen and Wittneben 2011)
Organisational wide management system experience and competence (Granly and Welo 2014)	Sustainability footprints record historical impact (Holland 2003)

	<p>Absence of carbon disclosure indices within the SME sector</p> <p>Prohibitive cost (Hicks 2010) (Hillary 2000)</p> <p>Consumers heightened sensitivities towards negative CSR (Bhattacharya and Sen 2004)</p> <p>Difficulties in determining cause and effect (Epstein and Roy 2001).</p>
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**Table 3.2 Critical Success Factors and Challenges arising from the pursuit of sustainability footprints by SMEs**

Sustainability footprints tools such as the carbon footprint are extensions of earlier techniques such as the environmental footprint and are mechanisms to assist firms in measuring performance. Conceptually sustainability footprints are influenced by three key management concepts:

- *Risk* – identifying organisational vulnerability to legal, supply chain and regulatory risk arising from GHG emissions and incorporating the social impact of the organisation and its effect on cost structure and revenue streams (Lash and Wellington 2007) (Krysiak 2009)
- *Natural Resource Based View* – sustainability footprint measurement contributes to strategy through improved resource management by pollution prevention, product stewardship and sustainable development (Porter 1980, 1985) (Teece 1987; Winter 1987; Hart 1995) (Hart 2010)
- *Shared Value* – as indicators, sustainability footprints assist firms in the mitigation of environmental impacts arising from value chain activities (Porter 2006, 2011)

Within these key concepts arising from the literature review the following four dimensions can be surmised namely;

*Innovation Impact* – the role of stakeholder influences and perceptions of the impact of sustainability footprint efforts on product innovation and process innovation (Lash and Wellington 2007, Porter 2006, Klewitz and Hansen 2014, Uhlaner et. al. 2012)

*Cost Impact* – perceptions of risk and financial capital resource allocation to sustainability footprint related initiatives (Hart 1995) (Krysiak 2009)

*Environmental Impact* – resource allocation for sustainability footprints and the nature of related operations on *energy, water usage, emissions* and *waste* (Lash and Wellington 2007) (Porter 2006; Hart 1995, 2010) (Klewitz and Hansen 2014)

*Stakeholder Impact* – institutional pressures for legitimacy in relation to sustainability and its effects on the allocation of anthro capital resources to the adoption of sustainability footprint initiatives (McElroy et al. 2008; Porter 2011)



The application of this theoretical background will provide insight into the operational context, assist in the analysis of perception of sustainability footprints amongst SMEs (*Chapter 6*) and informs the methodological approach (*Chapter 3*) that was adopted to address the research aim and objectives.

## **Chapter 3 Methodology**

### **3.0 Introduction**

This chapter reviews the research methodology that was adopted to achieve research aim and objectives (*Chapter 1*). Overall this research seeks to explore perceptions of the context, contribution, challenges and critical success factors in the adoption of sustainability footprints by a review of existing research literature on sustainability footprint tools i.e. carbon footprint, water footprint, social footprint used by SMEs, the perceived benefit of sustainability footprint tools (*Chapter 2*). The question of perception is a subjective criterion and varies with the actor i.e. policymaker, non-governmental organisations, manager, sub-ordinate, customer, supplier and ultimately the general public. As with organisations and their search for *purpose* or *telos* researchers must define the *purpose* of research activity (Yin 2003).

Understanding perceptions of sustainability footprints and the influence on SME business activity forms the underlying purpose of my research (De Vaus 2005).

Although a recent study suggests that the pursuit of CSR initiatives by managers can improve the overall CSR perception of companies, despite this researchers emphasise that higher CSR performance is not indicative of higher levels of CSR perception (Dilling 2011). Regardless of perception all actors exist within the business environment and are influenced by the prevailing paradigm i.e. economic growth and expansion without the acceptance of limits.

### **3.1 Research Philosophy**

The researcher is also influenced by the dynamics of the business environment but also interprets phenomena based on their view of the world. Therefore due to the nature of sustainability footprints a philosophical approach based on *Interpretivism* will be pertinent for the following reasons:

Sustainability footprint data in itself may be useful but its true value is derived when individuals interpret sustainability footprint data and adopt behaviours or make decisions which are inherently sustainable. Observation and interpretations of the actions of decision makers i.e. code of conduct are as important as the adoption of a CSR initiative such as sustainability footprint methodology (Torugsa 2013).

***Interpretivism*** is defined “*as approaches emphasizing the meaningful nature of people's participation in social and cultural life.... Researchers working within this tradition analyse the meanings people confer upon their own and others' actions*” (Chatterjee et. al 2015)

The interpretation of feelings is fundamental to the construct of the *interpretivist* approach which consists of *Consciousness* – individual awareness of self and others, *Action* – choices made by individuals in reaction to external stimuli and *Unpredictability* – Individuals react differently to external stimuli, with their reaction not being able to be predicted with absolute certainty (Livesey 2006).

The need to make sense of reality or phenomenon defines *ontology* which is categorised into *objective ontology* i.e. external to the researcher and *subjective ontology* the phenomenon, individual actions are part of a social construction (Searle 1991). *Epistemology* is concerned with how individuals determine reality which may be *absolutist* i.e. “right or wrong”, *multiplist* i.e. knowledge and truth are subjective or *evaluativist* the assimilation of accepted norms of inquiry that contributes to the categorisation of information into *facts*, *opinions* and *judgements* (Mason et. al. 2006) (Limon and Mason 2002). Inherent in the categorisation of information is the value judgements placed by human beings who are influenced by prevailing aesthetic and ethical paradigm (Saunders et. al. 2011). Therefore information accepted as *facts*, *opinions* and *judgements* are reflective of the belief system or perceptions of the researcher (Bryman and Bell 2007). *Axiology* is a branch of

philosophy that involves value judgements on knowledge/ “reality” which inherently are influenced by human factors (Kvanvig 1998). Aligned to the research aims and objectives the axiological stance adopted in this study contends that it is difficult to separate the researcher from the phenomenon being studied therefore complimentary of an *Interpretivist* view of research philosophy (Sauders et. al. 20011) (Bryman and Bell 2007). *Methodological assumptions* is concerned with the techniques and tools involved with the process of research and its relationship which may be inductive or deductive in nature (Collin et.al. 2009).

In operating environments a myriad of internal and external stimuli can impact on strategic growth making it uniquely challenging to quantify the impact of the use of sustainability footprint reporting on financial performance nor would quantifying the impact of sustainability footprint tools be appropriate in this research but may be suitable for other studies.

The ontological stance of *constructivism* complements the epistemological position of *interpretivism* in that knowledge of sustainability footprints and its application is evolving thereby acknowledging that the interpretation of these phenomena will be influenced by individual perspective (Ackerman 2011). The philosophical assumption is based on the classical view of *constructivism* which contends that learning; ideas and concepts do not evolve organically but is determined by the contextual fabric and the individual interpretation of their own environment to generate knowledge (Papert 1980). Individuals in their performance of normal daily roles and functions are not independent of social phenomena (Ackerman 2011). Policymakers, management and staff perception of the utility of sustainability footprint strategy therefore determines the reality for the organisation and society as

a whole. Therefore, by extension the success of the sustainability footprint strategy may be based on a self-fulfilling prophecy of “perception is reality” (Forbes 2008). This concept of interdependence with our social systems integrates seamlessly with the concept and methodology of sustainability footprints.

Research approaches in Sustainability Footprint methodology and more specifically carbon footprint methodologies have relied on mainly quantitative techniques with much of the focus being placed on listed companies (CDP Project 2012, CDP 2010). Quantitative methods are philosophically based on positivist principles and stand in antithesis to *interpretivism*. The use of *interpretivism* supports the pursuit of *descriptive* approaches to examining the adoption of sustainability footprints as a phenomenon rather than *explanatory* or *exploratory* techniques (Marshall and Rossman 1999).

*Positivism* assumes an independent relationship between phenomena and human interaction (Livesey 2006) (Amaratunga et. al. 2001). Building on the tradition of research in Natural Sciences this approach involves the development of hypotheses which are tested by using surveys, structured interviews and questionnaires (Ellram 1996). The assumption that the phenomena observed are independent of their social context is not applicable in regards to sustainability footprints because the act of footprint measurement is an indication that the organisation acknowledges that its activities impact on the environment that also threatens the social and economic success of its stakeholders. The emphasis on objectivity is a key tenet of *Positivism* by restricting the researcher to gather and analyse data whilst avoiding contact with the phenomena being observed (Livesey 2006). This may not be practicable in light of the aim of this research; however interpretivist approaches may capture the

motivations and perceptions of stakeholders regarding the value of adopting sustainability footprint methodology.

Therefore research philosophy in essence can be divided into diametrically opposed paradigms consisting of the *rational/existential dimension* which is directly influenced by the researcher's philosophical orientation *deductive* i.e. analytical or *inductive* i.e. interpretive (Meredith et.al. 1989). The *natural/artificial dimension* varies with the mechanism by which the data is being converted into information either by *empirical* methods i.e. direct observation or *subjective* i.e. exposed to researcher elucidation (Craighead et. al. 2007). Aligned to the aim and objectives during this study an *interpretivist* and *existential* paradigm was pursued using qualitative data collection techniques used in this study will be discussed in section 3.2

### **3.2 Research Approach**

Research approaches can be categorised into *quantitative* involving the use of statistics to derive meaning from data sets using tools such as surveys and *qualitative* involving the interpretation of data e.g. interviews to describe phenomena , derive deeper meaning which can be affected by human filtering (Denzin 2009) (Bryman and Bell 2011). Arguably *mixed methods* can be considered an alternative research approach as is described as “a systematic integration of quantitative and qualitative methods in a single study for purposes of obtaining a fuller picture and deeper understanding of a phenomenon” (Johnson et. al 2007 pg. 119).

The essence of the motivations and perceptions of individuals within organisations that have adopted sustainability as a strategy can reasonably be explored using a

robust case study approach espoused by Yin (2003) as having *Construct Validity, Internal Validity, External Validity and Reliability*.

*Construct Validity* – involves the establishment of procedures and protocol governing the research exercise.

*Internal Validity* – examines the relationship between the variables identified in the phenomena being observed to determine whether these relationships are unique and specific to the existing context.

*External Validity* – determines the extent to which conclusions drawn can be applied to varying and unique context.

*Reliability* – explores the reproducibility and repeatability of the research design.

Despite Yin's case study model it is not without its fierce critics (Ellram 1996). Academic criticisms surround the *internal validity* of the research regarding the issues surrounding the influence of the researcher on the outcome of the phenomenon being studied and the rigour of research design as a solution to overcome researcher bias and the universality of the application research findings which can be reduced through external validation of the robustness of the research design (Amaratunga et. al. 2001, Ellram 1996, Yin 2003). Despite these criticisms case study methodology will provide an explanation as to the perceived benefits of or sustainability footprint strategy for policy makers and decision makers within the organisation and whether these perceptions are also held by other employees and stakeholders.



Ellram (1996) outlined five steps to assist in addressing the criticisms of the case study methodology namely *the Sample, Research Instrument, use of Multiple Data Sources, Maintain a Chain of Evidence* and *Draft Review by Key Informants*. The use of these criteria complements the ontological and epistemological pursued in within this research study (Yin 2003). Using Ellram's (1996) methodology, mechanisms that were employed to improve the validity of the research findings are subsequently discussed in sections 3.2.1 to 3.2.6

### **3.2.1 The Sample**

As Ellram (1996) states case study methodology is not sampling but an in depth analysis of the organisation in relation to the phenomenon the researcher wishes to observe. The in depth nature of case study analysis supports the examination of a subset Scottish SMEs in the exploration of the characteristics under study i.e. perceptions of sustainability footprint methodology. As a universally accepted definition of an SME does not exist the organisations with a compliment 5 to 120 employees were identified (Jenkins 2009).

Case study company selection was based on the following:

- implementation of sustainability footprint methodology
- award winning enterprises or in receipt of industry accolades
- location in Scotland
- and a willingness to participate in the research.

In respect to SMEs, sustainability footprint measurement is a voluntary exercise. Therefore potential case study organisations were solicited from the membership database of organisations such as the Bright Green Business, Crichton Carbon

Centre and the Institute of Chartered Accountants Scotland. Each case study organisation that comprised the sample voluntarily participated through self selection from the following business sectors:

- Case Study 1 Use of Sustainability Footprint in Engineering Sector – Capital Cooling Ltd
- Case Study 2 Use of Sustainability Footprint in the Engineering Sector – The Log House People Ltd
- Case Study 3 Use of Sustainability Footprint in the Tourism and Leisure Sector – Moffat Golf Club
- Case Study 4 Use of Sustainability Footprint in the Tourism and Leisure Sector – Rabbies Trail Burners Ltd

These four case study organisations from both the traditional economy and the service economy were selected so that comparative analysis and generalisations as to best practice can be deduced as being applicable to SMEs (Yin 2003).

### **3.2.2 Defining the Context**

However since organisations do not exist in isolation but react to the external stimuli generated from the business environment it is imperative that the policy making and business context is evaluated. The word context is derived from the Latin word *contextus* connection of words in its basic form it consists of two parts *com* meaning together and *texere* meaning to weave (Welter 2011). Therefore when the definition is applied to the business context it can be inferred that businesses are woven into the fabric of the context, this approach allows for a better understanding of observed phenomena (Welter 2011). Welter (2011) describes these contexts as *Business, Social, Spatial and Institutional*. Context may also be *substantive* situations within which individuals or groups operate *methodological* arising from a research study.

The all-encompassing nature of context may involve an understanding of the *omnibus* contextual view “the lens” i.e. whom, what, when, where and why or can be

*discrete* “variable” involving specific contextual variables (Welter 2011) (Whetten 2009) (Griffin 2007). Due to the multidimensional nature of context it can be inferred that the context is an external stimuli (Welter 2011) (Mowday & Sutton 1993).

This external stimulus in the Scottish context emanates from legislation enacted by the Scottish Parliament such as the Climate Change (Scotland) Act 2009 which sets legally binding targets for emissions reduction. These signals are interpreted by key organisations that influence sustainable development within the Scottish context which are the Scottish Environmental Protection Agency (SEPA), Scottish Government and Business in the Community Scotland. The government policymaking context within which these Scottish SME’s operate in terms of the use of sustainability footprint tools as a mechanism to reduce emissions and improve resource use is an influencing factor on entrepreneurial perceptions (Revell et. al. 2010, Revell and Blackburn 2007). The Scottish policy making context key organisations that interviewed and their strategic relationship to the firm is illustrated in (Figure 3.1)

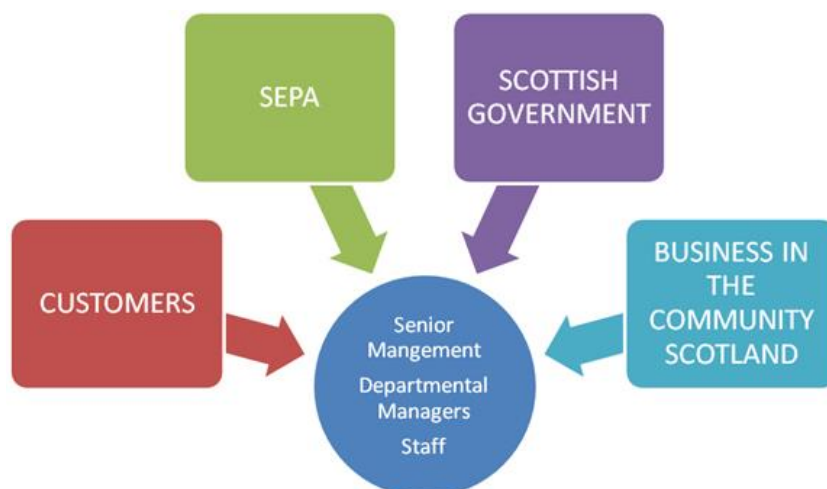


Figure 3.1 Policy Making & Business environment and its influence on the actors within the firm

**Scottish Environmental Protection Agency** – is the lead body for the regulation and protection of the natural environment in Scotland (SEPA 2011).

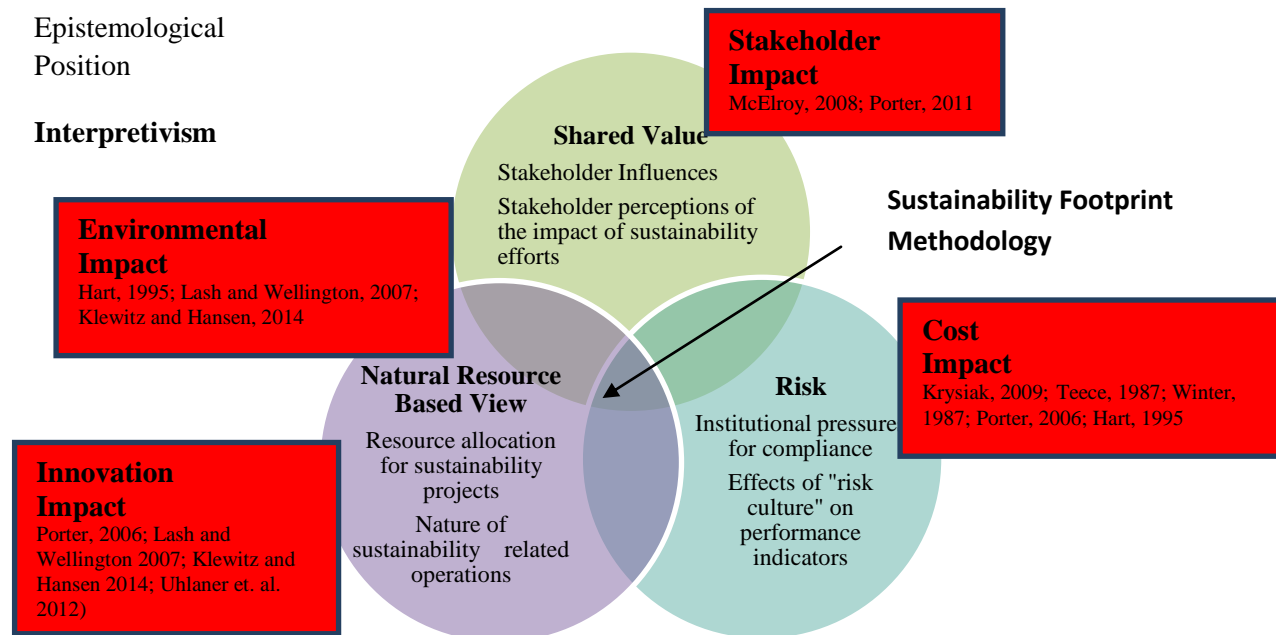
**Business in the Community Scotland** – a renowned nongovernmental organisation is one of the Prince of Wales charities whose goals in their view transcends CSR and sustainability but seeks to build “*Better business for a Better Scotland*” (Business in the Community Scotland 2011).

**Scottish Government** – is charting a course of sustainable development for Scotland with ambitious legislation such as the Climate Change Act 2009 which aims to reduce 80 percent overall carbon emissions by 2050 and the generation of 80 percent of Scotland’s Electricity from renewable resources by 2020 (Scottish Government 2011). The interpretation and the articulation of meaning from the messages emanating from policy makers, non-governmental organisations, customers and the general public sets not only the background but also the context for case study development. Findings arising from interviews with policymaking advisers are presented in *Chapter 4* and discussed in *Chapter 6* highlighting any convergence or divergence in perceptions with Scottish SME case study interviewees.

### **3.2.3 Research Instrument**

The main research instrument for case studies is the interview which may be *unstructured, structured or semi-structured* consisting of pre-planned questionnaires however questionnaires in the case of the semi-structured interview are used to guide the interview process with the interviewer having flexibility to explore different avenues of enquiry (Ellram 1996) (Yin 2003). A *semi-structured* approach was implemented using pre-planned questions which afforded the

flexibility to explore different avenues of enquiry that arose during the interview exercise rather than an *unstructured* interview style which does not use pre-planned questions but relies on interviewer experience in the subject area and reflective capabilities to control the interview exercise. This research combines both its methodological framework using the epistemological position of *interpretivism* and the ontological position of constructivism along with the conceptual framework discussed in section 2.4 to rationalise the use of sustainability footprints by SME's as outlined in (*Figure 3.2*). Although it may be unconventional to combine methodology with the conceptual framework it is pertinent in this context due to the potential multi-dimensional application of sustainability footprint tools to drive innovation within business. Therefore the questionnaire's enquiry themes were built around four main areas *Innovation Impact, Cost Impact, Environmental Impact* and *Stakeholder Impact* which seeks to explore perceptions of sustainability footprints in relation to management theory. *Figure 3.2* illustrates the key elements within which theoretical underpinnings of the research can be interpreted and will serve as a reference point for the analysis of interviewee statements. The model provides the flexibility to reflect additional salient emerging themes that arose from case study analysis and interviews.



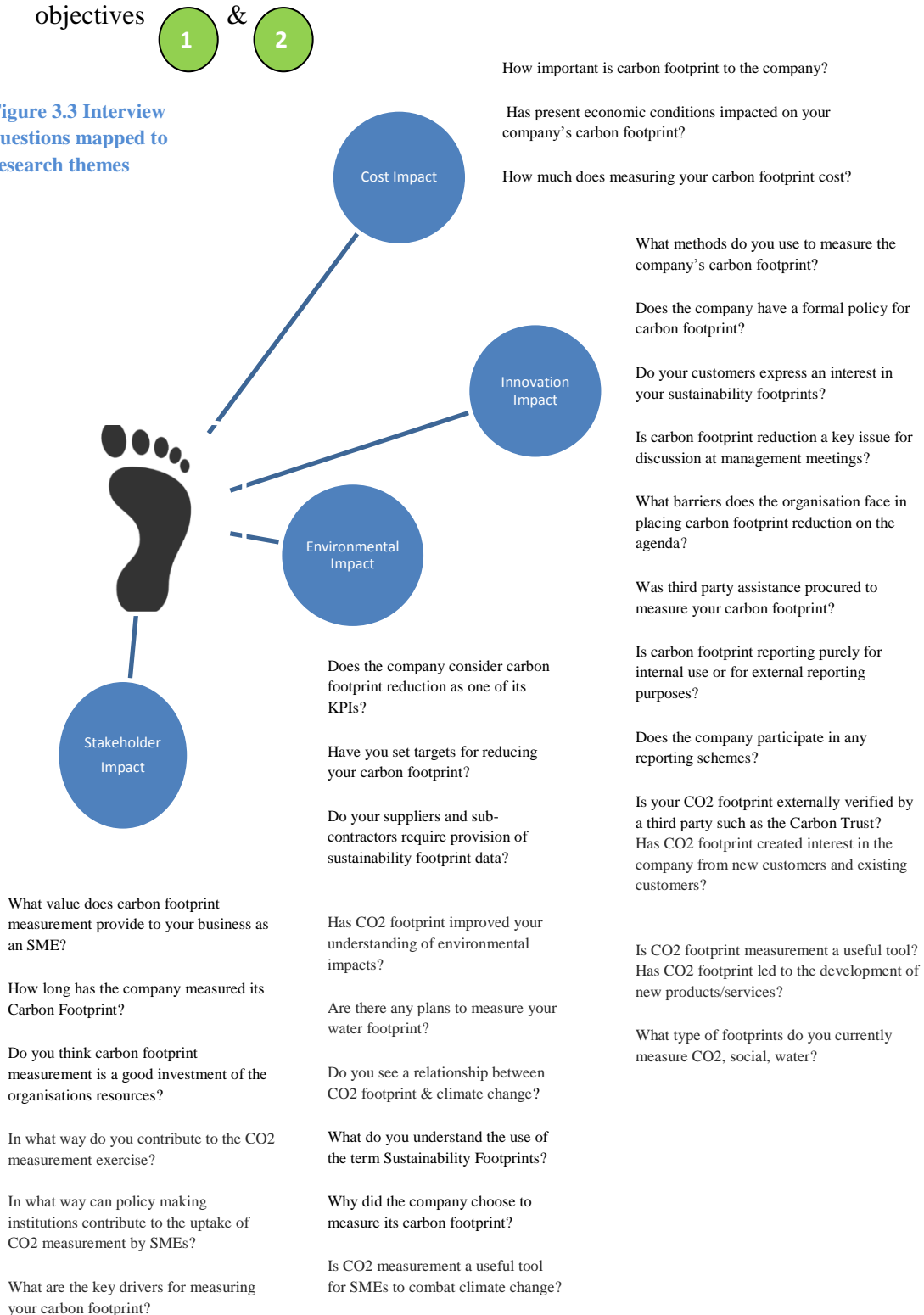
**Figure 3.2 Philosophical position of Sustainability Footprint Methodology within existing Management Theory and its relation to research question design**

*Figure 3.2* illustrates the philosophical synergy between the existing sustainability footprint methodology management theory and its influence on the questionnaire themes. Based on these themes a total of 32 questions were generated from questions designed by the Institute of Accountants of England & Wales (ICAEW) in their surveys of sustainability amongst their membership (ICAEW 2009). Although these questions were pre-planned a semi-structured approach was adopted as the preferred interview style.

The questions were tailored to suit the interviewee organisation i.e. governmental, non-governmental, regulatory, service and engineering with interviews normally lasting 45 – 60 minutes. Interviews duration varied depending on the inclination of the interviewee to disclose their perceptions of sustainability footprints.

A total of 19 individuals were interviewed with backgrounds ranging from CEO, engineers and administration staff (Table 3.4). Figure 3.3 below illustrates the interview questions in relation to the themes to be explored whilst Table 3.1 shows the co-relation between the interview questions and the overarching research objectives

**Figure 3.3 Interview questions mapped to research themes**



Research Objectives	Concepts & Themes
<p><b>1</b> To critically analyse the context, perceptions of contribution of sustainability footprint tools to Scottish SMEs</p>	<p><b>Cost Impact</b> (Lash and Wellington 2007) (Porter 2006) (Krysiak 2009) (Teece 1987; Winter 1987) (Hart 1995, 2010)</p> <p><i>Risk</i> How important is carbon footprint to the company?</p> <p><b>Innovation Impact</b> (Lash and Wellington 2007) (Porter 2006) (Klewitz and Hansen 2014) (Uhlener et. al. 2012)</p> <p><i>Process Innovation</i> (Klewitz and Hansen 2014) What type of footprints do you currently measure CO2, social, water? Does the company have a formal policy for carbon footprint? Was third party assistance procured to measure your carbon footprint?</p>
	<p><b>Environmental Impact</b> (Lash and Wellington 2007) (Porter 2006) (Hart 1995, 2010) (Klewitz and Hansen 2014)</p> <p><i>Energy &amp; Water Usage</i> Are there any plans to measure your water footprint? What do you understand the use of the term Sustainability Footprints?</p> <p><i>Emissions &amp; Waste</i> Do you see a relationship between CO2 footprint &amp; climate change? Have you set targets for reducing your carbon footprint? Is carbon footprint measurement a useful tool for SMEs to combat climate change?</p> <p><b>Stakeholder Impact</b> (McElroy et al. 2008), (Porter 2011)</p> <p><i>Anthro Capital Resource Allocation</i> Are there any plans to measure your social footprint? Do you think carbon footprint measurement is a good investment of the organisations resources?</p> <p><i>Shared Value Creation</i> What value does carbon footprint measurement provide to your business as an SME? Do you require suppliers and sub-contractors to provide sustainability footprint data?</p>
<p><b>2</b> To identify the Critical Success Factors (CSFs) and challenges in the use of sustainability footprint</p>	<p><b>Cost Impact</b> (Lash and Wellington 2007) (Porter 2006) (Krysiak 2009) (Teece 1987; Winter 1987) (Hart 1995, 2010)</p> <p><i>Financial Capital resource allocation</i> Has present economic conditions impacted on your company's carbon footprint? How much does measuring your carbon footprint cost?</p> <p><b>Innovation Impact</b> (Lash and Wellington 2007) (Porter</p>



<p>methodology within Scottish SMEs</p>	<p>2006) (Klewitz and Hansen 2014)</p> <p><i>Process Innovation (Klewitz and Hansen 2014)</i>  Why did the company choose to measure its carbon footprint?  What methods do you use to measure the company’s carbon footprint?  Do your customers express an interest in your sustainability footprints?  Is carbon footprint reduction a key issue for discussion at management meetings?  What barriers does the organisation face in placing carbon footprint reduction on the agenda?  Does the company participate in any reporting schemes?  Is your CO2 footprint externally verified by a third party such as the Carbon Trust?  Is CO2 footprint measurement a useful tool?  Is carbon footprint reporting purely for internal use or for external reporting purposes?</p> <p><i>Product Innovation (Klewitz and Hansen 2014).</i>  Has CO2 footprint created interest in the company from new customers and existing customers?  Has CO2 footprint led to the development of new products/services?</p> <hr/> <p><b>Environmental Impact</b> (Lash and Wellington 2007) (Porter 2006) (Hart 1995, 2010) (Klewitz and Hansen 2014)</p> <p><i>Emissions &amp; Waste</i>  Does the company consider carbon footprint reduction as one of its KPIs?  Has carbon footprint improved your understanding of environmental impacts?</p> <hr/> <p><b>Stakeholder Impact</b> (McElroy et al. 2008), (Porter 2011)</p> <p><i>Anthro Capital Resource Allocation</i>  How long has the company measured its Carbon Footprint?  In what way do you contribute to the CO2 measurement exercise?</p> <p><i>Shared Value Creation</i>  In what way can policy making institutions contribute to the uptake of CO2 measurement by SMEs?  What are the key drivers for measuring your carbon footprint?</p>
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**Table 3.1 Interview questions and their relationship to the research objectives, themes & concepts**

Table 3.1 highlights that research objectives may be related to one or more research themes and concepts.

### 3.2.4 Multiple Data Sources

To allay concerns regarding validity, information from multiple data sources ranging from company brochures, minutes of environmental committee meetings, minutes of safety committee meetings, CSR Reports, carbon footprint reports were collated.

These data sources were then used to corroborate information provided from interviews using Triangulation techniques (Forman 2006) (Seuring 2008) (Oliver 2004). Triangulation is the combination of qualitative and quantitative methods in the study of the same phenomenon (Amaratunga et. al. 2001)

Triangulation assisted in the analysis that was derived from the interview and secondary data sources to determine the following:

- Congruence or divergences in perceptions between functions within the case study organisation i.e. are perceptions of sustainability footprint methodology homogenous across and within functions within the organizational hierarchy.
- Congruence or divergences in perceptions across case study organisations i.e. are perceptions of sustainability footprint methodology homogenous across the case study organisations.

Similar qualitative approaches have been used by other commentators such as Arenas et al. (2009) in their study into the perception amongst stakeholder role of NGOs in relation to CSR within the Spanish context incorporated *Grounded Theory* to develop frameworks within which concepts regarding perception can be explored. Semi-structured interviews were conducted with 18 leading professionals who were active in CSR debates with open coding and axial coding being used in the analysis of the narrative (Arenas et. al.2009). The use of Grounded Theory allows for the “*systematic generation of theory from data that contains both inductive and deductive thinking*” (Murillo and Lozano 2006 pg. 230). Grounded theory also formed the methodological backdrop for research that ascertained SME motivations

and perceptions of CSR within the Spanish context, Murillo and Lozano (2006) decoded the interviewees “own words”, site observations and notes develop a picture of SME perceptions. In both cases researchers developed interview questions which were broader in scope to extract from interviewees a rich depth of ideas and comments regarding CSR (Murillo and Lozano 2006) (Arenas et. al.2009) (Dolan and Ayland 2001). The application of coding is used to conceptualise and categorise interviewee statements noting the frequency of a phenomena through a thorough analysis of interviewee transcripts (Strauss and Corbin 1990) (Meadows and Hyle 2010). Key dimensions were generated from concepts and themes arising from the literature review (*Table 3.2*). Interviewee responses were transcribed using Microsoft Word software and where necessary elucidating statements to aid with subsequent analysis, categorising responses by concept or theme i.e. *cost impact, innovation impact, environmental impact* and *stakeholder impact* and then into sub categories or dimensions utilizing an *a priori coding* structure (*Table 3.2*) (Creswell 2007). A review of this preliminary analysis was then conducted to highlight any further opportunities to analyse interviewee statements into sub categories or dimensions. This process was repeated to identify any emergent themes with careful recoding of information where required (Braun and Clarke, 2006) (Strauss and Corbin 1990) (Meadows and Hyle 2010).

Concepts & Themes	Dimensions
<b>Cost Impact</b> (Lash and Wellington 2007) (Porter 2006) (Krysiak 2009) (Teece 1987; Winter 1987) (Hart 1995, 2010)	
<b>Risk</b>	
1. How important is carbon footprint to the company?	Financial Risk Management Legal Risk Management Customer Requirement Market Leadership Cost Reduction Environmental Risk Management
<b>Financial Capital resource allocation</b>	
2. Has present economic conditions impacted on your company’s carbon footprint?	Cost Reduction Process improvement

3. How much does measuring your carbon footprint cost?	Cost Neutral
<b>Innovation Impact</b> (Lash and Wellington 2007) (Porter 2006) (Klewitz and Hansen 2014)	
<b>Process Innovation</b>	
4. What type of footprints do you currently measure CO2, social, water?	Carbon footprint Water footprint Social footprint Unaware
5. Why did the company choose to measure its carbon footprint?	Legislative pressure Benchmarking To be seen as being green Marketing Eco-Tourism strategy Care for the environment Corporate Social Responsibility Process Improvement Promote environmental achievements Cost Reduction
6. What methods do you use to measure the company's carbon footprint?	DEFRA Methodology Unfamiliar with carbon measurement methodology
7. Does the company have a formal policy for carbon footprint?	Carbon footprint policy Carbon management policy Environmental Policy
8. Do your customers express an interest in your sustainability footprints?	Tender requirement Limited customer interest Supply Chain pressure
9. Is carbon footprint reduction a key issue for discussion at management meetings?	Carbon footprint is a key issue for discussion Carbon footprint not a key issue for discussion
10. What barriers does the organisation face in placing carbon footprint reduction on the agenda?	Cost Senior management commitment Communication
11. Does the company participate in any reporting schemes?	Participation in reporting schemes Non-participation in voluntary reporting schemes
12. Is your carbon footprint externally verified by a third party such as the Carbon Trust?	Carbon footprint externally verified Carbon footprint not externally verified
13. Is CO2 footprint measurement a useful tool?	Benchmarking Measuring carbon reduction Strategic Planning To be seen as being green Market Leadership Considered as useful tool Not considered a useful tool
14. Was third party assistance procured to measure your carbon footprint?	External support used to measure carbon footprint External support not used to measure carbon footprint
15. Is carbon footprint reporting purely for internal use or for external reporting purposes?	External and internal purposes External purposes only Internal purposes only
<b>Product Innovation</b>	
16. Has CO2 footprint created interest in the company from new customers and existing customers?	Tender requirement No customer interest Supply chain pressure
17. Has CO2 footprint led to the development of new products/services?	Product Leadership No contribution to product/service development
<b>Environmental Impact</b> (Lash and Wellington 2007) (Porter 2006) (Hart 1995, 2010)	
<b>Energy &amp; Water Usage</b>	
18. Are there any plans to measure your water footprint?	Water footprint measurement No plan to measure water footprint

	Plan to measure water footprint
19. What do you understand the use of the term Sustainability Footprints?	Sustainable development Sustainability
<b>Emissions &amp; Waste</b>	
20. Does the company consider carbon footprint reduction as one of its KPIs?	Carbon footprint an important KPI Carbon footprint not an important KPI
21. Do you see a relationship between CO2 footprint & climate change?	Relationship between carbon footprint and climate change No relationship between carbon footprint and climate change
22. Have you set targets for reducing your carbon footprint?	No explicit emissions reduction targets Explicit emissions reduction targets
23. Has carbon footprint improved your understanding of environmental impacts?	Carbon footprint awareness Carbon impact indicator Environmental impact awareness Adoption of eco-friendly practices
24. Is carbon footprint measurement a useful tool for SMEs to combat climate change?	Carbon footprint considered a useful tool Carbon footprint not considered a useful tool
<b>Stakeholder Impact (McElroy et al. 2008), (Porter 2011)</b>	
<b>Anthro Capital Resource Allocation</b>	
25. Are there any plans to measure your social footprint?	No plans to measure social footprint Plans to measure social footprint
26. How long has the company measured its Carbon Footprint?	1 year 2 Years 3 Years 4 years 5 Years
27. Do you think carbon footprint measurement is a good investment of the organisations resources?	Cost reduction Market Leadership Combat climate change Pre-empt future legislation Carbon footprint considered a good investment Carbon footprint not considered a good investment
28. In what way do you contribute to the CO2 measurement exercise?	Environmental aspect monitoring Carbon footprint measurement
<b>Shared Value Creation</b>	
29. What value does carbon footprint measurement provide to your business as an SME?	Cost reduction Market leadership Corporate Social Responsibility Carbon footprint considered of critical value Carbon footprint not considered of critical value
30. Do you require suppliers and sub-contractors to provide sustainability footprint data	Carbon footprint not required by suppliers Carbon footprint required by suppliers
31. In what way can policy making institutions contribute to the uptake of CO2 measurement by SMEs?	Fair Competition Access to grants Tax Relief Mandatory guidelines for SMEs Legislation
32. What are the key drivers for measuring your carbon footprint?	Legislation Senior management commitment Process Improvement Cost reduction Energy efficiency Waste reduction Corporate Social Responsibility

Table 4.2 A priori coding structure used in analysis of interview data

Using DEFRA's segmentation model of individual attitudes and behaviours towards the environment as a philosophical template (DEFRA 2008 pg. 41-45; CEER 2009) (Table 3.3). These descriptors were adapted into a three dimensional format ranging from overtly *sustainability positive* to *sustainability negative* and *sustainability passive* within which interviewee perceptual positioning can be understood utilizing a similar approach adopted by Hansen et al. (2002) who identified that SME environmental strategy may exhibit *Negative Strategic Behaviour* focused on cost reduction and compliance, *Neutral Strategic Behaviour* and *Positive Strategic Behaviour* aimed at developing environmental competencies. Boiral et. al. (2014) suggests that *passive* positioning may be a reflection of lack of senior management commitment to sustainability initiatives thereby influencing within the SME strategic context. (Figure 3.4) (Klewitz and Hansen 2014)

**Summary of DEFRA's segmentation Model of individual attitudes and behaviour towards the environment**

*Positive greens*" (estimated to be 18% of the population) – who are driven by a very strong concern for the environment and high levels of personal responsibility to limit their impact on the environment. While they are doing more than any other group to reduce their environmental impact, there is scope for them to do more, particularly in relation to their travel behaviours. They are most likely to be in the AB socioeconomic groups and have the highest household incomes – of 40k and over per annum.

2. „*Wastage watchers*“ (12% of the population) – who are motivated by a desire to avoid waste of any kind, although they often lack awareness of other pro-environmental behaviour and may be more sceptical than average about the scale and urgency of environmental problems.

3. „*Concerned consumers*“ (14% of the population) – who broadly hold pro-environmental beliefs, but with less conviction than groups 1 and 2. They make some compromises for environmental benefit, but balance this with a sense that they „deserve“ to do certain things, like flying.

4. „*Sideline supporters*“ (14% of the population) – who have a generally pro-environmental worldview but whose green beliefs are not translated to their behaviours. Most say they are doing one or two things to help the environment and would like to do more.

5. „*Cautious participants*“ (14% of the population) – whose environmental worldview is close to the average for the population. Although recognising their impacts they are pessimistic about our ability to tackle climate change and quicker to say that efforts will be negated by other individuals and countries than groups 1, 3 and 4.

6. „*Stalled Starters*“ (10% of the population) – holding somewhat confused environmental views: mostly negative, with many seeing climate change as too far in the future to worry about and, with group 7, with the 3 highest numbers believing the environmental threat has been exaggerated. They are also the most likely, however (with group 1), to agree that there are limits to growth and that

humans are damaging nature, despite not wanting to act on this.

7. „*Honestly disengaged*“ (18% of the population) – whose ecological worldview is shaped by a lack of interest and concern and who are sceptical about the current environmental threat. They display no interest or motivation to change their current behaviour to make their lifestyle more pro-environmental and are unmoved by debates about the environment and climate change.

Table 3.3 Summary of DEFRA's segmentation Model of individual attitudes and behaviour towards the environment

Thereby contending that human perception is not static but dynamic changing dependent on stimuli received from the environment or context. This state of ambivalence has been observed in scenarios where individuals are faced with an ethical dilemma e.g. sustainability or trust and there are simultaneous conflicting emotions such love and hate (Lewicki et.al 1998)

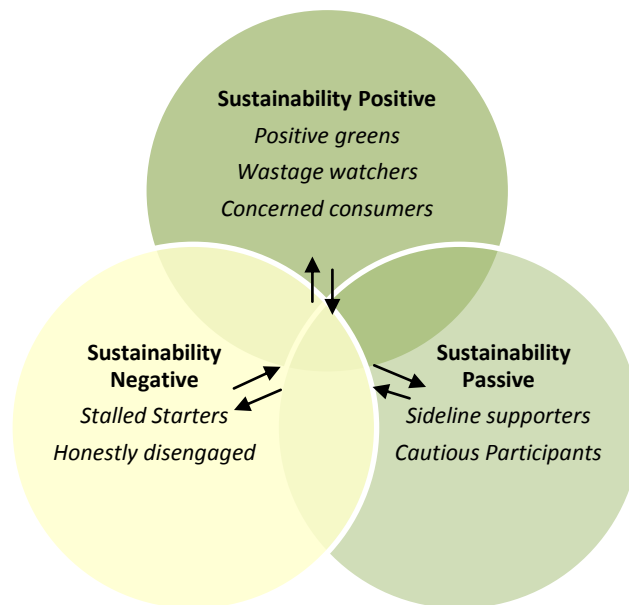


Figure 3.4 Sustainability perceptual orientation diagram

Concepts such as the *dynamic triangle* framework support this intellectual positioning by inferring that the adoption of environmental initiatives is influenced by the **Strategic Orientation** – communication and perception of environmental issues by actors within the firm, **Network Relations** the information landscape from which knowledge is derived and **Competencies** – capability of SMEs to change and adapt (Hansen 2002).

The predominantly qualitative approach for capturing perceptions of sustainability is a departure from the more conventional quantitative approach adopted by recent research conducted concerning perception Quality of Life (QoL) and its relationship to sustainability (Lepage 2009).

Xu and Yang (2009) in their study of Chinese perception of CSR surveyed 630 CEOs to identify the similarities and differences in their attitudes towards CSR.

Luchs et al. (2010) used a traditional scientific approach to their research methodology based on hypothesis development with each hypothesis being tested amongst students using Implicit Association Test (IAT) and projected techniques in a controlled laboratory environment with external validity being achieved by an observational field study. Ramasamy and Yeung (2009) in their review of Chinese consumer perceptions of CSR surveyed 200 employees in financial sector of Shanghai and Hong Kong the data was derived from the survey was further analysed using regression models that related the data to four dimensions of CSR – ethical, legal, economical and philanthropic. In a study conducted by Cormier et. al. (2004) into management perceptions and the reality of corporate environmental disclosure researchers surveyed 41 European and North American firms, the responses generated from the survey were then analysed using correlational and factor analysis to derive general trends.

A study of media perceptions of CSR was derived using data generated from 72 British journalists who responded to a quantitative survey questionnaire from which research themes were derived. Further in-depth exploration of each identified theme was then conducted by interviewing selected journalists from whom a descriptive framework within which to categorise journalistic opinion of CSR was developed



(Tench et al. 2004). The use of qualitative methods and data sources in this research will not only improve the validity of the case study but also the quality of the case study output by discovering “relationships between the constructs derived from qualitative research” (Amaratunga et.al. 2001).

### **3.2.5 Maintaining Evidence**

To confirm the validity of the research design, research question formulation and ultimately the research strategy it is useful the reader of the case study is able to systematically follow the steps taken by the researcher to develop the case study (Ellram 1996). The maintenance of a clear chain of evidence provides traceability of data sources and contributes to the reproducibility of the research study. Therefore interview transcripts, researcher notes and information collected from secondary data sources e.g. CSR Reports for each case was collated in the form of an *Evidence Pack* which was reviewed by the research supervisory team. This process in itself contributes to construct validity of the research. The *Evidence Pack* contains the following:

*Information Sheet for Potential Participants/Consent Forms*  
*Carbon footprint/Reports*  
*CSR Reports*  
*Environmental Policy Statements*  
*Energy consumption data*  
*Product catalogues/brochures*  
*Researcher Notes*

The aforementioned documents were used not only to develop company background or identify interviewees and solicit their consent but also to compare and contrast statements with pertinent secondary data relating to sustainability footprints implementation for each case study organisation.

### 3.2.6 Draft review by key Informants

Though unique in this regard, interviewee participants (Table 3.4) reviewed the *Statement of Research (Appendix 2)* and each signed the *Information Sheet for Potential Participants/Consent Form (Appendix 3)* verifying interview authenticity (Ellram 1996).

Sector	Organisation	Function		
		Manager	Technical	Non- Technical
Policymaking	Scottish Government	Head of the Environmental Economic Analysis Unit		
	SEPA	Head of Environmental Strategy		
	SBC	CEO Head of the Environment		
Engineering	Capital Cooling	Logistics Manager	Engineer	PPM Administrator Sales Administrator Marketing Co-ordinator
		Product Development Manager		
Engineering Manager				
Technical Manager				
Area Manager 1				
Area Manager 2				
	The Log House People	Director		
Tourism & Leisure	Moffat Golf Club	Greens Convenor	Greens Keeper	
	Rabbie's Trail Burners	Sales Manager		

Table 3.4 Interviewee List

The consent form is as a commissioning instrument authorising the use of the case study in a subsequent future publication and a verification instrument assuring the case study overall quality. Due to individual interviewee operational commitments, career changes and retirement draft review of transcripts was stymied incurring

additional costs as well as impacting on the timely completion of the research project. Albeit consent and permission was received from representatives of case study organisations for subsequent research publication derived from this study (*Appendix 7*).

### **3.3 Applicability of the Case Study approach**

The key *qualitative* tool used in this research is the case study method which provides a flexible yet structured format for capturing intangible human emotions, perceptions and feeling on a phenomenon of interest through the form of a narrative which may be *exploratory*, *explanatory* or *descriptive* in nature (Yin 2003; Forman 2006; Seuring 2008).

Research design arguments naturally arise when Action Research is a preferred alternative when the researcher was also a practitioner within the case study organisation which applies in respect of *Capital Cooling Ltd*. The dilemma of role duality of practitioner and researcher (Coghlan 2007) contributes to criticisms of bias and the influence of the researcher on the resultant outcome of the research. To negate against such criticisms it is necessary to define and identify the differences between a case study and action research (Table 3.5).

Specifically in the context of *Capital Cooling Ltd* as a case study organisation within which at the point of data collection the practitioner was also the researcher the aforementioned characteristics apply (Table 3.5)

Action Research	Case Study
Research in action, rather than research about action; Participative; Concurrent with action; A sequence of events and an approach to problem solving (Coghlan 2004)	It does not control or manipulate variables, It studies phenomena in their natural context, It studies phenomena at one of a few sites, It uses qualitative tools and techniques for data collection and analysis(Oliver 2004)

**Table 3.5 Differences between Action Research and Case Study**

Action Research is a methodological approach that involves collaboration, participation between the researcher and the organisation that defines the problem, creates interventions the effectiveness of which is refined through cycles of reflection and feedback that informs the development of models and theories (Dick 1991) (Zuber-Skerritt 1992) (Altrichter et. al 2002) (Perry et. al 2004). Fundamental to action research is the collaborative nature of the exercise between the actors and the researcher to explain, change, improve or provide solutions to the phenomenon under observation (Lewin 1946). This partnership is usually initiated by the company in an effort to solicit expertise and build competency in trying to derive a solution to a business challenge (Rapoport 1970) (Kaplan 1998). The researcher is provided an opportunity to test hypotheses and build theory through review and reflection (Alderfer 1993). This differs greatly from the role of the researcher in case studies which although intrusive is not interventionist but focused in observing the phenomenon and its impact on the organisation.

As with the case study approach questions of validity are overcome by the rigour of the action research process, problem definition and nature of the collaboration (Kaplan 1998). Oliver (2004) contend that case study methodology is particularly suited to research studies where the interpretation of external stimuli and the

meaning attributed i.e. perception is fundamental to understanding the phenomena under observation (Walsham 1995).

In that the case study undertaken is research of actions taken by the company in implementing sustainability footprint methodology with the researcher having limited influence over the variable being observed - the perception of employees and owners of the organisation and the impact these perceptions of sustainability footprint methodology on the success of the organisation's overall strategy including the relationship of these perceptions and utilising data from CSR Reports, carbon footprint reports and financial reports.

### **3.4 Methodological and Ethical Considerations**

Although case study methodology has been adopted as the main methodological technique, its use by nature implies the examination of a company or discrete group of companies in essence a "sample" of existing Scottish SMEs. Therefore any inferences that are drawn from findings cannot be readily generalised (Yin 2003).

This research is aimed at exploring perceptions of sustainability footprints amongst Scottish SMEs. To achieve this aim, individual perceptions were solicited with potentially emotive statements being divulged; therefore all practicable steps were taken to ensure interviewee anonymity by specifying only job titles. Thereby ensuring individuals were protected from potential conflict with their employing organisation. Reproducibility of findings is amongst the criticisms of case study approaches and is affected by the contextual nature of perceptions as individuals express a "love" or "hate" relationship with sustainability approaches (Lewicki et.al. 1998) (Yin 2003)

### **3.5 Conclusion**

The adoption of a case study research strategy using the techniques outlined by (Yin 2003) (Ellram 1996) will provide useful data from which information can be derived that will describe the perceptions of key decision makers within organisations using sustainability footprint methodology. Through the analysis of the interviewee narratives utilising the *Sustainability Perceptual Orientation Diagram* (Figure 3.4) provides a clearer categorisation of individual perceptual orientation regarding sustainability initiatives can emerge that can aid management in the implementation of pertinent tools that will influence sustainable behaviours. Critically, the case study narrative can reveal the transfer of these perceptions or changes in perceptions amongst sub-ordinates in relation to the sustainability footprint methodology adopted which could not have been readily identified using quantitative research methodology.

## **Chapter 4 Findings – Scottish Policymaking Context**

## 4.0 Introduction

This chapter describes the policy making climate under which each case study organisation operates. A background is provided of the Scottish policymaking context, *firstly* by identifying key policymaking organisations Scottish Government, Scottish Environmental Protection Agency and Scottish Business in the Community that influence political decision making regarding sustainability issues such as climate change, GHG emissions and its social consequences. *Secondly*, aligned to the research aims and objectives background information on each policy making institution is provided as well as statements from key decision makers that provides insight into the *philosophical, cultural* and *strategic* context of sustainability footprint implementation within Scotland. The statements of policymaking interviewees form the findings in support of the research aims and objectives creating a picture of the policymaking contextual landscape that is explored under three key headings:

**Challenges** – policy adviser views of the challenges faced by the Scottish economy as it transitions to a new low carbon state and perceptions of the adoption of Sustainability Footprints by Scottish SMEs.

**Contributions to SME success** – policymaking positions on the potential contributions to Scottish SME organisations and the Scottish economy arising from the implementation of Sustainability Footprint initiatives.

**Critical Success Factors** – policy adviser perceptions regarding the pre-conditions that will ensure that the benefits of Sustainability Footprints are fully realised by Scottish SMEs and the Scottish economy.



#### **4.1 Background – Scottish Government**

Scotland the cradle of capitalist thinking as espoused by intellectual giants such as Adam Smith now stands at the crest of a new wave of eco-innovations such as wind energy, tidal energy, carbon capture and storage (CCS). This hive of science and industrial endeavour is supported by robust government statutory initiatives such as the Climate Change Act Scotland 2009 which aims to cut Scotland's Greenhouse Gas emissions by setting an interim 42 per cent reduction target for 2020, with the legislative power for this to be adjusted based on expert advice and an 80 per cent reduction target for 2050 (Scottish Government Statistics 2011). The act requires that the Scottish Government set annual targets for the period 2010 – 2050 with the stipulation that continued reductions are 3% lower than the previous year from 2020 onwards (AEA Group 2011). The Scottish Government is leading this transition to a low carbon economy by enshrining the requirement for regular reporting of greenhouse gas emission performance by public bodies. The Environmental Economic Analysis unit provides analysis of environmental data such as GHG emissions to allow Scottish Ministers to make informed decisions as to the achievement of emissions reduction targets. The collection and analysis of Scotland's GHG emissions have become part of the Environmental Economic Analysis unit's remit since 2008. As an adviser to the Scottish Government, the Head of the Environmental Economic Analysis Unit was interviewed and responses were analysed to provide insight as to the policymaking perception within the Scottish Government.

The policymaking landscape is also influenced by two other organisations the SEPA and SBC.

#### **4.1.1 Scottish Environmental Protection Agency (SEPA)**

SEPA is an environmental body established by the Environment Act 1995 to regulate and monitor activities relating to Scotland's environment. Philosophically the SEPA as an organisation views itself as part of a long history of attempts to protect the environment that began with the 1388 Act of the realm in the reign of King Richard II (SEPA 2010). Since its inception the organisation has assumed the mantle for promoting environmental best practices by publishing an environmental report since 1999 (SEPA 2000). Unsurprisingly SEPA has actively measured its carbon emissions since 1997 (SEPA 2010).

To gain insight into SEPA's policymaking approach to carbon footprint measurement, an interview was conducted with the Head of Environmental Strategy. The Head of Environmental Strategy oversees a team that provides a "horizon scanning service" that assists SEPA with developing strategy to combat future challenges such as sustainability, human health, climate change, energy consumption and renewable energy.

#### **4.1.2 Scottish Business in the Community (SBC)**

Scottish Business in the Community views itself as Scotland's champion for better business practices. Established in 1982, this Prince's Trusts organisation has as its mission "*Building better business for a better Scotland*" by creating consensus within the business community for the adoption of sustainable business practices (SBC 2014). One of the organisations key initiatives is the Mayday Network – a collection of businesses engaged in taking action on climate change. Since 2007 the

Mayday Network has encouraged voluntary annual reporting of GHG emissions by its 3,800 member organisations (SBC 2014).

The Chief Executive Officer and the Head of the Environment for the SBC were both interviewed to ascertain the organisational policy regarding carbon footprint measurement.

## **4.2 The Policymaking Context**

Interviews were conducted with key policy makers from the Scottish Government, SEPA and SBC and later transcribed with perceptual views detailed in the narrative of this chapter. Interviewees are policymakers with practical experience in the collection and analysis of carbon footprint data thereby able to express relevant views regarding the challenges and critical success factors involved in carbon footprint measurement. This practical element of their experience as policy makers bolsters the validity of the research.

*“As Chief Executive... Well I just facilitate and encourage the internal team allow them the time to focus on it and encourage good results”* **CEO** (2011)

*“I kind of I guess responsible for putting it all together”* **Head of Environment** (2011)

Uniquely Scotland is pioneering the use of “consumption based” emissions methodology (Scottish Government 2011). Consumption based emissions methodology involves the calculation of emissions arising from the consumption of goods and services from Scottish nationals wherever they occur in the world as opposed to only “production” emissions which are generated within Scottish territory (Scottish Government 2011). The use of the consumption based emissions is enshrined within the Climate Change (Scotland) Act 2009 (Scottish Enterprise 2012). The methodology employed to calculate Scotland’s carbon emissions

involves the application of the environmentally extended input-output analysis method which takes into account not only trade volumes and full life cycle impacts but also the embodied energy impacts of raw materials within supply chains (Scottish Enterprise 2012). Both Scotland's carbon footprint and ecological footprint are used as national indicators (Scottish Enterprise 2012).

Official figures indicate that Scottish GHG emissions for 2009 were 52 million tonnes CO<sub>2</sub>e - a reduction of 27.6% using 1990 as a base year (Scottish Government 2011). The Business sector accounted for 13.2% of Scotland's GHG emissions (AEA Group 2011). Significantly the business sector accounts for all Sulphur hexafluoride (SF<sub>6</sub>) emissions, 68.5% of hydro fluorocarbon (HFC) emissions and 98.3% of perfluorocarbon (PFC) emissions (AEA Group 2011). Despite these pioneering efforts there is a perception articulated by government that Scotland's carbon footprint is a separate variable that does not impact on Scotland's economic growth whilst the majority of policy makers view the carbon footprint measurement as essential to encourage businesses to adopt sustainability best practices.

*"We are very conscious of trying to manage our own emissions because it is very important to the scheme of things to try and show what can be done, to show leadership and to explore and to show real approaches"* **Head of Environmental Strategy** (2011)

*"I do not see quite the connection between the carbon footprint and Scotland's economic future. I think they are quite independent of one another"* **Head of the Environmental Economic Analysis Unit** (2011)

Policymakers agree on the overall importance of carbon footprint measurement yet experience amongst policymaking institutions in the measurement, management and reporting of carbon emissions vary with SEPA being a pioneer initiating carbon emissions reporting in 1997(SEPA 2000). The Scottish Government began actively

measuring and reporting carbon in 2008 closely followed by the SBC whose carbon emissions reporting program was initiated a year later in 2009.

*“We did this in 2008 for the first time. Yes, it’s fairly new”* **Head of the Environmental Economic Analysis Unit** (2011)

Although fundamentally “sustainability positive” in regards to the impact of carbon emissions on Scotland’s economic future there is some uncertainty expressed regarding the importance of carbon footprint measurement to SMEs.

*“Hard to tell I don’t know how far people will become or will make their decisions their consumption decisions on the carbon friendliness of the products it’s still up in the air”* **Head of the Environmental Economic Analysis Unit** (2011)

*“It is critical it is not up for question anymore it is not a nice to do it is a must happen but it is something that has still got a way to go in terms of the SMEs understanding it and I still think we have got work to do in Scotland in positioning it as a bottom line asset”* **CEO** (2011)

Similar views are expressed by interviewees when considering the contribution of SME emission reduction to Scottish Government GHG emission targets. Public sector policymakers disagree with some preferring tailored approaches to suit the SME sector whilst other government representatives suggest methodological issues as barriers. Non-governmental policymakers are in favour of SME emissions reporting due to their scale in the economy accounting for 99% of businesses.

*“To Scotland’s carbon footprint measurement exercise... Well SMEs are 60% of the workforce or 40% one or the other and 99% of businesses so in terms of business emissions there is a huge role that SMEs can play in reducing business emissions”* **Head of Environment** (2011)

*“I think by SMEs using these systems it would help the assessors and people who produce these systems come up with better suited more proportionate approaches for smaller companies. That is what it is all about no point is it to take something that works for IBM and give it to a local printing company you have got to tailor it”* **Head of Environmental Strategy** (2011)

The perceived centrality of importance of carbon footprint measurement to the success of the Scottish economy has led to its adoption of carbon footprint and

ecological footprint methodology to the exclusion of other techniques such as water footprint and social footprint amongst policymaking institutions. In respect to NGO's there is difficulty in determining the boundaries of their social footprint because it forms the foundations of their organisation's business.

*"Well we did also measure the ecological footprint in the same round as we had the carbon footprint calculated"* **Head of the Environmental Economic Analysis Unit** (2011)

*"We don't measure our water footprint at all"* **Head of Environment** (2011)

The pursuit of carbon footprint measurement within policymaking institutions is influenced by legal requirements, senior management commitment, stakeholder expectations and best practice leadership. There is concern amongst government policymakers that the reductions in domestic carbon emissions act as a smokescreen for the export of carbon emissions and the importation of water through agricultural and forestry products.

*"For all those reasons we were saying earlier because we had a commitment to reduce because other people expect us to...senior managers wanted us to... our staff expect us to and because we want to show leadership for all those different reasons"* **Head of Environmental Strategy** (2011)

*"It is in the law and because it is clear that reducing the production footprint alone may not be the be all and end all on reducing our impact on climate change"* **Head of the Environmental Economic Analysis Unit** (2011)

Interviewees perceive Scottish SMEs as pursuing carbon footprint measurement for mainly commercial reasons to show *corporate responsibility, help customers make better informed decisions, resource efficiency, cost reduction, supply chain pressure and commitment to climate change.*

*"To allow its customers to make better informed decisions and to show corporate responsibility and to manage its resources or its resource use better"* **Head of the Environmental Economic Analysis Unit** (2011)

*"Either because they are committed to climate change the whole agenda and or they want to save money"* **CEO** (2011)

The long term Scottish Government strategy is the development of a low carbon economy, this policy shift is defined by Ian Marchant Chair of the 20:20 Climate Group as “*Low carbon is a way of thinking, behaving and operating that minimises carbon emissions while enabling sustainable use of resources, economic growth and quality of life improvements*”(Scottish Government 2010 pg. 4). Global economies are still reeling from the effects of sluggish economic growth as a result of the recent financial crisis. Public sector policymakers are convinced that there is a derived impact on the carbon footprint of their organisation as a result of existing economic conditions. Interviewees at Scottish Business in the Community an NGO perceive economic conditions as having negligible impact on the carbon footprint of their operations.

*“I would have expected it to have gone down simply by reducing production both at home and consumption of imported goods”* **Head of the Environmental Economic Analysis Unit** (2011)

*“I don’t think you can actually say the economic environment has affected our own internal carbon footprint”* **CEO** (2011)

There is however consensus amongst interviewees that prevailing economic conditions have impacted on the carbon footprint of Scottish SMEs either through reduced productive activity, climate change, increased recycling cost, linkages between high carbon emissions and resource consumption. This ‘*sustainability positive*’ outlook is tempered by a perception that management of some Scottish SMEs may consider carbon footprint measurement a luxury or an unnecessary activity outside of their core business.

*“Again my impression would be that there are two tensions the sort of risk as market conditions decline and everything gets tighter companies jettison everything that are not core so presumably there are companies out there who are cutting back on sustainability and carbon footprints because they think it’s a luxury”* **Head of Environmental Strategy** (2011)

The challenging financial constraints the “Age of Austerity” government economic policies have imposed on public sector bodies both directly and the indirectly (Cameron 2009). The effect of government policies on charitable funding to non-governmental organisation’s such as the SBC have made cost reduction a critical management issue amongst policymakers (Cameron 2009). These factors have not deterred policymaking institutions from pursuing carbon footprint measurement as part of their organizational strategy. Interviewees state that carbon footprint measurement costs can range in some instances from £200,000 – £20,000 for public sector organizations to less than a £1000 for NGO organizations.

*“Cost SBC. That’s a good question we probably spend... we have had three of us at least working through it ....under a thousand pounds”* **Head of the Environment** (2011)

*“We commissioned the carbon footprint from 1996 – 2006 and that cost about £15000 and added to that would be am not sure just thinking about that how we do it and who does it will cost between ten to twenty thousand pounds per year”* **Head of the Environmental Economic Analysis Unit** (2011)

In the case of public sector interviewees the need for verification and validation of carbon footprint data has ameliorated concerns of cost, hence the use of consultancy support and assistance. SBC as an NGO collate and analyse their carbon footprint using internal resources within the organization.

*“No, it is verified in so far as it is an independent institute doing it for us so we have not done it ourselves and the Stockholm Environmental Institute is a well-respected academic institution”* **Head of the Environmental Economic Analysis Unit** (2011)

*“There is this ISO 14001 Audit as I mentioned they would require us if they so choose to go into the books and say so show me and they have done that sometimes the main route is this annual report called ‘Greening SEPA’ so we have our targets and then we report against them and then we always have that externally validated. We appoint an independent company every year we usually tender for the work. It may be a different company but they have to be qualified auditors of some kind they will have some certification behind them and it is there job to basically make us justify every statement and we pay £5000 or more a year to get that done.”* **Head of Environmental Strategy** (2011)



The ability public sector policy advisers to communicate reliable data to stakeholder groups such as government ministers and NGOs necessitates the need to rely on assistance from external consultants due to the lack of specialist technical expertise, assurance and validation.

*“Well could do it ourselves but the quality would have been slightly lower if we had done it ourselves but that is because this IO analysis is very specialised and we can do it for Scotland but we don’t have the information for the emissions that arise abroad or the input – output tables of our trade partners which you need in order to do a comprehensive analysis so we could have done a footprint based on UK & Scottish input – output tables which would have given us a footprint similar to the one we got from SEI who did the work for us the Stockholm Environment Institute but we opted for an independent body to do it for us and to rely on their expertise and the information they have they have got at hand about foreign emissions and foreign IO tables”* **Head of the Environmental Economic Analysis Unit** (2011)

Third party assistance is considered as essential to assist SME’s in collating information on energy consumption, determining the level of Scope 3 emissions and the development of capability to conduct carbon footprint measurements in-house.

*“I think they should, I am not totally convinced it should be a quality assurance route all the time or if it is it has to be a light touch one but certainly having simple tool and having the assistance of the Carbon Trust or Zero Waste Scotland or whoever it is a very good idea... it should be imbedded within Business Gateway, the local authorities and enterprise companies”* **Head of Environmental Strategy** (2011)

*“I think they probably need too until they understand all the issues that relate to this...Well actually there are three phases the first phase is for SMEs to start collecting properly information on energy consumption.....The second phase is about including scope 3 emissions and that is where I think they need more support..... The third stage if they understand how that works they can do that themselves and in conjunction with everyone else doing it the information becomes available on scope three through product footprints much more easily they would be able to do the whole footprint in-house”* **Head of the Environmental Economic Analysis Unit** (2011)

This structured “quality assurance” approach is however not universally accepted as the only solution, a “light touch” intuitive approach using online calculators with support from the government via incentives, Carbon Trust, Business Gateway, Zero

Waste Scotland and the knowledge of environmental students are postulated as alternative mechanisms.

#### **4.3 Challenges – Transitioning to a Low Carbon Economy**

The transition to a low carbon economy presents Scotland with the opportunity to gain competitiveness in the new green economy but also mitigate against its exposure to climate change and energy costs in a carbon constrained world (Scottish Government 2010). If unabated the risks arising from climate change and increased energy costs occur it may create a scenario involving:

- The loss of public access to water either through the flooding of infrastructure or drought.
- Damage and disruption to communication and transport systems as a result of flooding or adverse weather events
- In ability to provide services during adverse weather conditions that will become more frequent due to climate change.
- Increased cost of raw materials and instability in global financial markets (Scottish Government 2010).

To manage these potential risks public sector organisations have instituted carbon management policies aligned to achieving the carbon reduction targets stipulated in the Climate Change Act 2009. The SBC has not developed a formal policy regarding carbon footprint measurement but has an enshrined commitment to operate sustainability as part of the Prince's Trust.

*“CSR Group who look at all our internal sustainability policies we do not have a formal policy we have a commitment to work as sustainable as we can”* **CEO** (2011)

*“Yes, absolutely it is direct emissions at the minute but you can go on our website and you will see our policy. It is written into our standard approaches, it is written into our values and one of our values is the environment obviously. It is written into our staff objectives our training program and our core competencies for staff. It is externally validated and reported monthly and quarterly to the corporate management team and board. I would say it is pretty much now imbedded in terms of carbon with the one caveat that it is not the full picture it is the direct emissions part”* **Head of Environmental Strategy** (2011)

The SBC's carbon footprint policy approach may be due to the lack of stakeholder interest in carbon footprint measurement despite attempts to foster stakeholder engagement. SEPA due to its role as Scotland's environmental regulator its carbon performance is subjected to regular media scrutiny whilst the Scottish government's key policy adviser perceives a lack of awareness amongst its stakeholder base.

*"I don't think I have ever been asked once about our own internal sustainability policies and our footprint"* **CEO** (2011)

Policymakers hold divergent views on the value of formal carbon footprint policies with SBC and Scottish Government advisers not only advocating universal adoption by all Scottish SME's supported by suitable advice but viewing carbon footprint policy development as a desirable activity with SEPA's policymaker preferring a targeted sector specific approach.

*"I don't know if they perceive a need for it but I think from a policy perspective it would be desirable simply to foster a more awareness of the carbon consequences both for the producer as well as the consumer"* **Head of the Environmental Economic Analysis Unit** (2011)

*"I would like to say yes that would be a bit disproportionate maybe it should be more targeted. The government should be more involved or maybe SEPA should be giving a lot more advice to the companies that should have and then everybody else it should be an option"* **Head of Environmental Strategy** (2011)

The deployment of carbon footprint policy to the supply chain varies amongst policymaking institutions with the SBC requiring membership of their Mayday Network a voluntary emissions reporting scheme as a contractual pre-requisite. Public sector policymakers however adopt a flexible approach requiring evidence of environmental policy statements to future implementation of carbon footprint measurement as part of their supplier pre-qualification questionnaire.

*"We do not have that many suppliers, to be honest and it's not been that huge focus. In terms of our cleaners are MITIE they are a member company so I am well aware of their CSR agenda because we helped them with it.... with any of our suppliers if they are big*

*enough we would ask if they want to work with us we are not big enough really to have a policy but obviously but in terms of office supplies cleaning it's good to have member companies that we know who are committed to CSR”* **Head of Environment** (2011)

*“That is a live issue for us we certainly require them to show us their environmental policy for what they are doing but at the minute we do not require that but it is certainly on our list. I think what we will do as part of our future targets is an assessment of our buying goods and services and then from that the major ones that cause impact and ask them to provide some data to us some would anyway because they have the data but it is not systematic at the minute”* **Head of Environmental Strategy** (2011)

Emission reductions are seen as a key factor being enabled by behaviour change in terms of consumption and resource efficiency (Scottish Government 2010). Carbon footprint reduction is perceived as a key issue that is discussed at management meetings by both SBC SEPA policy advisers however the government key policy adviser contends that the use carbon footprints is only a tool that provides context within which product based emissions can be understood.

*“The key issue is to reduce our production based emissions the carbon footprint puts that into context and makes us realise that we have not been successful in driving down our global emissions impact”* **Head of the Environmental Economic Analysis Unit** (2011)

Policymakers agree that carbon footprint reduction should be on the management agenda of SMEs along with other sustainability indicators thereby fully supporting Scottish government's targets for carbon reduction and transitioning to a low carbon economy.

*“Ideally yes I think that would be very helpful to support the government's aims to meet its emissions reduction targets”* **Head of the Environmental Economic Analysis Unit** (2011)

*“Would we like it too absolutely, but not just carbon it is quite narrow I do not think it should be carbon necessarily it could be on the environment more generally also the social impact of what the business is doing should be on the agenda. So we are looking at real triple bottom-line reporting on the agenda”* **Head of Environment** (2011)

However the environmental and climate change movement in the view of some policymakers has not engendered itself to business by the use of terminology and jargon such as “carbon footprint” “low carbon”. Concepts inherently alien to

traditional business lexicon of “pounds, pence and shillings”. Language itself is perceived as barrier that promotes exclusivity to an altogether invisible subject. This may necessitate a cultural shift within the business community in general and Scottish SMEs specifically as well as overcoming traditional concerns such as cost, lack of information, time pressure and resource constraints.

*“I think it is similar to our barriers part of it is knowing the opportunities, part of it is having the tools, the information available to decide how to proceed, I think the biggest one though is the issue that faces all SMEs is time pressure”* **Head of Environmental Strategy** (2011)

*“I think one of the barriers we have not talked about is language. I think one of the barriers is that your normal SME your average business will see climate change or whatever element within climate change whether its environmental or carbon or whatever is shared as an area that is owned by policy makers scientists , eco-warriors and economists”* **CEO** (2011)

The view from within policymaking institutions is diverse with government the key policy adviser perceiving limited barriers to carbon footprint measurement except for the conundrum of dealing with of consumption based emissions over which there is little influence. Consumption based emissions is the equivalent of Scope 3 emissions within DEFRA’s greenhouse gas emissions guidance.

*“Another barrier is initiative overload so even for an environmental agency there is only so much change and new initiative someone can take there is only so much resistance initially ‘oh there is another thing that I have got to do’. So this is in a nutshell understanding what our contribution should be, finding the most cost effective solutions putting in place data and systems to support people to change, then constant reinforcement of the message that this was not going to go away and to engage with them”* **Head of Environmental Strategy** (2011)

The reporting of Scope 3 emissions by SME’s is considered by the key government policy adviser as challenging but only really useful if measured by a vast majority of Scottish SME’s. Interviewees from SEPA and the SBC infer internal barriers mirror that of SME’s in terms resource constraints, cost, lack of information, time pressure but uniquely target setting and “initiative overload” of employee schedules.

#### 4.4 Contributions to SME success

The low carbon, environmental, goods and services sector (LCEGS) estimated at £8.8 billion in 2007 -2008 is expected to grow to 12 billion by 2014 – 2016 or 10% of the Scottish GDP (Scottish Government 2012). An estimated 50% of LCEGS sales are expected to occur in sub sectors such as sustainable buildings with opportunities for sales in green tourism and timber construction (Scottish Government 2010). The ability of carbon footprint measurement to stimulate innovation and contribute to the development of new products and services is universally accepted amongst interviewees and is perceived as not only yielding these benefits to policymaking institutions but also SMEs.

*“I think understanding of the barriers and obstacles to carbon footprint and environmental engagement we are certainly developing mechanisms and tools so for us it has enabled us to understand what mechanisms we can produce for our members we doing some quite exciting and innovative work in that area”* **CEO** (2011)

*“Distilleries again used to take the waste and had to pay for it to go to land fill or pay for it to go to a farmer’s field and then the carbon pressure comes along and they say why can’t we use this as a fuel? Can we use this as a renewable resource? Can we turn this into bio-butanol? and definitely a new service and there are other examples where the things that were waste is an actual resource that we can sell”* **Head of Environmental Strategy** (2011)

Interviewees from public sector policymaking institutions perceive that their stakeholders have expressed an interest in their carbon footprint. This experience differs in regards to the SBC whose stakeholders are passively indifferent.

*“Yes they are very keen on us producing this type of footprint information mainly the carbon footprint”.* **Head of the Environmental Economic Analysis Unit** (2011)

*“No, absolutely not”* **CEO** (2011)

There is unanimity of perception regarding the generation of interest for the goods and services produced by SMEs through the participation in environmental award

schemes such as the Vision in Business for the Environment Award Scheme (VIBES), customer ability to influence management decision making by purchasing low carbon or environmentally friendly products and services, supply chain pressure from large customers to adopt carbon reduction policies, a differentiating factor in purchasing decisions, a proxy for good management performance, unique selling proposition (USP) for products and services, improve SME competitiveness and reduced risk of environmental non-compliance. These benefits of carbon footprint measurement are perceived a naturally accruing to Scottish SME firms although varying by sector.

*“Yes I think can it can be very well become an USP for an SME if its products are very low carbon and it is produced sustainably. Yes in the first instance it might be something for them to raise their competitiveness in the market”* **Head of Environmental Economic Analysis Unit** (2011)

*“I think it is quite sector specific I think some sectors naturally there will be more of a divide as with the likes of Marks & Spencer, ASDAs.... what the retailers are doing for their suppliers and really pushing their suppliers in terms of sustainability so if you want to get on to the supply chain of those suppliers it is essential. In some other industries mainly in the professional services industries it is still important but maybe less important again depending your client base”* **Head of Environment** (2011)

The drive to reduce greenhouse gas emissions embodied in the products and services consumed by the public has influenced the development of the Zero Waste (Scotland) Regulations 2012. Although recovering from the effects of the global financial crisis its devolved government launched an ambitious Zero Waste Plan on the 9th June 2010. Scotland’s Zero Waste Plan hopes to achieve waste recycling rates of 70% with 5% of waste going to a municipal landfill by 2025. The recent enactment of the Waste Information (Scotland) Regulations 2010 provides a clear indication of the intention of its law makers to influence business to efficiently manage the consumption of resources. Parallel to the ratification of environmental legislation is a rise in carbon emissions reporting and the proliferation of voluntary

carbon reporting schemes. SEPA participates in two major voluntary reporting programs the Local Authority Management program and the World Wildlife Fund (WWF) “One in Five Challenge” (WWF 2009). Through participation in the One in Five Challenge SEPA has reduced business flights by 48% and emissions by more than 90 tonnes saving £100,000 in travel costs during 2009 -2010 which is equivalent to a 50% reduction in travel expenditure (SEPA 2010). The SBC discloses carbon performance through its own Mayday Network reporting scheme whilst the Scottish Government reports carbon emissions as part of the UK’s overall carbon emissions report. Although benefits such as best practice leadership and stakeholder awareness is derived by participating in carbon footprint reporting schemes these are not perceived by some policymakers as being substantial.

*“Often we are doing it from a leadership point of view to try and encourage others with often not huge benefits to ourselves because we understand our mission quite well but showing others what we’ve done it and it showing others it can be done”* **Head of Environmental Strategy** (2011)

*“Just through the Mayday Network”* **Head of Environment** (2011)

Policymakers however agree that reporting schemes are beneficial to SMEs; their perceptions differ regarding the approach i.e. mandatory or voluntary. Non-governmental policymakers contend that SMEs are confused due to the proliferation of reporting schemes with an accompanying bureaucracy of varying reporting requirements that has a potential of creating an administrative burden. Policy advisers within the Scottish Government are biased towards SME participation in reporting schemes as the process of reporting may improve the quality of their carbon footprint analysis.

*“Should a business of ten have to go through a reporting scheme I am not convinced I am not sure it depends what the reporting scheme is I think in CSR and sustainability overall there is a lot of reporting schemes”* **Head of Environment** (2011)



*“In so far as these reporting schemes improve the quality of the analysis”* **Head of Environmental Economic Analysis Unit** (2011)

Divergent views are expressed by interviewees regarding the benefits of participating in reporting schemes yet they routinely produce carbon footprint reports. Scottish government agencies consider carbon footprint reports as directed to external stakeholders differing from SBC policymakers who regard carbon footprint reporting as directed mainly at internal stakeholders.

*“Well it is for external reporting really it’s to allow anyone the public the NGOs to understand where we’re at... We have produced the carbon footprint as well as the ecological footprint. It’s part of a performance information framework”* **Head of the Environmental Economic Analysis Unit** (2011)

*“Our own reports are primarily internal as I said we’ve never been asked externally before but we need to be accountable as a Princes Charity we represent a brand we need to be accountable for it We would not push it out there probably we like it better that way as we still got work to do were still developing it and I think it’s important we are keen to share with SMEs because we understand the challenges ourselves and that’s the most important thing that you can share your own challenges which sometimes creates a safe environment for a good conversation”* **CEO** (2011)

Disagreement exists as to the approaches Scottish SMEs should adopt regarding carbon footprint reporting with Scottish government policy advisers preferring a phased approach initially targeting carbon footprint reports to internal stakeholders to enable them to improve resource efficiency and optionally reporting their progress in areas such as product carbon footprints to external stakeholders. Alternatively SEPA advocates external reporting utilising a sector specific approach to create competitive advantage and to satisfy supplier expectation with the aspiration that all Scottish SMEs should measure their carbon footprint. Policymakers at the SBC recommend carbon reporting for Scottish SMEs especially for procurement and contract bidding purposes if the methodologies used are honest and robust thereby acting as an employee engagement tool supporting sustainable behaviours and best practices.

*“That as a minimum there should be certain sectors where there is a competitive advantage or a supplier expectation that they report so those ones as a minimum should report externally... Hotels and Tourism businesses and those businesses that “sell” to Tesco’s and other major retailers or those industries that are a major source of carbon”*  
**Head of Environment Strategy (2011)**

*“It depends how good it is as I mean we’ve said they should use it for procurement and contract bidding if its sound and honest and measurable but they should also use it to engage their employees around those behaviours that create good practice about carbon measurement”* **CEO (2011)**

Despite enthusiasm for carbon footprint reporting only the SBC require suppliers and sub-contractors to participate in its Mayday Network as part of their supplier/subcontractor pre-qualification process. SEPA require their suppliers/subcontractors to provide Environmental Policy statements whilst the Scottish Government is considering the use of carbon assessments as part of their supplier/subcontractor pre-qualification process.

*“Well we are looking at options of doing that we are including some kind of carbon assessment into our procurement decisions but it has to be done in a fair manner not all of our contractors have the capability with providing us with that sort of information we have to find ways of enabling them to provide information”* **Head of the Environmental Economic Analysis Unit (2011)**

*“We do not have that many suppliers to be honest and it’s not been that huge focus. In terms of our cleaners are MITIE they are a member company so I am well aware of their CSR agenda because we helped them with it... with any of our suppliers if they are big enough we would ask if they want to work with us we are not big enough really to have a policy but obviously but in terms of office supplies cleaning it’s good to know we have member companies that we know who are committed to CSR”* **Head of Environment (2011)**

Public sector policymakers are acutely aware that supply chain pressures to meet the demands of large customers such as Tesco, Marks & Spencer and B&Q are forcing SMEs to report carbon emissions with the Scottish Government adopting a practical view as to the feasibility of SMEs to influence companies within their supply chain to report their carbon footprint emissions. Non-governmental policymakers advocate

that SMEs adopt flexible approach factoring in price concerns which may involve a balancing act between cost, social and environmental issues.

*“Again I think it would be desirable but I do not think it is feasible”* **Head of the Economic Analysis Unit** (2011)

*“Yes, again certainly in the major industries and I think it is already happening at Marks & Spencer suppliers, B&Q, Tesco... I think absolutely a way to drive change if the people you supply to require it. It makes you do it. I think it is really important”* **Head of Environmental Strategy** (2011)

Cost considerations and resource constraints do not deter interviewees from considering carbon footprint measurement as a useful tool. Policymakers perceive carbon footprint measurement as a process management tool, performance indicator, providing a holistic view of carbon emissions, identifying areas of global impact and a useful mechanism for comparative analysis of carbon emissions.

*“We would certainly say so because if you cannot measure it you cannot manage its simple yes absolutely”* **Head of Environmental Strategy** (2011)

*“I do think it’s useful as it does remind us no matter how much we are able to reduce or no matter how successful we are at reducing our own footprint. We still have to be mindful that other countries have to do the same in order for us to be able reduce our global impact and does include the impact we have through the imports we consume”* **Head of the Environmental Economic Analysis Unit** (2011)

There is agreement amongst policymakers that carbon footprint measurement is a useful tool for Scottish SMEs as a performance indicator, an evolutionary mechanism for SMEs to measure Scope 3 carbon emissions and a tool for SMEs to reduce Scope 1 & 2 carbon emissions.

*“I think carbon footprint measurement is very useful for SMEs because if they are not measuring it they are not going to reduce it. Simple as that if you are not measuring it you are not reducing it you are not reporting it then you lose all the benefits surrounding having sound environmental policies and action. Whether that is pure cost savings, innovation or whether it is up the supply chain”* **CEO** (2011)

Policymakers from the SBC suggest that the Scottish SMEs that do not pursue carbon footprint measurement may not realise benefits such as cost savings, innovation and supply chain efficiency.

#### **4.5 Critical Success Factors**

The Scottish government is keen to apply carbon measurement techniques to identify opportunities to reduce the adverse impact of waste on the environment and its contribution to climate change in addition to using traditional weight measures in analysing its waste management performance (Waste Scotland Regulations 2012).

A key to achieving this societal step change is a policymaking shift from viewing waste not as cost but as revenue. Policymakers lack unison regarding the adoption of carbon footprint measurement as a KPI.

*“No, but its one piece of information it’s not a performance indicator as such”* Head of **Environmental Economic Analysis Unit** (2011)

Interviewees agree that the carbon footprint is a useful KPI for Scottish SMEs who require support from the UK Government and trade bodies regarding the setting of emissions targets intimating that carbon footprint measurement can also improve the management of energy use and can be a motivator for the adoption of sustainable practices when included in job descriptions.

*“I think that they should have targets it is always useful. I think when you are managing employees you got to assume they are not part of this they don’t get it, let’s assume that most employees don’t get it you will have targets are good. I think it’s good to make a KPI part of the senior manager or middle managers KPIs because that will feed down the line”* **CEO** (2011)

*“Yes certainly as a minimum for those sectors that is important for Carbon Emissions. Ideally for everybody but certainly for those sectors where it is a key priority”* **Head of Environmental Strategy** (2011)

Due to this view of carbon footprint reduction being a useful KPI it necessitates the setting of achievable emissions reduction targets. However target setting has not been explicitly adopted by the Scottish Government and SBC for their emissions however SEPA has established formal emissions reduction targets aligned to the Climate Change Act. As a non-governmental organisation the SBC is challenged to decouple its growth as a membership body from its carbon emissions a large proportion of which arises from business travel.

*“No that’s been our target... that’s been informal as being part of the Mayday Network and everything else. That was our target there where we are we have got a number of challenges without going into too much detail about our carbon footprint there are a number of challenges specifically about how they are made up and obviously our location of where we are so there is limited things that we can do. Our carbon footprint is quite small its minimal in the grand scheme of things and yes we can reduce it by two or three tons and we have been reducing it by two or three tons . People still need to go to meetings... in respect to the challenge that we have got is that the more members we have the higher our carbon footprint will probably become like as with any small business you need to start looking at absolute reduction or are you looking at decoupling your emissions basically from your business growth or not and that obviously is quite a challenge because from based where we are we encourage people to take the trains”*  
**Head of Environment (2011)**

SME carbon emission reduction targets are considered challenging due to large proportion of SME carbon footprint comprising Scope 3 emissions which are outside the control of SMEs. Carbon emission targets for Scope 1 and Scope 2 emissions or production based emissions are considered by government policy makers as achievable. Non-governmental policymakers consider employee “buy-in” and support, review of the carbon impact of core processes and the adoption of sustainable behaviours as pre-requisites for the establishment of carbon footprint targets. These pre-requisites in conjunction with government support in determining sector or company specific emissions reduction targets are perceived as being adequate for Scottish SMEs.

*“Yes, I think it Is a good thing to do to get all the staff bought into it but I think businesses if they set targets have to support their own employees”* **CEO (2011)**

*“It is very difficult to set targets because it is very difficult to set what is achievable. So you can set targets but they are relatively meaningless I think because we do not know what is actually achievable I think it is much more useful to put targets on what is within your control and much of the carbon footprint is outside your control and the Scottish government. Scotland I think has put a target of what is in our control which is the production based emissions”* **Head of the Environmental Economic Analysis Unit** (2011)

Policymakers also agree that the carbon footprint measurement and target setting identifies carbon emission sources, carbon impacts clarifying the link between production and consumption based emissions.

*“Yes, absolutely because again it has forced us to just do more analysis where are the impacts. So five years ago I could not tell you the major components of our carbon footprint now I can tell you whether you want to know what our impacts are, where they are coming from and what we are doing about them”* **Head of Environmental Strategy** (2011)

An air of confidence exists that similar benefits that were accrued by their organisations were also realisable within the SME operational context such as carbon footprint measurement acting as a catalyst for emissions reduction, providing insight into emission producing activity or processes, the discipline of reporting and target setting as tools that identify emission sources and impacts.

*“I think it is an important piece of information especially in an environment where our production based emissions are going down but somehow our consumption based emissions remain stubbornly constant. So we do have to realise that we are perhaps not as performing as well as we think we are partly because more energy intensive industries have relocated abroad or shut down shop here but we still demand their products so we have to import them and its partly to do with the fact that we are getting richer and consuming more things”* **Head of the Economic Analysis Unit** (2011)

Although the focus of most footprint measurement initiatives have been on identifying carbon related impacts policy makers are aware of other areas of environmental impact. As organisational entities policymaking institutions have no plans to measure their water footprint and fail to understand the carbon intensity of providing a fresh and clean water supply (Energy Efficiency News 2010).

*“No, not at the minute it is something I would be interested in as we go forward. Certainly there is the possibility but no firm plans at the minute in my mind”* **Head of Environmental Strategy** (2011)

*“For the core of Scottish Government you will find information on our water consumption. No, Not at the moment, the problem is the data that you need to do something similar to the carbon footprint is not really available so you need water use by industry and that is not collected”* **Head of Environmental Analysis Unit** (2011)

Scottish Government policy advisers consider water footprint measurement to be a low policy making agenda for the SME sector as Scotland has an abundance of water resources. SEPA policymakers prefer a sector specific approach based on water consumption intensity whilst SBC policymakers advocate an opportunistic approach based on the availability of resources such as finance, time and labour available to conduct water footprint measurement.

*“I think you can if you have the resources to do it I think the only thing we did is that we removed the water cooler we use tap water”* **CEO** (2011)

*“I do not think it is very high up on our policy agenda for SMEs but for the water footprint to be collected by SMEs to be desirable. Simply because we have got plenty of water, yes it is a non-issue”* **Head of the Economic Analysis Unit** (2011)

The effective evaluation of social impact in Sustainability footprint reporting is evolving. This is acknowledged by government policymakers who consider the methodologies for social footprint measurement to be multi-dimensional in comparison to carbon footprint methodologies. The multi-dimensional nature of social footprints and social impact analysis has made such measurement tools a lower priority on the policymaking agenda. As an NGO SBC policymakers perceive difficulty in separating social impacts from the operational aspects of the business due to its mission as a charity.

*“In terms of our social footprint that is interesting actually we measure the number of days but we have policies around how much staff volunteering is allowed and encouraged. We monitor how many people are taking up volunteering opportunities and getting into the community it is quite a challenge for us in many respects because it is*

*what we do. So some days I do not know whether I am volunteering and do not report it or whether I am helping out on a program I was doing mentor training the other now that is having a big impact on the community, it is what we do. So defining what we do away from CSR is sometimes a challenge so it should be what we do which is a good thing”*

**Head of Environment (2011)**

*“Social footprint has not been demanded to my knowledge either. I think carbon footprint lends itself to being calculated relatively easily using IO (input –output) Social footprint I am not entirely sure I will agree that there is a simpler way of doing that there are many more dimensions on the social side of things. Carbon is just one measure it is just one unit on the social side I think you can find that the issues are many fold and reducing that to a single number or to a single footprint does not do justice to the problem”* **Head of the Environmental Analysis Unit (2011)**

Government policymakers recommend that Scottish SMEs measure their social impact using social footprint methodology conceding however that social footprint methodology is less well developed. SEPA policymakers are biased towards the implementation of water footprint measurement amongst Scottish SMEs because the ethical and macroeconomic risk created by the importation of goods and services from emerging economies with limited water resource.

*“I think the water one is very interesting I am not too sure about the social one. I do not know enough about it to comment maybe but the water one really does interest me in the sense. If we are exporting our carbon then we are certainly importing our water now that bothers me from an ethical point it bothers me too. So we are not only exporting the pollution but importing our water in the products and services we buy from countries that cannot afford it and I think that is an issue coming certainly for food. In Scotland it is certainly an issue in some of the products presumably some of the wood panelled products there must be an awful lot of embodied water coming from countries that could barely afford it. It is something that starts with the bigger companies again with the smaller ones too if we know about climate change is going to drive water scarcity. It just does not seem right to have no understanding of that but policy in government is quite at an early stage”* **Head of Environmental Strategy SEPA (2011)**

*“Social Footprint possibly... I think that methodology for that might be less well developed than for carbon and water footprinting and therefore less reliable but they should also think about the wider resource use, non-renewable materials they use in their production and how that is included in the material cycle”* **Head of the Environmental Economic Analysis Unit (2011)**

The philosophical leaning of policymakers towards the promotion of carbon footprint measurement as the preferred tool for measuring environmental impact is



their perceptual connection between carbon footprint reduction and combating climate change.

*“Yes, clearly the higher your carbon footprint worst it is for climate change the less you have done about reducing your impact. If SMEs were mindful of their carbon footprint and were aiming to reduce it that would clearly feed through to the national footprint”*  
**Head of the Environmental Economic Analysis Unit (2011)**

*“Yes in the sense that we need to get the emissions down which means we need everybody to play their part which means we need to understand what is happening in each sector and the individual parts of each sector”*  
**Head of Environmental Strategy (2011)**

This desire amongst policymakers to combat the effects of climate change has dictated their overall preference for carbon footprint measurement as an indicator. In a sense they have developed a “carbon myopic” view to answering the challenges created by unabated climate change. Policymakers perceive carbon footprint measurement as KPI that helps in the understanding of the impact of carbon emissions on a sector or country basis, a tool for reducing the impact of carbon emissions, providing benefits of reduced costs and resource efficiency.

*“Yes, although I do not know whether that is the primary motivation or whether it is or rather the reduction costs that you get if you manage your resources in a more efficient manner with a beneficial effect on emissions”*  
**Head of the Environmental Economic Analysis Unit (2011)**

*“Yes because I think again if you don’t measure it you don’t manage it if it is not one of your own Key Performance Indicators it is one of those things that is always nice to have. Well if you understand your contribution to the bigger picture your sector, country surely that is going to help us all”*  
**Head of Environmental Strategy (2011)**

This “carbon myopia” is borne by a limited interpretation of sustainability in the policy making arena and by extension sustainability footprints which has led to varying perspectives sustainability footprints. Government policymakers’ perceptions range from unaware to interpretations of sustainability footprints separate the concept of sustainability from the methodology or action of

measurement in essence separating the qualitative philosophical elements from the quantitative techniques.

*“To me these are if you are saying sustainability you are trying to understand not just the environmental but the social and economic consequences of your activities. There is usually a dimension of ethics and fairness in it as well so thinking about our global to local impacts through time that this should be about decisions that affect the future as well as the present. Footprint implies to me quite a defined and measurable metric the difference to me between footprint and sustainability approaches is that I might have an approach which is quite high level and quite qualitative. When somebody says footprint to me it triggers into my mind standard methodologies as to approaches which deals with boundary issues, reporting and are usually quantified. So when I hear sustainability footprint it takes me down that route quantification measurement, metrics analysis rigour. In a way if I say sustainability approaches it could be a bit more qualitative”*  
**Head of Environmental Strategy (2011)**

Although policymaking is focused on emissions reduction and carbon footprint measurement as a tool in combating climate change. There is no consensus that carbon footprint measurement is a good investment of organisation’s resources mainly due to the inability to calculate a return on investment however non-financial benefits such as the ability to analyse carbon emission impacts, best practice leadership, adoption sustainable behaviour, employee retention, employee motivation and engagement.

*“Yes, I do think it is a good idea to have that information at hand and be able to analyse the impact of Scotland’s consumption”* **Head of the Environmental Economic Analysis Unit (2011)**

*“I think it is important from pure cost investment but overall in terms of the other benefits employee motivation, retention, engagement”* **Head of Environment (2011)**

Policymakers within the public sector advise that firms tailor their carbon footprint methodology to according to the firm’s size and overall environmental impact with a “lighter” touch approach for SMEs. Specifically measuring Scope 1 and Scope 2 emissions to identify potential efficiencies and gain value from the investment. Non-governmental policy makers contend that value to Scottish SME’s are realisable

depending on the efficiency and effectiveness of the implementation actions to reduce carbon emissions.

*“I do not know it depends on how expensive it would turn out for them... I think doing scope one and two is a good investment probably because it does help you identify scope for efficiencies”* **Head of the Environmental Economic Analysis Unit** (2011)

*“I think for the smaller companies you can take a much lighter touch approach but you still got to take an approach”* **Head of Environmental Strategy** (2011)

Public sector policymakers differ in terms of their view of the value of carbon footprint measurement to Scottish SMEs ranging from environmental awareness, carbon emissions data that will inform decision making, increased market share, innovation in goods and services to perceptions of carbon footprint measurement as a low value added activity when seen in isolation in the macroeconomic context in relation to Scotland’s GHG emissions. Non-governmental policymakers adopt a pragmatic view as to the value of carbon footprint measurement to Scottish SMEs which they contended must contribute to the bottom-line; reduce carbon emissions and environmental impact.

*“As we said the value it’s got to give them is bottom line value and reducing their impact on carbon emissions and the environment”* **CEO** (2011)

*“I think it’s what we talked about earlier again it is understanding, it is data to inform priorities, it is potentially market share, it is potentially innovative goods and services. All those things that can come from understanding”* **Head of Environmental Strategy** (2011)

Although views regarding the value of sustainability footprint measurement vary policy making institutions are driven to pursue sustainability footprint measurement tools such as the carbon footprint to receive the benefits of cost reduction, to meet customer requirements, carbon emissions reduction, stakeholder expectations, senior management commitment, encourage the adoption of sustainable behaviour and teamwork, employee engagement and best practice leadership.

*“Well it is legislation and there is a policy interest simply to know and understand the wider context to the emissions reduction that we achieve within Scotland”* **Head of the Environmental Economic Analysis Unit** (2011)

Policymakers perceive that SMEs are driven to measure their carbon footprint for similar reasons such as cost reduction, energy management, CSR, procurement, employee engagement, brand leadership, marketing, customer requirements, senior management directive, staff morale, innovation and graduate recruit expectations.

*“Well again better management of energy, to bring about some cost savings and to demonstrate to their customers that they act sustainably”* **Head of the Environmental Economic Analysis Unit** (2011)

*“I think we have answered it Cost, procurement and employee engagement”* **CEO** (2011)

These drivers alone are ineffective to ensure that SMEs adopt carbon footprint measurement. This realisation has led to divergent views amongst public sector policymakers with SEPA proposing a competitive landscape where policymaking institutions play an integral part in promoting best practices, inspection, advice and guidance establishing carbon emission targets and clarifying expectations.

Government advisors although inferring the possibility of further carbon emission regulation imply it is in the SMEs’ best interest to understand carbon footprint guidance and where necessary seek consultancy support. In essence Scottish SMEs are not to expect government support as their focus is on reducing public sector emissions. SBC as an NGO view their role as to represent their membership, when required provide support to Scottish SMEs by the secondment of university graduates to assist organisations with Carbon footprint measurement, critique government policy, provide feedback to government regarding SME concerns and expectations.

*“Primarily carbon footprint is voluntary and should be in the SMEs interest to undertake that.. There is plenty of guidance available if you want to do it. There are plenty of contractors available to do it we are supporting the rest of the public sector to account*

*for their carbon but ultimately the responsibility of the private sector is to do what they need to do but what they find most important for them...*” **Head of the Environmental Economic Analysis Unit** (2011)

*“On a more practical level a more operational level we run programs for university students we put them through training them let them go in and measure SME carbon footprint”* **Head of Environment** (2011)

Carbon emission reduction is viewed by policymakers as a critical success factor for business in the future. Public sector policymakers perceive an indirect relationship between organisational success and carbon footprint measurement as the process of carbon emissions reporting may lead to greater awareness of the need to collect and use performance information with the benefit competitive advantage for Scotland as an economy through the efficient use of resources as commodity prices increase.

*“Well I don’t know. There might be an indirect relationship in that SMEs that look at their carbon emissions will or perhaps be more conscious of the need to collect the right management information and therefore be more successful. They might have a greater awareness of the need to collect and use performance information in doing a business so I could imagine the SMEs that collect this information now are generally better run”* **Head of the Environmental Economic Analysis Unit** (2011)

SBC advocates a focus on wider sustainability issues such as social impacts with carbon footprint measurement as one facet of the sustainability. Although NGO policymakers imply that the benefits of improved organisational performance identified in FTSE 350 companies can be accrued by SMEs full materialisation of these benefits maybe dependent on the industrial sector.

## **4.5 Conclusion**

Perceptions of sustainability footprints and its effect on SMEs vary with the functional or strategic orientation of the policymaking unit or institution.

Government policymakers view sustainability footprints within a macroeconomic shroud stating disconnect between carbon footprint and Scotland’s economic future.

However, acknowledging a direct relationship between carbon footprint measurement Scottish economic growth mainly due to the perception of economic growth contributing to higher greenhouse gas emissions. The extent to which Scottish SMEs can benefit from carbon footprint measurement is considered to be determined by the overall value customers place on the carbon friendliness of products and services as purchasing criteria.

Critical success factors that can be employed to enable policymakers to improve the adoption of sustainability footprints are provided in *Table 4.1* below:

<b>Policymaking critical success factors enabling the adoption of sustainability footprints</b>
View waste not as a cost but as revenue
Adoption of tCO <sub>2</sub> e as a KPI
Reduce “ <i>carbon myopia</i> ” by promoting of water footprint & social footprint
Tailored approach to sustainability methodology amongst SMEs

**Table 5.1 Policymaking critical success factors enabling the adoption of sustainability footprints**

As Scotland’s environmental champions SEPA policymakers, consider carbon footprint measurement as providing businesses with an understanding of the relationship between costs and carbon impacts. The link between carbon pressures and cost pressures is apparent especially as Scottish SMEs are perceived to reallocate resources to core activities during declining economic conditions

The SBC, as a member of the Prince’s Trust, is not burdened by cost pressures as a result of carbon footprint measurement within the organisation due to senior management commitment. However from an operational perspective they contend that Scottish SMEs must consider carbon footprint reporting as a resource but more specifically a bottom-line asset that contributes to growth and provides cost savings.

The Scottish Government through its program to measure Scotland's carbon emissions adapted extended input – output analysis to carbon footprint measurement. Through the implementation of this initiative the government gained a better understanding of the global impact in terms carbon emissions of Scotland's consumption. This enhanced understanding has contributed to the development of carbon performance benchmarks and the development of legally binding carbon reduction targets. The use of LCA and DEFRA methodology for carbon footprint measurement are perceived as useful tools that will engender innovation within SMEs. Carbon footprint measurement is viewed as yielding positive benefits for Scottish SMEs such as effective Carbon policy through understanding the consequences of carbon decisions, measurement of product carbon footprint to inform customers, recording and management of emissions and carbon footprint in itself creating a USP for SMEs. Government adviser's postulate that Carbon measurement is a useful management tool for Scottish SMEs that builds awareness of environmental impacts helps its customers make better decisions, promotes competitiveness corporate responsibility and resource management.

At SEPA, there has been a strategic focus on carbon emission reduction since 1997. Carbon footprint measurement is pursued within because of senior management directive, to meet or exceed stakeholder expectations for environmental and to provide best practice leadership. The organisation's carbon policy is devolved to all levels of the organization and has led to the use of information systems, building management, journey planning and field operations management. The policymaking view at SEPA contends that Carbon management can lead to better understanding of resource flows. SEPA advocates a sector specific approach to carbon policy adoption amongst SMEs. Carbon emission reporting by SMEs in voluntary schemes such as

the Mayday Network is considered to drive innovation with further opportunities to the area of water footprint to understand the ethical issues surrounding the water impacts of exports/imports and develop new products/services or processes to combat these new challenges .

Within the SBC organisation, carbon footprint measurement is philosophically considered a component of CSR with carbon management policy being articulated by an internal CSR group. The organisation's ethos to promote not only carbon footprint measurement as a tool but the entire CSR agenda contributed to the development of its proprietary voluntary carbon reporting scheme through the online Mayday Network which helps SMEs monitor carbon emissions and environmental impact through an annual reporting cycle. Policymakers' at the SBC perceive SME adoption of sustainability footprint tools such as the carbon footprint is driven by customer expectations for sustainable behaviour. They recommended that SMEs produce a simple policy or statement of intent regarding carbon footprint measurement and use a carbon calculator to assist with carbon footprint reporting. The implementation of these measures is perceived to contribute to the development of carbon management best practice within SMEs with innovation seen as a natural outcome of carbon footprint measurement, the ultimate goal being for SMEs to utilise triple bottom-line reporting.

Due to the macroeconomic orientation within the government policymaking, there is limited understanding of the environmental impact of carbon emissions arising from water consumption within Scotland. The policymaking focus on carbon emissions reduction has contributed to "*carbon myopia*" with concern regarding the reliability of information derived from using social footprint methodology. Critically SMEs are



considered as having a significant although limited role in reducing Scotland's emissions due to target setting challenges as a great proportion of SME carbon emissions are outside their sphere of control or influence. However carbon footprint measurement is perceived as helping SMEs understand their environmental impact through identifying source emissions and developing mechanisms to reduce emissions.

As an environmental regulatory body, SEPA's use of carbon footprint measurement techniques has contributed to an improved understanding of its environmental impacts. This enhanced understanding has contributed to effective target setting for reducing carbon footprint. Policymakers at SEPA however advocate a sector specific approach to the use of carbon footprint as a KPI for SMEs and also to the use water footprint measurement by SMEs.

SBC policymakers are convinced of the link between greenhouse gas emissions and climate change by extension carbon footprint reduction and SME success – a conceptual leap which is unique amongst policymakers within the Scottish context. In their view the objective of carbon strategy to either make an absolute reduction in emissions or decoupling emissions from growth. SBC policymakers recommend carbon footprint reduction as a useful KPI for SMEs with reduction targets being set after meaningful stakeholder consultation. The promotion of CSR and triple-bottom line reporting is a key aim of the SBC policymakers suggesting the water footprint reduction is a useful strategic objective for Scottish SMEs if resources can be allocated to the measurement of the organisations water footprint

The adoption of carbon footprint measurement is perceived by government as a proxy for good management providing value through stakeholder engagement,

commitment to climate change, useful tool for evaluating overall impact and maintaining competitive advantage. Despite this Government policymaking orientation postulates that the challenges with using Social footprint methodology to measure social performance are multi-dimensional and cannot be expressed by a single calculation. Carbon footprint is a good investment for SMEs depending on cost and opportunities for efficiency contributing to potential cost savings, carbon management and commitment to sustainability.

The SEPA policy advisor considers that carbon emission calculations are based on present notions of the future climate change with social /ethical obligations to individuals and businesses to improve resource use. A tailored approach to carbon footprint measurement is preferred for SMEs that is aligned to their existing capabilities with a long term objective being SMEs the reducing the carbon impact of their supply chain. However successful carbon emission reduction must overcome the challenges of managing “initiative overload” when other organisational initiatives are also an imperative.

As a key policymaking institution Scottish Business in the Community views its role as creating a safe space for sustainable debate as well as providing technical support with carbon footprint measurement for SMEs through the Carbon Master’s program. Policymakers at SBC contend that carbon footprint measurement contributes to the adoption of sustainable behaviours, better employee motivation and retention. Carbon footprint measurement is perceived as a good investment for SMEs by creating value for SMEs through reduced carbon emissions and reduced environmental impact.

## **Chapter 5 Findings – Scottish SME Case studies**

## 5.0 Introduction

Aligned with the research theme this chapter explores the context, perceptions, challenges, and critical success factors in the use of sustainability footprint tools specifically carbon footprint measurement by SMEs within the Scottish economy. In particular the factors which contributed to the use of carbon footprint measurement by the company with perceptions of the use of carbon footprint grouped according to the functional specialism i.e.

- Technical staff
- Non-Technical staff
- Managers

This categorisation will facilitate comparisons amongst case study SME companies.

Aligned to research aims and objectives, the findings are presented using the following thematic headings outlined in *Table 3.4*:

### **Cost Impact**

- *Risk*
- *Financial Capital Resource Allocation*

### **Innovation Impact**

- *Process Innovation*
- *Product Innovation*

### **Environmental Impact**

- *Emissions & Waste*
- *Energy & Water Usage*

### **Stakeholder Impact**

- *Anthro Capital Resource Allocation*
- *Shared Value Creation*

The case studies in engineering sector Capital Cooling Ltd and the Log House People are reviewed prior to companies in the tourism sector Moffat Golf Club and Rabbies Trail Burners.

### **5.1 Capital Cooling Ltd**

Capital Cooling Ltd is an awarding company specialising in the manufacture, supply, maintenance of stationary refrigeration and air conditioning equipment. Although a family-owned enterprise it has grown from very humble beginnings to achieve a turnover of over £22m in 2009 and a ranking of # 63 on the Heating Ventilation Air Conditioning & Refrigeration Index 2012 (RAC News 2012). The company's founder Alister McLean having a passion for refrigeration established the company in 1996, reflected on his motivations for establishing the company:

*“What led me to establish Capital Cooling... basically having a passion for refrigeration once I completed my apprenticeship, once I learnt the industry. Just having a passion for the commercial refrigeration industry”* **Managing Director**

This passion for refrigeration has extended to his offspring who assists him in managing the business. His son, a qualified refrigeration and air conditioning engineer who completed his apprenticeship within the company, is now presently involved in the expansion of the product development department as well as his daughter an Actuarial Science major who spearheads the company's human resource management function a role that was once performed by her mother who has an advisory role in the operations of the business. All four members of the family form the nexus of the decision making within the business supported operationally by the Finance Director who ensures that budgetary controls are maintained within the enterprise is the only senior member of management that is not a relative.

Instrumental to the company's success has been its management team, of which most

have been with the company since its inception, being ably supported by an administrative and engineering staff complement which presently stands at over 150.

In 2002, the company began developing its own range of refrigeration and air conditioning equipment and launched its first integral refrigeration unit the *Perge*. From these explorative beginnings in product development emerged the company's *Capital* range of environmentally friendly refrigeration and air conditioning equipment (Capital Cooling Sustainability/CSR Report 2012).

With an evolving product strategy senior management then proceeded to align operational processes to benefit from synergy and generate growth. In early 2009, the management of the organisation adopted a strategic approach of aligning the company's environmentally friendly product strategy with its process strategy.

Central to this strategic approach was the implementation of an ISO 14001 Environmental Management system which laid the foundations for the development of the firms Sustainability/CSR Policy (Capital Cooling Sustainability/CSR Report 2010).

### **5.1.1 Cost Impact**

#### **Risk**

Within Capital Cooling reducing the carbon footprint forms a key part of the company's sustainability ethos and its importance to the business is fully appreciated by staff at all levels of the organization.

*"At this stage I think it is very important going forward we want to be seen as a proactive company with all the requirements of not just the government legislation but our own customer requirements. We have to be seen and doing in line with their requirements"*  
**Installation Manager (2011)**

*“Very important for the environment going forward” PPM Administrator (2011)*

### **Financial Capital Resource Allocation**

The prevailing economic climate naturally dictates that buyers are price sensitive yet expect exceptional service and product performance. This sensitivity to the prevailing economic conditions is echoed in the sentiments of staff of Capital Cooling with interviewees generally having a *carbon positive* outlook. This was not a general consensus amongst management as there were alternative perceptions that economic conditions have no impact on the carbon footprint with non-technical staff unsure of the impact of economic conditions.

*“I am not so sure we are getting paid for our waste I don’t think that is something that we done years ago we just dispose of the thing and we would have paid to dispose of it but now I think it is different where people actually paying for your waste whether it is metal, wood... So I am not so sure... people are actually paying for your waste now I think it has more to do with the economy rather than your carbon footprint” Sales Co-ordinator (2011)*

*“Again I don’t really have access to figures I would assume that there is always going to be some form of impact money is going to be more focused on other aspects not as freely sometimes it will be treated as a kind of luxury but again I can’t comment officially without any figures” Marketing Co-Ordinator (2011)*

Measurement of Capital Cooling’s carbon footprint is a voluntary exercise whose costs are not financially quantified which has led to an apparent lack of awareness amongst some of the company personnel.

*“It’s impossible to calculate... how long is a piece of string? It comes from so many elements there is R&D cost on reducing the carbon footprint it is something you can’t actually measure” Product Development Manager (2011)*

### **5.1.2 Innovation Impact**

#### **Process Innovation**

Capital Cooling’s strategic approach to carbon footprint measurement was disseminated through the development of a sustainability culture which is driven by

environmental policy and procedures. This had the immediate effect of adding the word carbon footprint to the organizational lexicon of the company. However some managers and non-technical staff interviewed are unaware of the different types of sustainability footprint arising from either poor communication or lack of training. However, initially personnel were concerned about the relevance of the carbon footprint to Capital Cooling as an SME.

*“I can only answer from what I was involved in which is from the direct carbon footprint from vehicles from the rubbish that we actually create etc. I have also alluded to the fact that I think that has rubbed off to the home life but the measurement tool I think it is entirely down to the QSE Manager in the way that he presents that to us at the end of the time as he is aware he comes under exceeding pressure to verify some of the things that he actually does so the report that he puts together in the way of presenting the carbon footprint tables that we have within site are very much queried until such times as we can then accept it. So it is entirely down to QSE Manager and all the individual people within the company to provide the information from their own departments for QSE Manager to then create the table or the carbon footprint or the policy going forward as the whole group or company”*  
**Logistics Manager (2011)**

Potentially looming over Scottish SME businesses such as Capital Cooling is a future characterised by increased emissions regulation and punitive taxation a possibility that has not gone amiss by its employees. Despite this interviewees regardless of their status within the organisation are supportive the adoption of carbon measurement.

*“Because of the size of the company by law we have to do it, I think we will choose to do it anyway. If you have a certain amount of employees within a company you would have to consider your carbon footprint”*  
**Engineering Manager (2011)**

*“ I think legislation is in place because of the EC and the British Government to reduce carbon footprint that’s why it should be our primary reason to comply with legislation both from the EU and the British government”*  
**Installation Manager (2011)**

To improve awareness of the carbon impact of environmental aspects the Quality Safety & Environmental Manager calculated the Capital Cooling’s carbon footprint and generated the company’s benchmark DEFRA -compliant greenhouse gas 2008-2009 report covering Scope 1 and Scope 2 activities. Environmental aspects are that



part of an organisation's processes, products and services that have an impact on the natural environment. Although employees are aware of the carbon footprint, the methodology used to calculate the impact was generally unknown. Employees internalized their contribution in terms of recycling processes and environmental mitigation techniques

*"I don't know the exact methods but I know about the work done by the Quality and Environmental team to do it. I don't know the physical methods". Marketing Co-ordinator (2011)*

*"Energy consumption is the only way you can calculate it". Product Development Manager (2011)*

Carbon footprint measurement is considered a voluntary act that confirms Capital Cooling's compliance with existing legislation and is an extension of its commitment to the wider community. Internally the company's carbon footprint policy is perceived as part of the wider CSR/sustainability policy along with recycling initiatives. Interviewees are supportive of the establishment of a formal policy for carbon footprint measurement with some managers and non-technical staff having perceptions ranging from unaware to being observed but not read in depth.

*"Yes, we have recycle bins throughout the company, which get emptied on a daily business. There is cans, plastic, paper glass and also from the warehouse side of things we (have) got a bundle for cardboard, plastic, wood scrap. We also recycle all of our redundant refrigeration equipment which we get paid for in weight, it leaves here on a weekly basis which in the past we get paid for most of these services to be done now we get companies to pay us Sales Co-Ordinator (2011)*

*"There is a formal environmental policy which encompasses all aspects of the business from energy usage to the actual carbon footprint" Marketing Co-Ordinator (2011)*

Although the Capital Cooling consistently achieves high levels of customer satisfaction interviewees are convinced of customer interest in the carbon footprint and its effect on purchasing decisions as it forms part of the tendering process especially for stock exchange listed customers. Although most interviewees perceive

that customers are interested in the organisations carbon emissions this sentiment is not universally held by all managers.

*“It has not created any interest it has been part of the tender selection process without it you don’t pass the first post.” **Product Development Manager** (2011)*

*“Yes, from major clients not necessarily independent clients corporate clients like the COOP, Sainsbury’s, Morison’s... certainly independents.” **Area Manager 1** (2011)*

Overall Capital Cooling interviewees perceive carbon footprint reduction is a key issue for the company. However this is not unanimous as carbon footprint reduction is not perceived to be a consideration at management meetings

*“Are we talking at Capital Cooling? Not at a management meeting”. **Installation Manager** (2011)*

*“I think it will be again its where it fits in.. it is all got priority I don’t know it’s always there if something is quite bad for the environment we know we are not going to do it I don’t know if it takes a lead in the decision making process but at this moment in time probably not but it always will be considered in some shape or form”. **Marketing Co-Ordinator** (2011)*

Though legal, environmental and competitive pressures abound employees of Capital Cooling view cost, customer requirements, manpower, time, financial constraints and lack of knowledge as conspiring factors forming significant barriers to the implementation of the carbon footprint policy.

*“I would think the financial predominantly... I would think with the economic climate it would be financial at the moment”. **Installation Manager** (2011)*

*“I think education is still quite a big problem not everybody understands the effects of their action it will be probably the main barrier not everybody knows about it. To be honest not everybody cares people have to be educated to understand it. Other barriers is obviously tough financial times is there is a significant financial aspect involved then that will always be taken into consideration. It is not a case of money no object the way business is at the moment”. **Marketing Co-ordinator** (2011)*

Communicating carbon performance to external stakeholders has been a key thrust of Capital Cooling’s sustainability communication campaign yet the messaging of the company’s participation in voluntary schemes such as the Mayday network has not been effectively disseminated despite the company achieving substantial

emissions with some managers and non-technical personnel of the company's achievements in this area.

*"I am not aware of it". **Installation Manager** (2011)*

*"Yes, the exact details of which I am not sure of it is a Quality, Safety and Environmental area not so much the marketing but I am sure to the best of my knowledge there is reporting on it all also under the ISO". **Marketing Co-ordinator** (2011)*

Yet the mere fact that the Capital Cooling has voluntarily measured its carbon footprint consistently since 2009 conveys a perceived legitimacy that the carbon footprint report has been verified by a third party organisation such as the Carbon Trust even though in reality this is not the case; a view that was shared by some employees.

*"Yes, the exact details of which I am not sure of it is a Quality, Safety and Environmental area not so much the marketing but I am sure to the best of my knowledge there is reporting on it all also under the ISO". **Marketing Co-ordinator** (2011)*

*"Apart from the ECA... No.... not from the cabinet development side I don't know other sides of the business but from cabinet development... No" **Product Development Manager** (2011)*

As a management tool Capital Cooling employees suggest sustainability footprints act as a useful performance benchmark, marketing or sales tool for contract bidding which can lead to positive customer feedback.

*"Very much so for probably all the reasons I have just mentioned previously for getting contracts for being considered for contracts for opening the doors to contracts we don't have yet and as Capital Cooling grows as a company the carbon Footprint has to be treated the same it is just as important". **Engineering Manager** (2011)*

*"Massively useful it gives everybody an idea of the level where we are and the level where we want to be at it is always something that pushes people the extra mile. I know it is something that sounds pretty clichéd by saying we are green company but we always want to be a green company and we want to be seen as a green company and as I said previously we want to be a market leader and a market leader in everything we do and that includes the carbon footprint having the best carbon footprint that we possibly can and then not stopping there making it better". **Technical Manager** (2011)*

Within Capital Cooling the act of reporting also creates a veil expertise in so much that there is a belief amongst employees that the company contracted consultants or other third party organisations to measure its carbon footprint.

*“Unsure about the answer to that question I would think that this is the type of thing that (the consultant) is involved in but is he not?” **Engineering Manager** (2011)*

*“Yes, everything was independently tested with an independent certificate” **Product Development Manager** (2011)*

Capital Cooling interviewees are convinced of the dual purpose of sustainability footprint reports such as the carbon footprint as a communicative tool targeted at both internal and external audiences.

*“External and internal I would say” **Engineering Manager** (2011)*

*“Well we do it for both internal and external the people internally to know we have to inform them about what’s going on but externally to let the appropriate people know that we are doing it” **Technical Manager** (2011)*

### **Product Innovation**

Although Capital Cooling consistently achieves high levels of customer satisfaction, interviewees are convinced of customer interest in the carbon footprint and its effect on purchasing decisions as it forms part of the tendering process especially for stock exchange listed customers. Although most interviewees perceive that customers are interested in the organisations carbon emissions this sentiment is not universally held by all managers.

*“It has not created any interest it has been part of the tender selection process without it you don’t pass the first post.” **Product Development Manager** (2011)*

*“Existing customers definitely, CoOp and any other large companies that come on board will be asking and part of it”. **PPM Administrator** (2011)*

Capital Cooling employees express similar sentiments regarding catalytic effect of carbon footprint measurement on the development of new products and services.

There is a perception of a general link between carbon emissions reduction and the company's pioneering eco-friendly refrigeration and air conditioning products and services. Managers and non-technical interviewees agree that carbon footprint measurement is either a direct contributing factor or an influencing factor on product development

*"Chicken & egg.. It is chicken an egg as much as yes the carbon footprint we have had to develop products that have a low carbon footprint to meet the ECA legislation so yes it is".*  
**Product Development Manager (2011)**

*"Product wise with our hydrocarbons, the design of certain components on cabinets as we have discussed... Yes"*  
**Area Manager 2 (2011)**

### **5.1.3 Environmental Impact**

#### **Energy and Water Usage**

The measurement of the Capital Cooling's water footprint although not on the agenda of the company is a potential source of innovation that can as perceived by some interviewees as contributing to the future prosperity of the organisation and the planet.

*"I wouldn't have an answer to that but I would suggest that when we are dealing with the likes of design and our input in the design of ice machines that we are aware of the water consumption in relation to the ice produced because we now seem to be moving into the larger market of ice machines. The more ice the more aware we have to become the more machines we sell the more aware we have to become if we can save a litre a day from each machine that we sell by this time next year that can make a big difference."*  
**Engineering Manager (2011)**

Sustainability Footprints is an emerging concept that has been embraced by Capital Cooling interviewees which they define as comprising recycling, carbon emission reduction and continuous improvement.

*“Well I would say like a continual improvement unless I am misinterpreting it.. sustainable.. it has got to be continuously trying to seek continual improvement I think”. **Engineering Manager** (2011)*

## **Emissions and Waste**

Capital Cooling interviewees perceive carbon footprints to be a KPI that focuses organizational efforts on carbon footprint reduction, business growth and market leadership.

*If I am willing and required to give time many other people within the company are doing exactly the same thing so it is very important and it does form part of our KPI it is a table of measurement after all that we are trying to do and we can only do that based on the information we have actually gleaned. The services we have actually put in place so from fuel, the waste that we actually have disposed... returned and the wood. We have always recycled the wood that comes in old pallets ....even that now is going to a different source and a different way of recycling so everything is measurable and will continue to be done and it does form part of the KPIs Next year we will be looking to reduce even more and we will be reducing to make bigger savings and we can only do that if we actually know what we are doing at present.” **Logistics Manager** (2011)*

By extension Capital Cooling employees construe a link between their recycling program and efforts to reduce the company’s carbon footprint with tackling climate change. This expressed concern is confirmed by their own observations of changing weather patterns and details of the social impact of climate change on their daily life. However the perceived link between carbon footprint and climate change is not accepted by all of the company’s management

*“Yes, but I also see all options available I look at both the positives and the negatives people that say it does relate to it and people that say it doesn’t but I share my own opinions on that but I will always strive to think and be aware of the carbon footprint and the reductions that will be required.” **Engineering Manager** (2011)*

*“Yes, you are saving the environment your emissions.... going into the atmosphere if you are reducing that you are helping the environment. Waste as recycling wood.... cabinets... polystyrene... cardboard everything gets recycled its good for the environment.” **Area Manager 1** (2011)*

Support for carbon footprint methodology abounds but the need to set targets seems to elude the management of Capital Cooling Ltd. However employees assume there

are explicit targets for carbon reduction however they are unaware of the exact details.

*“Continually trying to reducing in anyway it can be done whether it is operational, design, transport every department should always be seeking to reduce their carbon footprint.”* **Engineering Manager** (2011)

*“Not that I personally know of but I must say that there must be targets that we have to meet to help lower the carbon footprint”* **Installation Engineer** (2011)

Overall Capital Cooling employees share the sentiment that carbon footprint reporting has improved their understanding of environmental impacts and their role in the process of emissions reduction.

*“Everyone is much more aware of carbon footprint actually means and much more aware of the importance of the Carbon Footprint as well.”* **Engineering Manager** (2011)

*“Yes, it has broadened my understanding of the carbon footprint impact on the environment.”* **Installation Engineer** (2011)

Capital Cooling interviewees perceive the underlying rationale for the adoption of carbon footprint methodology is to measure a firm’s level of greenhouse gas emissions, reduce costs, consumption and combat against climate change. When challenged as to the usefulness of carbon footprint measurement as a tool for SMEs to combat climate employees generally perceived a genuine benefit from the exercise despite the associated with the costs of the environmentally friendly features of the product.

*“Yes it is a useful tool we always need to be improving on it which can only be a positive. As time goes on I see it constantly evolving into something else then you have the improvements that even we have made It is an important tool for SMEs”* **Area Manager 2** (2012)

*“Yes definitely without that you would not know you would just be guessing it’s a definite yardstick.”* **Technical Manager** (2011)

## 5.1.4 Stakeholder Impact

### Anthro Capital Resource Allocation

Although engaged in social issues Capital Cooling employees are unaware of social footprint methodology perceiving it as the domain of senior management with an underlying feeling that the firm is unable to influence the social environment as it is beyond the control of the organisation.

*“It’s a hard one I think there is ... as in the water side of things the water usage with the company we are trying our best to limit the amount of water we are using, I think we have always looked at that in the way of waste, it’s waste we want to try to limit the amount of waste as we possibly can. Social it is a harder one to try and evaluate the social footprint because it is out with the work. So socially what do you do? You cannot legislate for what happens outside out with your work. As long as we focus on the footprint of employees within the organisation within their working time I think we will be doing all we can”*  
**Technical Manager (2011)**

Capital Cooling Personnel have differing views as to when the company adopted carbon footprint measurement as a measurement tool. This variation is due to individual association or knowledge of carbon footprint as a concept or methodology. Although most managers interviewed are aware of the firm’s active engagement in carbon footprint measurement some are unaware of the length of time of this involvement with technical personnel perceiving carbon footprint measurement as a more recent initiative.

*Seriously probably within the last ten... five to seven years...started to maybe in the last four... three to four years. We have really taken it seriously we have measured it within the last five years but I would say within the last three years we have really taken it seriously.*  
**Technical Manager (2011)**

Capital Cooling Personnel have differing views as to when the company adopted carbon footprint measurement as a measurement tool. This variation is due to individual association or knowledge of carbon footprint as a concept or methodology. Although most managers interviewed are aware of the firm’s active



engagement in carbon footprint measurement some are unaware of the length of time of this involvement with technical personnel perceiving carbon footprint measurement as a more recent initiative.

Carbon footprint as an investment although handicapped by long payback period is considered by both the Capital Cooling interviewees as a valued investment that aids in carbon reduction and the economical use of financial resources.

*“Managed sensibly ...and being financially aware in that investment” **Engineering Manager** (2011)*

*“As I said going forward everybody is going to have to do it and everybody should be doing it we are trying to prepare and protect what is happening in the future for others and if we don’t start now when do we start.” **PPM Administrator** (2011)*

Each interviewee perceives their contribution to the measurement of Capital Cooling carbon footprint from purely functionalist or specialist perspective.

*“To ensure that engineers are committed to F-Gas regulations and just ensuring best practices is continually carried out” **Engineering Manager** (2011)*

*“By fitting newer equipment which is obviously more economical uses less electricity” **Engineer** (2011)*

### **Shared Value Creation**

As a result of the success of the carbon footprint measurement program the Capital Cooling achieved ISO 14001 Environmental Management certification, the Scottish Green Award for Best Green SME and is presently considered an example of organisational best practice.

*“We didn’t start out to actually to gain financial reward immediately from that we never start out to be at the top of somebody’s list because we are doing something we did it because we care I think that is the important part we can’t forget that we are doing it because we care and that is the important part” **Logistics Manager** (2011)*

Within Capital Cooling there is uncertainty of the need to require suppliers and sub-contractors to provide the sustainability footprint data and the extent to which small

suppliers and subcontractors may be expected to comply with a largely voluntary initiative.

*“Suppliers we would expect.... sub-contractors it may be slightly beyond them at the moment. Again I would imagine that if they are a sub-contractor for us they are a lot smaller their focus is more on the business side rather than the operational side of things and having the capability to provide that type of information not all our sub-contractors could have a QSE Manger to provide that type of information” Area Manager 2 (2011)*

Capital Cooling interviewees perceive that policy making institutions can assist with the adoption of carbon footprint measurement by creating a fair competitive marketplace; provide incentives such as grants, tax relief, training, guidance and enforcement.

*“I think it would be nice to see rewards, grants tax relief similar to the ECA Scheme for people that are making the effort similar and doing their best for the environment. Obviously we have the ECA scheme for our products that if a retailer buys one they can claim back their corporation tax in the first year if there was something for that based on reducing your carbon footprint then I am sure more people would do it but obviously there is the cynical side that says people are doing it to save money the environmental aspect will certainly be a healthy by-product” Marketing Co-ordinator (2011)*

Despite the absence of incentives it is perceived that Capital Cooling is driven by the following factors to measure its carbon footprint: legislation, waste reduction, senior management commitment, operational requirements and cost reduction.

*“To reduce waste in general to make sure we are not paying to dispose of waste and we are necessarily getting paid to dispose of waste instead to try and overall reduce our carbon footprint we are putting out there compared to what we might have been a few years ago”. Sales Co-ordinator (2011)*

## **5.2 The Log House People**

The Log House People Ltd is a British civil engineering company specialising in the supply and construction of log houses for personal or commercial purposes (LHP 2013). Established in 2008 by Hugh Gourlay and his father Frank Gourlay a former Chairman of the Dumfries and Galloway Tourist Board, the Log House People

combines a family interest in the building of Log Homes with a concern for the environment (Herald Scotland 1997) (LHP 2013). The company is managed from a rented office in Edinburgh and a home office located in Sandyhills, Dumfriesshire that is staffed by two full-time employees with additional staff being hired on a project basis (LHP 2011). The seeds of this interest began with Frank Gourlay who has constructed log homes since 1970 such as the holiday chalets at the Barend Holiday Village which consists of 78 log homes as well as 8 log homes in Riverview in Dumfriesshire with subsequent investments in a Ski company expanding his knowledge in the building of log homes (LHP 2013). Using his understanding of the local tourist sector he surmised that there was a need for larger holiday homes, so in partnership with his son began importing log homes from the North America (LHP 2013).

Hugh Gourlay has spent most of his formative living in log homes and was a witness to the development of the Barend Holiday Village (LHP 2013). Although educated as a Product Designer Hugh wanted to combine his interest for the environment with his familiarity with log houses (LHP 2013).

*"The Log House People was started in 2008 by me and my father. My Father has actually been building log homes since 1970 and has built a holiday village in Dumfries and Galloway. I got involved with him in business in 2008 and we started the Log House People to import log homes from America which we build for clients and we have been doing it since 2008" **Director** (2012)*

Initially the first 7 log homes were built using Scottish Pine wood, as supply became unavailable Douglas fir from Aberdeenshire was then procured to construct an additional 53 dwellings. Scandinavian pine from Finland were latter used as a construction material but was found not to be suitable for the Scottish environment (LHP 2011). The importation of timber mainly American Pine from the USA and

Western Red Cedar from Canada were due mainly to the inability to procure within the UK timber log dimensions measuring 0.15m x 0.2m x 6m (LHP 2013).

The company prides itself in purchasing timber harvested from mature forests located in the Blue Ridge Mountains of North Carolina using sustainable techniques such as the selection of only mature trees for felling and the planting of two new trees for each tree that has been harvested (LHP 2013).

As a senior Director of The Log House People, Hugh Gourlay was interviewed to ascertain his perceptions regarding the benefits of sustainability footprint methodology to his business as an SME.

### **5.2.1 Cost Impact**

As an SME within the construction sector The Log House People began measuring their carbon footprint whilst being member of the Crichton Carbon Centre's Carbon Smart Project in 2009. Management of the company consider carbon footprint measurement to be important to the company because of its usefulness as a measure of the organisations output in terms of carbon emissions and a performance indicator of environmental impact.

*"I did it last year because I was working on a project within the Crichton Carbon Centre and that was my first introduction to carbon footprints. I think it is important and I think it is a good measure of your company's output in terms of carbon emissions. It's a useful way to measure what you are doing and your impact on the planet so I think it is useful.. I think it is a very useful thing to do" **Director** (2012)*

Economically Dumfries and Galloway was not a high growth region prior to the global financial crisis with overall economic growth and wellbeing considerably below Scottish and UK levels (DGLEC 2008). Employment prospects remain weak dominated by seasonal, self-employment and part- time jobs with increasing

migration of individuals in the 18 – 45 age groups, a scenario symptomatic of a rural economy (DGLEC 2008). Construction provides employment for 6% of the workforce in Dumfries and Galloway (Scottish Enterprise 2012). The seasonal nature of the workforce complements The Log People's strategy to hire on a project basis (LHP 2011) (DGLEC). Activities to market the business products and services are considered contributing factors that will ensure an increase in the firm's carbon footprint

*“Last year obviously we did a base line footprint so I am taking it from there this year in terms of trying to get more marketing I probably actually increased my footprint instead of decreasing it because it was a very quiet year.... I am doing more to try and bring in more business and this year is going to be a busier year so my carbon footprint will have probably increased purely through being busier that is why I think the measurement of the carbon footprint is interesting because you could think that a business is doing nothing can have a smaller footprint than a business that is doing a lot even if the business is the same size. I think my footprint would be bigger this year”* **Director** (2012)

Carbon footprint measurement is considered cost neutral by the management of The Log House People as it was one of many derived benefits of participating in the CSmart programme which included carbon management training senior management and an additional member of staff (LHP 2011)

*“Last year it didn't cost anything because I was doing the project with the Carbon Centre and they taught me how to do it as part of the project so it was a case of using their smart meters to measure electricity and taking various readings from the office building I was in and that sort of thing so no it does not cost anything”* **Director** (2012)

## **5.2.2 Innovation Impact**

### **Process Innovation**

This focus on carbon footprint methodology as a sustainability indicator is at the expense of other sustainability footprint measurements such as the water footprint and social footprint can be described as “carbon myopic”. The firm's consumption impacts such as water are being expressed in terms of carbon emissions without

measures or analysis being conducted on the avoidance, reduction or recycling of water.

*“Water obviously was taken into account but nothing no kind of direct footprint”* **Director** (2012)

Apprehensions of cost did not factor into the Log House People’s decision to pursue greenhouse gas measurement as an organisational objective but marketing considerations and synergies to exploit existing assets from existing property portfolio under an eco-tourism banner formed the business case to adopt carbon footprint methodology. The business case is bolstered by senior management’s personal belief in care for the environment and social responsibility.

*“Well it was part of the Carbon Smart project which I got involved with because I felt that it was apart from anything else a useful marketing tool utilising some sort of eco-tourism banner or that you do care about the environment and equally because I have a belief that we should be taking responsibility for our carbon footprint and our actions”* **Director** (2012)

The Log House People identified key environmental aspects and calculated their environmental impact using DEFRA’s emission conversion factors (LHP 2011). The greenhouse gas emissions data from the process contributed to actions targeted at reducing fuel consumption but however management are unaware or concerned about in the measurement methodology but interested in its practical applications.

*“What... methods in terms of what using smart meters to measure electricity.. I don’t know the answer to that I basically used whatever the carbon centre told me to use or what they taught me to use”* **Director** (2012)

The organisation’s corporate policies were extended to include a carbon management policy that is pursuing GHG reduction in the business operations, construction and the development of carbon neutral log homes.

*“We have an environmental policy but in terms of carbon footprinting we do not”* **Director** (2012)

Management of the Log House People express a conviction that carbon footprint measurement is a useful tool but does not translate into customer enthusiasm or interest in the use of the sustainability footprint tools such as the carbon footprint by the company.

This is reflected within the company as only one the Directors is actively engaged in the reduction of the organisation's environmental impacts in his role as "Carbon Champion" perceiving that generational issues in the recognition of the climate change impacts of business operations. This denial in itself affects the nature of the type of management decisions taken in regards to environmental mitigation efforts.

*"Because he is older is less interested in that kind of thing and so probably not but he would be retiring soon and it is something that I would probably have more of an impact upon"*  
**Director** (2012)

The divergent views between the Log House People key decision makers in itself creates a communication barrier that negates against the effective implementation of sustainability initiatives with the deferral of proposals until the retirement of the senior Director or an agreed succession.

*"Just my father's not lack of interest but failure to recognise the benefits of it and I suppose a dinosaur but the dinosaurs became extinct."* **Director** (2012)

Non participation regarding external verification of the Log House carbon footprint by independent third party organisations such as the Carbon Trust persists as measurement by Crichton Carbon Centre provides a veneer of reliability regarding its carbon footprint report.

*"I guess... Yes from the Crichton Carbon Centre"* **Director** (2012)

Innovations such as carbon footprint measurement are perceived by the management of the Log House People to be useful yet at times ambiguous tools due to the

potential for firm's to omit operational aspects or lack of control over operational aspects e.g. suppliers when determining measurement boundaries.

*"I think it can be certainly from a bigger company's perspective it can be weighted perhaps unfairly in terms of perhaps what they bring into the scope of their carbon footprint. I think it has to be this way otherwise it is very difficult to measure sometimes but sometimes you can take out one of the things that you don't like let's say external supply say for example can be ambiguous and sometimes unfairly weighted. For example our shipping of our log homes because that is a supplier not something directly put out by my company I cannot of course leave it out it is not kind of factored in a way it should be"* **Director** (2012)

Understandably as a KPI carbon footprint data is used primarily for internal analysis of the Log House People's performance but there is a willing on the part of the management of the firm to disclose their emissions data to stakeholder and the public.

### **Product Innovation**

There is a perceived apathy regarding the Log House People's carbon footprint regardless if they are existing customers or new customers. Management insist that efforts to reduce the carbon intensity of log homes lead improvements in building design that do not radically alter their product offering nonetheless have contributed to ensuring that future log homes meet or exceed mandatory energy efficiency performance requirements.

*"No not yet"* **Director** (2012)

### **5.2.3 Environmental Impact**

#### **Energy and Water Usage**

Although the Log House People seek to deploy water conservation techniques such as "water hippos" to reduce domestic water consumption, the pervasiveness of carbon footprints within the macroeconomic and microeconomic spheres may have



contributed to the management of The Log House People opting not to pursue water footprint measurement.

*“No not yet.. no”* **Director** (2011)

Disputes as to the importance of sustainability footprint measures such as the carbon footprint amongst senior management of the Log House People and the focus on carbon footprint measurement as the sole sustainability indicator is a transitional hurdles in the assimilation of sustainability within the organisation.

*“Until I read your research statement I did not know of the term except for as in the context of carbon footprint”* **Director** (2012)

### **Emissions and Waste**

The management of the Log House People consider the carbon footprint to be a KPI that is used to measure the impact of the firms output.

*“Because we are so small and it’s been a slow year last year. I think if we were to try to reduce our carbon footprint on last year will end up achieving nothing. So it is important in the scope of keeping it in line as business increases and we do get busier to keep an eye on it. Doing obviously a carbon footprint year on year and comparing it to output and getting it in proportion it is important to bring it in line and to keep it in check”* **Director** (2012)

The owner of the Log House People is convinced that individual and carbon footprint measurement are vital to reducing carbon impacts and acknowledging anthropogenic contributions to climate change. A conviction influenced by an academic interest in environmentally sensitive design as a student.

*Absolutely well... every company has the carbon emissions... everyone produces... there is a result an increase in carbon. I do recognise that by measuring everyone’s carbon footprint one can reduce one’s carbon impact on the world. I certainly believe that affects climate change. That said also when I was in university one of the subjects I studied was environmentally sensitive design one of my professors did argue the case that if you look back in history there is an ice age every x number of thousands or millions of years he said that we actually due an Ice Age his argument the climate will warm up the climate could change in order to bring about another Ice Age. So I do believe it is carbon related whether or not it is to do with us I mean I do believe it is to do with us we are certainly increasing there is no doubt that we are increasing the amount of carbon in the world.* **Director** (2012)

Reduction targets for the Log House People carbon footprint is affected by the operational realities such as the “*just in time*” nature of the organisation’s supply chain that is reliant on obtaining building materials from North American suppliers.

*In terms of the things we could do to reduce it or in terms of figure percentages.. That is very difficult to say at the moment there are things we could do to reduce it. At the moment we have been getting this is out of our direct carbon output but shipping we bring over a house from America one house at a time because that is the orders have been always been that way but if we had houses or we were building house let’s say two at a time instead of using three containers we might get it into two containers so that could be smaller otherwise other than that I am looking at more environmentally sound heating options to put into houses and some kind of the more sustainable technologies in that field”* **Director** (2011)

The Log House People’s Carbon Champion although aware of the environmental impacts of business operations consider carbon footprint as an effective measurement and assessment tool that can be applied to comparative analysis of carbon management performance with other businesses.

*“I have always been aware of environmental impacts and carbon right back from when I was at university. I don’t think it has improved it... It has helped understand how one can measure it and assess it and actually give yourself a figure that you can compare to other businesses but I would not say it has affected my understanding of the environment and the impact of carbon but what I would say it’s made me more aware of for example when you see a pint of milk in the supermarket when Tesco’s put on their carbon footprint per a pint of milk and it makes you think that is a lot of carbon used in the production of that bottle of milk”* **Director** (2012)

#### **5.2.4 Stakeholder Impact**

##### **Anthro Capital Resource Allocation**

By extension the use of social footprint calculations are also negated by the management of the Log House People as a performance indicator.

*“No... Water obviously was taken into account but nothing no kind of direct footprint”*

**Director** (2012)

The Log House People has recently adopted carbon reduction as an organisational objective; the novelty of carbon footprint measurement may be a determining factor in the limited awareness of the methodology and concepts with management perceiving carbon footprint as an investment handicapped by time consuming data collection techniques despite being considered as a valued investment that supports carbon reduction and the economical use of finite resources.

*“Absolutely at the time it did not cost me anything this year my situation has changed a bit I am no longer in the same office but I would to potentially buy some smart meters this year to measure to kind of work it out the same way we did it last year. Yes I think it is a worthwhile thing to do and worthwhile use of the resources” Director (2012)*

As well as organisational policy the management of the Log House People is driven to measure its carbon footprint by a number of factors including entrepreneurial interest in environmental issues, participation in the Carbon Smart Scheme, corporate responsibility, an inherent belief in personal responsibility for the environment and continuous learning.

### **Shared Value Creation**

The challenges of target setting however has not prevented senior management of the Log House People from realising the inherent value of carbon footprint measurement in aiding the business as an SME to recognise its carbon impacts, mitigate carbon emissions and accept as a corporate body its responsibility to combat climate change

*“If it promotes or helps small to medium sized enterprises recognise the impact of carbon the effects it has on climate change and it helps them accept responsibility and deal with their carbon output. It has a lot of value but if it is something that people churn out at the end of a tax year because it is something they have to do then I think it does not have very much (value)” Director (2012)*

In attitudes reflective of their customer base the management of the Log House People do not require their suppliers to provide sustainability footprint data such as the carbon footprint.

*“No not at the moment”* **Director** (2012)

The Log House People management suggest that Scottish SME’s can be encouraged to implement carbon footprint measurement if it were included as a legal requirement as part of the annual auditing process and a carbon performance league table created to encourage benchmarking with penalties such as fines to ensure reporting compliance.

*“I think in terms of making it voluntary or a compulsory potentially it could do as I mentioned earlier make it part of the company’s auditing process at the end of the year put on to Companies House on their website with everything else along with their financial turnover and carbon turnover, that would be the most sensible thing to do otherwise I guess they could impose fines and just a league table. The measurement has to be relational to the output I don’t know how it would be done of course obviously a smaller company will have a much smaller output carbon footprint than a bigger company. Maybe it’s something that is divided by its turnover or number of employees. By making it a compulsory thing as part of their annual audits that would be helpful”* **Director** (2012).

Senior management of the Log House People are intrinsically motivated to pursue carbon footprint measurement as part of both personal and corporate responsibility for operational impacts as well as continuous learning.

*“Well obviously it was part of my Carbon Smart project with the Carbon Centre that was the key thing that instigated me to do it and taught me about it but my awareness of the world and the environment and what we are doing to the planet and my interest in environmental issues is a driver. On a personal level it has always been something that I have always been interested in... I think their needs to be an onus on individuals and companies to accept responsibility So I guess my key driver was learning about it that gave me an interest in doing it”* **Director** (2012)

### **5.3 Moffat Golf Club**

The tourism and leisure sector is a key area for low carbon growth by the Scottish Government (Scottish Government 2010). Within the tourism sector golf tourism contributes £220M to the Scottish Economy this contribution represents £120M Gross Value Added to the Scottish economy (Scottish Enterprise 2009). Amongst the approximately 550 golf courses in Scotland, the Moffat Golf Club is considered “the Jewel in the South” (Moffat 2011). The Moffat Golf Club was established in 1884 during the heyday of its local town Moffat, a Victorian tourist spa destination due to the presence of mineral springs in the area and the construction of a bath (now the site of the town hall) which was built to satisfy the needs of its visitors (Turnbull 1871) (Moffat 2011). Work on the existing golf course began in 1904 based upon designs from Ben Sayers of North Berwick a renowned golf practitioner (Moffat 2011). Situated 670 feet above sea level on Coats Hill, this 18 hole golf course is within the vicinity of an ancient Roman signal fort overlooking the market town of Moffat in Dumfriesshire (Royal Commission 2012; Moffat 2012) (Moffat 2011). The design of the course incorporates all natural undulations with expansive views of the countryside and is a great example of a traditional Scottish moorland course (Moffat 2011). Infrastructure on the site consists of a clubhouse which is a composite of an older wooden building and conservatory with a flat roofed extension of brick construction to provide improved amenities. The amenities within the clubhouse include a bar, dining room area, club offices, pool table, darts board, table tennis table, male and female changing facilities and is operated by a full time staff of two individuals. Investments in three electric golf carts were made to enhance the appeal of its golfing facilities (Moffat 2012). Moffat Golf Club also promotes a weekly

snooker tournament in addition to its established golf tournament schedule (Crichton Carbon Centre 2010).

As a keen operator in the tourism sector, the Moffat Golf Club pursued carbon footprint measurement in 2009 as a strategy to sustain the organisation now in its second century of existence. Interviews were conducted with the Greens Convenor and Greens keeper to provide insight into challenges and critical success factors in the adoption of sustainability footprints within the business.

### **5.3.1 Cost Impact**

#### **Risk**

The Moffat Golf Club management express a pragmatic approach; as carbon footprint perceived to improve operational efficiency and “bottom-line” financial stability. Alternatively technical personnel consider carbon footprint measurement as an enabling factor in the reduction of chemicals and the alignment of good environmental management practices with sound financial management.

*“We just do not have any spare money to be nice that is the cruelty about this, that is the bottom-line and if you were to ballot our members and ask them if they would pay £10 more subscription so that we could be more responsible regarding the carbon footprint they would not pay it they just would not that is the truth of the matter” **Green Convener** (2012)*

#### **Financial Resource Allocation**

The effects of present economic conditions and declining visitors have led decision makers at the Moffat Golf Club to seek opportunities to reduce cost through staff reduction, efficient fuel consumption and chemical use.

*“Yes, in some ways in a positive way as we have less people coming so there are less road miles coming here so there is less diesel, petrol they use to get here. As we economise we use less fossil fuels... for example we had a member of staff on Mondays, Wednesdays and Fridays for four hours during the day. It is cheaper for us to tell that member of staff to stay at home than it is for us to heat this place. We are using hundreds of litres less gas because we are not heating the place so the recession in a perverse way has reduced our carbon footprint” Greens Convenor (2012)*

Management of Moffat Golf Club calculate that £1000 of consultancy effort was allocated by the Crichton Centre to measure the organisations carbon footprint.

Although financially driven the organisation does not consider the calculation of carbon footprint costs as a business critical activity.

*“No, we could not afford a consultant to do that the Crichton did it free of charge so I guess its value is a minimum of a £1000 worth of effort was put into it by the Crichton Carbon Centre to come and measure for us but we do not consciously measure” Greens Convenor (2012)*

### **5.3.2 Innovation Impact**

#### **Process Innovation**

The expression of water consumption in CO<sub>2</sub>e and the common understanding of carbon impacts within Rabbits Trail Burners have led to the implementation of water conservation techniques as well as other social initiatives using CO<sub>2</sub>e as a performance indicator.

*“Yes, we do actually that is actually quite important and that would be in our business plan. Actually there is a point here if we go for grants then there is very definitely be our carbon footprint... our reports from the Crichton Carbon Centre and all the rest of it will definitely go into that grant application because the council or the government or sports organisations would most certainly want to see some sort of responsibility towards the environment within an application so it would figure very much in grant applications just the same as demonstrating that we are inclusive with the community” Greens Convenor (2012)*

This interaction and dependence with nature further defines organisations such as Moffat Golf Club as *Pro biodiversity Enterprises (PBEs)* (Dickson 2007). PBEs face challenges around the human resource retention; management of knowledge,

networking and the acquisition technical expertise (CEER 2009). Within this competitive environment management and technical staff consider cost reduction and senior management commitment as the main factors that encouraged the company to pursue carbon footprint measurement.

*“Finance that was the point” Greens Convenor (2012)*

Similarly Moffat Golf Club’s carbon emissions data was derived from DEFRA emissions factors and contributed to the implementation of measures to reduce fuel consumption but however decision makers are yet to be comfortable with the process of carbon footprint measurement and the use carbon dioxide equivalent (tCO<sub>2</sub>e) preferring to refer to reductions in financial terms. Technical staff perceives carbon footprint methodology to be the remit of senior management.

*“I am not entirely sure you can accurately measure it we do not consciously measure it we would not say we have used 500 litres less gas therefore our carbon footprint has been reduced by at least x kilograms of CO<sub>2</sub> we don’t do that what we do is say we have used 500 litres less of gas which has saved us £800” Greens Convenor (2012)*

A practical but altogether informal approach to carbon footprint policy and carbon management was implemented by Moffat Golf Club; this deployment of organisation’s policy was understood by management but not technical staff.

*“I suppose in a way we do but it is financially driven not carbon footprint driven but we have changed the lighting system of the clubhouse we have changed the water system up at the green keepers hut we have actually altered the building to reduce the amount of energy that we use but in truth it was not done to reduce the carbon footprint it was done as a result of somebody auditing our carbon footprint so the outcome was directly from that audit that was drove it in the first place but in truth we are much more driven by finance” Green Convenor (2011)*

*“No not at the moment” Green Keeper (2011)*



Surprisingly Moffat Golf Club's customers are perceived as not being concerned with the organisations carbon emissions performance but rather on affordability and the pursuit of self-interest.

*"The current membership all vote the way things will suit them because it is a selfish environment in golf courses it is very difficult to get people together as would find everything is based on how much we can afford as far as the membership is concerned"*  
**Greens Keeper (2012)**

Moffat Golf Club management appointed its Greens Convenor and another senior committee member as "Carbon Champions". The Greens Convenor being a retired senior Fire Officer was keen to reduce the impact of the organisation on the environment and to explore opportunities to sell carbon credits derived from existing forest surrounding the Golf course. Although a senior management led initiative carbon footprint measurement is not perceived by interviewees as a key issue for discussion at management meetings.

*"I am only involved in the green side and if it is my convenor will be doing that job for us"*  
**Greens Keeper (2012)**

The use of carbon footprint as a tool by senior Moffat Golf Club to secure financial outcomes such as the acquisition of carbon credits for resale ensures carbon footprint reduction is on the management committee's agenda.

*"No there would be no barriers if I said we need to include carbon footprint on the agenda of the next meeting nobody would say we are not they would say okay we would wait and see what that is about"*  
**Greens Convenor (2012)**

Although proud of having taken the strategic step of measuring its carbon footprint Moffat Golf Club does not participate in any voluntary reporting schemes due mainly to the financially driven focus of senior management. Technical staff interviewees perceive reporting issues to be a consideration at senior management meetings.

*“Again not that I am aware of... but the Greens Convenor deals with that kind of things at management meetings” **Greens Keeper** (2012)*

Similar attitudes persist regarding external verification of the Moffat Golf Club’s carbon footprint by independent third party organisations such as the Carbon Trust. Analysis by the Crichton Carbon Centre is seen as sufficient to inspire confidence as to the carbon footprint reporting integrity.

*“Again not that I am aware of... but the Greens Convenor deals with that kind of things at management meetings” **Greens Keeper** (2012)*

Management and staff of Moffat Golf Club view carbon footprint measurement as a useful tool for any organisation regardless of its size by identifying opportunities to reduce cost, aid to strategic planning, providing the SMEs with “green credentials” that support marketing and business strategy. However “green credentials” are not perceived as a lucrative differentiating factor in the golf tourism sector.

*“A good question really... it is a useful tool because small to medium sized businesses are interested in reducing their cost so it is a useful tool from that point of view... For those that are in a luxurious position not having to worry too much about the bottom line it is a useful tool to know where you are going and there might just be an element in certain industries not this one where your green credentials could be very good business good marketing strategy” **Greens Convenor** (2012)*

*“I think it should be useful to everyone small or big” **Green Keeper** (2012)*

Moffat Golf Club opted to become members of the Crichton Carbon Centre’s CSmart Project in an effort to reduce energy costs and provide information on carbon offsetting on its emissions (Crichton Carbon Centre 2010).

*“If it was it would be dealt by Greens Convenor rather than me” **Green Keeper** (2012)*

The management of Moffat Golf Club have preferred to provide open access to carbon footprint report information for staff, external organisations and the general

public. Technical staff interviewees seem unaware of this flexible approach to information sharing and disclosure of carbon footprint performance.

*“If it was it would be dealt by Greens Convenor rather than me”* **Green Keeper** (2012)

### **Product Innovation**

Climate change impacts such as increasingly wet summers have not only affected domestic membership but is also considered a factor in choosing Scotland as a golf tourist destination (Scottish Enterprise 2009). However Moffat Golf Club’s customers are not concerned with the organisation’s carbon emissions performance but rather on affordability and the pursuit of self-interest.

*“The current membership all vote the way things will suit them because it is a selfish environment in golf courses it is very difficult to get people together as would find everything is based on how much we can afford as far as the membership is concerned”*  
**Greens Keeper** (2012)

Strategically the management interviewee perceives carbon footprint measurement as driving change in the processes by which the Moffat Golf Club delivers the golf leisure experience by aiding in reduction of fertiliser consumption and a redesign of the building to achieve energy efficiencies. There is however a critique of the carbon assessment process as being narrowly focused on energy efficiency but not on the wider carbon impact of operations. The rate of adoption of new technological developments in green keeping by the golf course is only restricted by affordability.

*“It has led to a change in the way we go about our business in the way we have arranged our premises and so on In terms of products and services nothing outgoing it has changed us on the side of the fertilisers and so we have cut down on what we use in there partly financially driven because the Crichton never looked at the green bit they only looked at this building but many of our suppliers were suggesting different ways of going about things a good organisation to talk to might be agronomists because the majority of the agronomists who would advise us on the technical aspects of our courses are definitely steering people away from the heavy nitrogen applications”* **Greens Convenor** (2012)

### 5.3.3 Environmental Impact

#### Energy and Water Usage

Rainfall and water consumption measurement are routinely monitored by Moffat Golf Club without the application of water footprint methodology to support the analysis. Technical interviewee states that the application of water footprint techniques is within the remit of management however continue to maintain records of annual rainfall statistics.

*“We do measure it all the time...we need to” **Green Convenor** (2011)*

*“There probably is but that is again down to Greens Convenor they will take care of that if they need any input from me I keep records of rainfall which has an effect on our irrigation use any way it gives me an idea if I look back into records over the last 2 – 3 years I could see if there are patterns for rainfall at the time so I don’t put irrigation on and we just leave it at that and 9 times out of 10 it does work. If we do get a dry spell we keep it to an absolute minimum as far as that is concerned we don’t really have much use for irrigation these days we have had 7 ½ feet of rain last year” **Greens Keeper** (2011)*

There is limited understanding of the role of sustainability footprints within the organisation which is viewed by senior management of Moffat Golf Club as being mainly concerned with emissions and fuel reduction.

*“It is that reduction in carbon footprint that you can sustain year on year rather than just a short term fix to reduce something so if you reduce your fuel consumption by X this year it is x +1 next year and so on to keep the thing going and not do what they do with the wind farms pretend” **Greens Convenor** (2012)*

#### Emissions and Waste

Although carbon footprint measurement was a novel concept within Moffat Golf Club both senior management and staff consider the organisations carbon footprint to be a KPI.

*“I would be misleading you if I said it did unless it was financially driven but then it would be a secondary outcome in truth” **Greens Convenor** (2012)*

Climate change science is perceived by Moffat Golf Club interviewees as a complex subject that has been tarnished by allegations of deception and lack of credibility amongst its supporters. A clear understanding of the concept has been clouded by the introduction into the debate of additional terminology such as global warming. The validity of carbon footprint measurement however is not being questioned being perceived as “real” or tangible requiring teamwork in order to overcome its impact on the climate which threatens the survival of the business.

*“The climate is definitely seen a huge change so I am hoping we can all work together and try and do something about it because it is certainly not any good for our business” Greens Keeper (2012)*

*“It is a very good question carbon footprint is real... climate change is such a woolly concept that I have not signed up to it at all. I think the whole thing needs reviewing... I think it needs to present itself through more credible people than it has done and I think it has got to stop the emotional blackmail of climate change and get into some facts that we could stand and say absolutely right. They have got to clean up their act so I totally believe the carbon footprint is measurable there is no argument about that it is scientific you can measure it. The climate change stuff there has always been climate change in one way I have to be careful what I say here the thing that is deceptive is the global warming bit” Greens Convenor (2012)*

Financial outcomes are considered absolute within the operational context of Moffat Golf Club all other non-financial objectives such as water or carbon footprints as secondary to financial objectives. The Technical interviewee demarcates “green keeping” emissions targets which are expressed in operational terms such as reduced consumption of water and chemicals, as differing from “general” organisation wide emissions targets which are within the remit of senior management.

*“In general again you have to ask Greens Convenor because that goes into management meetings because they will be looking at that. On the golf course side we will be looking to reduce our wastage, to cut back on chemical use of water on the surfaces and keep it to a minimum if we can and maybe in the future look to by machines are going to be a lot more friendly to the environment etc. that’s something we keep biting away a bit at a time and hopefully we can get their one day” Green Keeper (2011)*

*“If it saves us money... that’s how the targets would be set is if it saves us money.. Carbon reduction would be a secondary outcome” Greens Convenor (2011)*

The search for cost savings triggered an interest in energy savings and carbon emissions reduction enhancing Moffat Golf Club’s overall understanding of its environmental impacts. Although this sentiment is accepted by interviewees, technical staff suggests that knowledge of environmental impacts is pre-determined by individual motivation, interests and ability. Management and staff of Moffat Golf Club view carbon footprint measurement as a useful tool for any organisation regardless of its size by identifying opportunities to reduce cost, aid to strategic planning, providing the SMEs with “green credentials” that support marketing and business strategy. However “green credentials” are not perceived as a lucrative differentiating factor in the golf tourism sector.

*“A good question really... it is a useful tool because small to medium sized businesses are interested in reducing their cost so it is a useful tool from that point of view... For those that are in a luxurious position not having to worry too much about the bottom line it is a useful tool to know where you are going and there might just be an element in certain industries not this one where your green credentials good be very good business good marketing strategy” Greens Convenor (2012)*

*“I think it should be useful to everyone small or big” Green Keeper (2012)*

#### **5.3.4 Stakeholder Impact**

##### **Anthro Capital Resource Allocation**

Moffat Golf Club historically has had cultural ties with the local community which have been strengthened through community initiatives such as providing opportunities for children to learn to play golf and ground maintenance support to the local Bowling Club is testimony to the organisation’s community engagement. Critically these activities are part of the organisations business plan despite lack of awareness of social footprint techniques.

*“One thing Moffat Golf Club has done since it opened is the local schools initially the private schools of course and when the communities and councils started to provide education schools in the area had free access to bring students up to learn to play golf... We have a lot of expensive and technical equipment so we go to maintain the local football field and rugby field, aerate or roll it for them on an annual basis we look after the bowling green so on that end we are quite involved with the community the local schools and sports organisations” **Greens Convener** (2012)*

The reluctance of senior management at the Moffat Golf Club to use carbon footprint terminology may be due to the novelty of its use as a measurement indicator within the golf club even though the organisation has monitored components of its carbon footprint prior to its benchmark GHG report.

*“About four years” **Greens Convener** (2012)*

Although Moffat Golf Club interviewees suggests that sustainability footprint tools such as the carbon footprint are value added activities but there is divergence of opinion regarding its benefits with management championing financial benefits and whilst technical staff suggest carbon management activities to be inherently beneficial.

*“Not unless it’s linked to financial return ... if you don’t keep your eye on financial return the organisation ceases to exist and then it contributes nothing... It has to be survival.. Survival comes first” **Greens Convener** (2012)*

*“Yes anything that is going to help in that way is good for any business” **Green Keeper** (2012)*

At a tactical level Moffat Golf Club’s Greens Convener as “Carbon Champion” monitors fuel and electricity consumption of both the building and plant equipment being ably supported by the Greens Keeper who monitors rainfall patterns to assist in the efficient use of fertilizer and pipe borne water supplies.

*“Monitoring of fuel consumption, electricity consumption plant fuel consumption and measurement of water consumption” **Greens Convener** (2012)*

Moffat Golf Club interviewees agree that carbon footprint measurement is a value added exercise that enhances the golf club's reputation, credibility and is an indication of strategic thinking in areas such as reduced chemical use.

*"Reputation, credibility and an indication of forward thinking"* **Greens Convenor** (2012)

For Moffat Golf Club interviewees' price sensitivity is an overriding factor in purchasing decisions despite awareness of environmental consequences despite opportunities to pursue "green" procurement policies

*"No, if someone has to haul the sand an extra 30 miles for us to save £5 a ton then that would be fine by us"* **Greens Convenor** (2012)

Moffat Golf Club management interviewee believe that policymaking institutions such as the government and regulating agencies can actively support the value added initiatives such as carbon footprint measurement by providing grants and requiring carbon footprint measurement as an awarding criteria.

*"By making it a condition of giving grants that's their big stick you have got to prove your carbon credentials in order to get a grant. It is as simple as that if you really want to force organisations to do it that's the route"* **Greens Convenor** (2012)

Instrumental to Moffat Golf Club's pursuit of carbon footprint measurement are the cost reduction benefits that accrue from reduced energy consumption and to pre-empt future environmental legislation.

*"You know the answer to this question it is the cost of running the organisation one goes with the other reduce your carbon footprint and in variably you reduce the cost of your organisation"* **Greens Convenor** (2012)



## 5.4 Rabbies Trail Burners

Rabbies Trail Burners is renowned SME in the Scottish tourism sector achieving the Vision in Business for the Environment of Scotland (VIBES) Award in 2011 Scotland's highest environmental accolade. The company has been operating small tours initially for elderly visitors since 1993 with a maximum of 16 individuals per coach trip. Since then the organisation has rapidly expanded to 13 fulltime staff and a vehicle fleet consisting of 16 modern Mercedes mini coaches and 1 people carrier (Rabbies 2011a). This focus on small tour groups and personalized service has yielded dividends helping the company achieved £3.4 million pound turnover in 2011 with 40,000 satisfied customers choosing the company to provide unique holiday experience (Bain 2012). However this strategy was borne of desperation rather than planning as the company's founder and Managing Director Robin Worsnop explains:

*"It was a trying time because I didn't have any money - I made about £4000 profit that was what I lived on." (Bain 2012)*

As Chairman of the Edinburgh Tourism Action Group (ETAG) a tourism industry body he actively champions innovation in the Scottish Tourism sector recently contributing to the development of a three year strategy to maintain Edinburgh's position at the forefront of UK's tourism industry. In his own business he is pursuing a similar five year growth strategy through the development of pilot operations first in Ireland and then the rest of the UK (Bain 2012).

Philosophically the firm's approach to sustainability is grounded in the concept of "small is beautiful" first postulated by E.F. Schumacher but embodied within the business by the use of small coaches, local tour guides that provide visitors with

access to remote and exiting places such as the Scottish Highlands (Rabbies 2011a). From the company's staffing complement of 13 individuals only the Sales Manager who opted to participate in the research by email rather than a "face to face" interview. Within her remit as Sales Manager is the responsibility for the measurement of the carbon footprint of office activities.

*"I measure the office Carbon footprint"* Sales Manager

Therefore aptly placed to provide insight into the contribution of sustainability footprint measurement to the success of the business and highlight the factors critical to successful implementation.

#### **5.4.1 Cost Impact**

##### **Risk**

This concern for the impact of Rabbies Trail Burner's operations on its wider community has formed part of the organisations ethos since the establishment of its first office near Edinburgh Castle which provided an outlet for local artisans (Bain 2012). Unsurprisingly the management of the organisation opted to pursue carbon footprint measurement in 2010 in an effort to demonstrate its continued commitment to environmental best practice. (Sales Manager 2011)

##### **Financial Resource Allocation**

The importance of visitors to the business cannot be underestimated as statistics of the coach tourism segment indicate average visitor annual spend of £96m for the period 2008 – 2011 mainly due to an expansion of the "staycation" market consisting of British based tourists (VS 2012). However this sense of stability does not reflect

the overall decreasing spending levels by visitors (VS 2012). The reduction of visitor spends within the coach tour segment of the Tourism sector is considered to have affected the organisation's carbon footprint due to reduced operational activity hence lower emissions as indicated by the statement "*Very important*" affirming the importance of GHG measurement to the organisation (Sales Manager 2011).

In the face of static overall growth with the coach tour segment senior management of Rabbits Trail Burners have not quantified the costs of conducting greenhouse gas measurement to the business as it is perceived as a routine exercise

*"Unsure - the time taken to do it has not been calculated - we do this on a regular basis"*  
**Sales Manager (2011)**

#### **5.4.2 Innovation Impact**

##### **Process Innovation**

The expression of water consumption in CO<sub>2</sub>e and the common understanding of carbon impacts within Rabbits Trail Burners have led to the implementation of water conservation techniques as well as other social initiatives using CO<sub>2</sub>e as a performance indicator.

*"We measure our water so could potentially look in to this"* **Sales Manager (2011)**

Rabbits Trail Burners has adopted sustainability footprint methodologies such as the carbon footprint for altogether altruistic reasons involving considerations regarding the economic, social and environmental impact of its operations on its various stakeholder communities.

*"To measure how sustainably we were operating"* **Sales Manager (2011)**

Using the technical support provided the Crichton Carbon Trust; Rabbies Trail Burners carbon footprint reporting boundaries were defined using DEFRA's carbon footprint measurement framework guidance (Rabbies 2012). However these carbon reporting boundaries are expressed by practitioners within the organisation in operational terms.

*"Measuring fuel, miles, passenger numbers, electricity, water, waste, recycling" Sales Manager (2011)*

Even though greenhouse gas measurement is routinely conducted by the Rabbies Trail Burners the initiative is not specifically stated in the organisation's policies but is captured within policy statements that reflect practical steps undertaken by the organisation to reduce its greenhouse gas emissions such as efficient tour scheduling to avoid traffic congestion and recycling (Rabbies 2013a). The firm's *Responsible Policies* are drafted in customer friendly language with the absence of environmental jargon; a similar approach has also been used to communicate their commitment to sustainable best practice to customers through a bespoke visitors guide (Rabbies 2013b). Similar sentiments are also expressed by management of Rabbies Trail Burners as their customers are generally disinterested in their carbon emissions suggesting *"Not many do"* (Sales Manager 2011).

However the management representative of Rabbies Trail Burners indicates that carbon footprint regularly features on the agenda at management meetings

Despite the user friendly approach adopted by Rabbies Trail Burners in communicating their commitment to reducing carbon emissions there is a perceived barrier in placing carbon footprint reduction on the agenda due to varying interpretations of the concept and purpose of carbon footprints.

*“Everyone’s understanding of carbon footprint” Sales Manager (2011)*

Rabbies Trail Burners actively participate in two voluntary carbon reporting schemes the Mayday Network established by the SBC a Princes Trust Charity and the Green Tourism Business Scheme developed in 2001 by Visit Scotland in collaboration with private sector partners

*“Yes Mayday/ GTBS” Sales Manager (2011)*

Voluntary carbon reporting is considered by senior management of Rabbies Trail Burners as a form of external verification and provides an opportunity to showcase the firm’s environmental initiatives to its customers and other key stakeholders.

The management interviewee for Rabbies Trail Burners also conveys similar positive perceptions regarding carbon footprint measurement is a useful management tool.

Early calculations of Rabbies Trail Burner’s carbon emissions were later refined by students participating in the Carbon Masters Programme a joint project between the University of Edinburgh and SBC that provides businesses with post graduate student interns that conduct short term projects in areas of Carbon Management (Rabbies 2012)

*“No we did it ourselves - however students have also verified our results” Sales Manager (2011)*

Disclosure of the Rabbies Trail Burner’s carbon management performance through carbon footprint reporting is considered to have a dual purpose both internal as part of internal quality management process to verify the achievement of KPIs and externally to communicate the firm’s green credentials to its stakeholder base.

## **Product Innovation**

Carbon footprint measurement as a tool is not considered by management of Rabbies Trail Burners to have led to the development of new products and services but has contributed to improved journey planning, implementation of green fleet policies such as fuel efficiency and better driving practices (Rabbies 2011b) (Sales Manager 2011)

Rabbies Trail Burners management representative suggests that there is limited impact on the development of new products and services arising from the adoption of carbon footprint methodology.

### **5.4.3 Environmental Impact**

#### **Energy and Water Usage**

The expression of water consumption in CO<sub>2</sub>e and the common understanding of carbon impacts within the Rabbies Trail Burners have led to the implementation of water conservation techniques by the organisation such as *mixer water saving adaptors*. However despite these phenomenal gains the firm does not actively calculate the impact of its water consumption using water footprint methodology.

*“We measure our water so could potentially look in to this” Sales Manager (2011)*

Conversely sustainability footprints are perceived by the management of Rabbies Trail Burners as being aligned to sustainable development.

*“Sustainable development” Sales Manager (2011)*

## **Emissions and Waste**

The management of the organisation are keen to clarify that motivations for carbon footprint measurement are financially driven with carbon footprint reduction being a secondary outcome. Carbon footprint measurement has also been strategically adopted as a KPI by the management of Rabbies Trail Burners.

The management of the Rabbies Trail Burners is committed to sustainable development and stewardship of natural resources, fostered by a benign understanding of the connection between organisational environmental impacts and climate change (VS 2012).

The commitment to sustainable growth is evidenced by the institution of “stretch” targets for carbon management performance. Rabbies Trail Burners aims to maintain its fuel consumption below 0.99 litres of fuel per passenger for 100km travelled.

*“Keeping below 0.99 litres of fuel per customer 100km travelled” Sales Manager (2011)*

Rabbies Trail Burners carbon footprint report provides a framework within which the true impact of its main environmental aspects diesel, water, electricity consumption, inert waste plastic, metal cans and glass can be fully understood.

The management representative of Rabbies Trail Burners perceive carbon footprint measurement as a tool to assist the organisation with combating climate change.

### **5.4.4 Stakeholder Impact**

#### **Anthro Capital Resource Allocation**

Despite the a non-response Rabbies Trail Burners social impacts are viewed from a carbon emissions perspective with the alignment of carbon reduction goals to social

programs through the imposition of a self-imposed carbon tax donates £10 to local and national charities for every ton of carbon emissions generated from business operations.

Aligned to the owner's passion for sustainable growth Rabbies Trail Burners initiated carbon reduction policies in 2007, firstly by creating a new KPI expressed as litres of fuel used per passenger for 100km travelled (Sales Manager 2011).

Financial benefits arising from energy savings and carbon emission reduction are influencing factors that have led senior management of Rabbie's Trail Burners to perceive carbon footprint measurement as a good investment of the firm's resources.

### **Shared Value Creation**

Carbon footprint measurement specifically is considered a critical value to Rabbies Trail Burner's operations helping the firm to differentiate its product/service offering as a green tourism provider (Sales Manager 2011)

Price sensitivity is key factor dominating purchasing decisions despite awareness of environmental consequences thereby negating the impact of green supply chain policies.

However management of Rabbies Trail Burners are keen to highlight opportunities for policymaking institutions to contribute to the adoption of sustainability footprint measurement tools such as the carbon footprint through the provision of consultancy services that can assist Scottish SMEs with the understanding and measurement of carbon emissions.

*"Make it easier - offer a service to help companies understand it or a service to measure it for the company" Sales Manager (2011)*



As an SME Rabbits Trail Burners is driven to measure its carbon footprint mainly to improve fuel efficiency, reduce costs but also as a yardstick of the company's overall success.

*“For us fuel efficiency, to measure the company's success /costs etc.” Sales Manager (2011)*

## **5.5 Conclusion**

Without any clear indication of its contribution and impact on growth of the company the management of Capital Cooling Ltd adopted carbon footprint measurement as a strategic tool and in so doing changed perceptions of the waste which is now viewed as a profit centre and quantified based on carbon emission impact. However despite this consensus carbon footprint measurement is not considered cost neutral and sustainability initiatives is considered by some employees as a luxury in a credit constrained environment.

A personal concern for the environment contributed to the articulation of the Log House People environmental policy and carbon management policy despite divergent views held by both Directors regarding the efficacy of sustainability footprint tools. The organisation's policy stance is based on two premises firstly that pressures to decarbonise through the construction and development of carbon neutral log homes secondly the acceptance of responsibility for environmental impacts. The company is keen to emphasise the sustainability of its building techniques which combines traditional approaches such as the use of logs which precludes the need for the consumption of cement or cement products in the building process (LHP 2013).

Moffat Golf Club is financially driven to measure its carbon footprint, macroeconomic issues such as financial crisis and competitive pressures within the golf industry invariably influencing decisions to adopt carbon footprint measurement. Financial objectives override latent climate change scepticism and doubts over the scientific credibility of climate change science.

Although part of the tourism sector Rabbits Trail Burners carbon footprint measurement program was scaffold from pre-existing environmental policy articulation with environmental concerns being borne from a balanced view of entrepreneurship that included economic objectives and wider social aims that included customer and community engagement.

## **Chapter 6 Analysis and Discussion**

## 6.0 Introduction

Aligned with the research aim *to develop a conceptual framework within which perceptions of sustainability footprints can be understood and sustainability footprint methodology utilized within Scottish SMEs* and research objectives *to critically analyse the context, perceptions of contribution of sustainability footprint tools to Scottish SMEs as well as to identify the challenges and critical Success Factors (CSFs) in the use of sustainability footprint methodology within Scottish SMEs*, the findings reviewed in *Chapter 5* and *Chapter 4* were analysed to determine the following:

- Congruence or divergence in perceptions amongst Directors, managers and staff i.e. are perceptions of sustainability footprint methodology homogenous across the organisational hierarchy.
- Congruence or divergences in perceptions across case study organisations i.e. are perceptions of sustainability footprint methodology homogenous across the case study organisations.

Responses to interview questions have been analysed using a priori coding to reflect each interviewees “own words” (Murillo and Lozano 2006) (Arenas et. al.2009) (Dolan and Ayland 2001) (Strauss and Corbin 1990) (Meadows and Hyle 2010) with responses interpreted along a dynamic continuum from *Sustainability Positive*, *Sustainability Passive* and *Sustainability Negative* reflecting the tendency towards ambivalence amongst interviewees towards sustainability depending on situational context.

For consistency the four themes as indicated in *Table 2* of *Cost Impact*, *Innovation Impact*, *Environmental Impact* and *Stakeholder Impact* utilized will provide the framework within which the analytical statements can be understood.

## **6.1 The context and perceptions of contribution of sustainability footprint tools to Scottish SMEs**

### **6.1.1 Cost Impact**

In terms of risk sensitivity towards sustainability footprints specifically carbon footprints interviewees across the four case study companies exhibit a strong *Sustainability Positive* orientation motivated by an ardent concern for the environment and its impact on the survival of the business. Employees perceive carbon footprints as a business priority as well as a link between the future survival of the business and the planet, environmental risk management, legal compliance, proxy for good management, identifies cost savings, satisfying customer requirements, and market leadership (*Appendix 5 - Table 1*). These sentiments are congruent with existing theory postulated by Lash & Wellington (2007) Krysiak (2009) that infers although future sustainability risk cannot be calculated in absolute terms individuals incorporate environmental concerns into their interpretation of susceptibility of investments, livelihoods and business to future risk.

Environmental risk concerns are a dominant factor in the risk perceptions of management of the Log House People and technical staff at Capital Cooling this may be due to the engineering nature of both businesses whereby frontline staff are acutely aware of the environmental impact of business operations (*Appendix 5 - Table 1*). Political pressures in the form of both direct and indirect legal obligations weigh heavily on Capital Cooling manifesting itself in the Fluorinated Gas Regulations 2009 and in stringent energy efficiency Building Regulations Part L 2011. From a contextual perspective most policymaker interviewees express a range of opinions similar to the *sustainability positive* positioning of SME interviewees

emphasising the importance of senior management direction on the success of sustainability initiatives such as the carbon footprint with cost reduction and best practice leadership as natural outcomes (Head of Environment 2011) (Head of Environmental Strategy 2011). However government policymaking influencers express uncertainty as to the likelihood of customers basing their purchasing decision on the carbon friendliness of SME products and services (Head of the Environmental Economic Analysis Unit 2011).

### **6.1.2 Innovation Impact**

Capital Cooling's management interviewees express a *sustainability positive* orientation towards the organisations approach to environmental impact reduction which is focused on carbon footprint measurement due to the multipurpose role as a performance measurement indicator, identifying opportunities to improve product/service carbon intensity and influencing personal consumption and disposal patterns (*Appendix 5 - Table 2*).

This consensus does not however extend to all managers or non-technical staff who exhibit *sustainability passive* traits being unaware of potential approaches that may be also implemented to improve performance (*Appendix 5 - Table 2*). In practice the Log House People senior management are *sustainability positive* identifying the multipurpose capability of carbon footprint measurement as an environmental impact indicator whilst the Rabbits Trail Burners adopt a practical approach by converting water consumption patterns into CO<sub>2</sub>e (*Appendix 5 - Table 2*).

Moffat Golf Club management representative express *sustainability positive* stance in that carbon footprint measurement is not only a tool that demonstrates

organisational commitment to carbon reduction and CSR thereby highlighting its multipurpose nature (*Appendix 5 - Table 2*). Yet the organisation's technical interviewee adopts a *sustainability passive* view being resigned to allow such activity as a management responsibility.

This acceptance of the multipurpose nature of carbon footprint measurement also pervades the sustainability positive sentiment expressed by the Rabbie's Trail Burners management interviewee (*Appendix - Table 2*). This general acceptance of the versatility of carbon footprint measurement has contributed to a *carbon myopic* focus by these SME organisations which are in part induced by legislation such as the Climate Change Act Scotland (2009) and other policymaking instruments e.g. the Carbon Reduction Commitment. Bendell and Kearins (2004) suggest that carbon footprint data can best interpreted when supported by financial data. *Carbon myopic* tendencies are also displayed by policy influencers who use carbon footprint measurement as a performance indicator.

The majority of Capital Cooling interviewees demonstrate strong *sustainability positive* views regarding the formalisation of carbon footprint policy within the company emphasising the holistic nature of the organisation's carbon footprint initiatives that encompass energy, carbon footprint, recycling, carbon reduction which are supported by the appointment of an Environmental Manager responsible for implementing policy and procedures (*Appendix 5 - Table 3*). Yet a manager and technical staff interviewees' exhibit *sustainability passive* orientation of benign disengagement being either unaware or indifferent to the company carbon policy (*Appendix 5 - Table 3*). The management of the Log House People although *sustainability positive* in orientation whose efforts initially focused on the

organisation developing and implementing its environmental policy which evolved to include a carbon management policy (LHP 2013) (*Appendix 5 - Table 3*).

Moffat Golf Club management interviewee also adopt a *sustainability positive* stance preferring an informal carbon footprint policy but instrumental in decision making despite being predominately cost driven(*Appendix 5 - Table 3*). The informality of the carbon footprint policy has naturally contributed to staff members being *sustainability passive* as they are unaware of its existence (*Appendix 5 - Table 3*).

Carbon management is firmly entrenched within the organisational culture at the Rabbits Trail Burners with management being *sustainability positive* in orientation in their policy making approach (*Appendix 5 - Table 3*). Even though greenhouse gas measurement is routinely conducted by the organisation the initiative is not specifically stated in the organisation's policies but is captured within policy statements that reflect practical steps undertaken by the organisation to reduce its greenhouse gas emissions such as efficient tour scheduling to avoid traffic congestion and recycling (Rabbits 2013a).

Policymakers support *sustainability positive* orientations recommending a sector specific approach to carbon footprint policy and the universal adoption of carbon footprint policy with the provision of government support (Head of the Environment 2011) (Head of the Environmental Strategy 2011).

The adoption of carbon footprint policy is a reaction to stimuli in the case of these SME firms as they seek to gain cost and competitive advantages from the pursuit of carbon reduction policies (O'Higgins 2010) (York 2009). Pragmatism is the operational thread that engenders cost reduction with the acceptance of environmental impact arising from business operations (York 2009).



Interviewees generally share a *sustainability positive* positioning regarding the use of external consultancy support (*Appendix 5 - Table 4*). External consultancy support is perceived as primarily being used to measure the organisations carbon footprint.

In the case of larger SMEs consultants are used for carbon management advice and carbon footprint verification. Management of Capital Cooling rely on external advice to identify potential carbon reduction opportunities whilst Rabbies Trail Burners utilise external support initially to verify carbon footprint measurement (*Appendix 5 - Table 4*).

*Sustainability positive* perceptual positioning by SME interviewees is also supported by policymakers who suggest the acquisition of external consultancy advice can assist in the development of internal carbon footprint measurement capability (Head of the Environmental Analysis 2011).

External support is not required by the Rabbies Trail Burners due to a comprehensive understanding of carbon footprint methodology. The transfer of carbon footprint measurement knowledge is considered a key value added rationale for soliciting independent third party support (*Appendix 5 - Table 4*).

Kolk (2008) concurs with these findings suggesting the need amongst European firms to communicate transparency and verify greenhouse gas reports.

### **6.1.3 Environmental Impact**

Management interviewees hold a diverse range of views concerning water consumption and water footprint measurement. Within Capital Cooling management interviewee perceptual positioning range from *sustainability positive* - product water

consumption awareness, *sustainability passive* – perceptions of low water consumption and *sustainability negative* – limited awareness of water consumption impacts (*Appendix 5 - Table 5*).

A *sustainability negative* orientation towards water consumption is also expressed by non-technical staff interviewees (*Appendix 5 - Table 5*). The absence of future plans to measure Log House People water footprint indicates *sustainability negative* positioning by senior management (*Appendix 5 - Table 5*). Moffat Golf Club interviewees are *sustainability positive* in orientation highlighting water consumption monitoring and rainfall trend analysis as tools in improving water consumption. Rabbies Trail Burners management interviewee displays a *sustainability positive* orientation confirming the use of comparable techniques such as water consumption monitoring with the potential for implementation of water footprint measurement in the future (*Appendix 5 - Table 5*).

Policymakers are generally biased towards *sustainability positive* perceptions expressed by SME interviewees advocating a sector specific approach to the implementation of the water footprint methodology depending on the availability of resources (Head of Environment 2011). However Scottish Government policy advisors consider water footprint measurement to be a low priority on the policymaking agenda for SMEs due to the availability of water resources (Head of Environmental Economic Analysis 2011).

The variance in perception regarding water footprint methodology is due to a limited understanding of water footprint measurement and a misconception amongst interviewees, perceiving water conservation measures equates to water footprint measurement.

The concept of sustainability footprints creates a generally *sustainability positive* perceptual orientation amongst management interviewees aligning operational activities with carbon footprint, water footprint and social footprint performance through continual improvement, recycling, carbon reduction, sustainable development, sustaining good carbon performance by reduced emissions and fuel consumption (*Appendix 5 - Table 6*). Comparable sustainable positive perceptions are displayed by the Capital Cooling non-technical interviewee considering carbon footprint monitoring to be akin with sustainability footprints (*Table 11*). However the both the Log House People management interviewee and Moffat Golf Club Technical interviewee demonstrate *sustainability negative* perceptual positioning indicating lack of familiarity of sustainability footprints as a concept (*Appendix 5 - Table 6*). Policymakers support *sustainability positive* orientations of SME interviewees interpreting sustainability footprints as being the incorporation of carbon, water and social footprints that separates the concept of sustainability “qualitative” from the measurement of sustainability “quantitative” (Head of Environmental Strategy 2011). *Sustainability negative* perceptions of other SME interviewees are also shared by the government policy advisor who indicates lack of awareness of the concept (Head of Environmental Analysis 2011). In essence interviewees agree with the definition proposed by Amekudzi et.al (2008) that implied the assimilation of ecological footprint methodology with *quality of life (QOL)* concept that includes air quality, water quality and soil quality. Based upon this Sustainability footprints can alternatively defined as *methodologies for assessing the social and environmental impact of the economic investment in a specific strategic option in relation to other strategic alternatives and their potential risk to*

*the survival of future generations.* The definition provides a strategic perspective to the concept of *quality of life* incorporating risks to the survival of future generations.

The perceptual positioning of interviewees is reflective of the existing debate raging within society amongst those that believe in anthropogenic climate change and advocates of climate change as a natural cyclical phenomenon. The majority of management interviewees display a *sustainability positive* perceptual positioning indicating the ability of carbon footprint measurement to instil climate change awareness, influence sustainable action through recycling and creating realism through highlighting the connection between carbon footprint reduction and climate change (*Appendix 5 - Table 7*). *Sustainability positive* views are also intimated by technical and non-technical interviewees who observe a relationship between carbon footprint measurement and climate change, the need for co-operation to combat the effects of climate change through the use of carbon footprint measurement as a mitigation tool (*Appendix 5 - Table 7*). However *sustainability negative* perceptions amongst management interviews arise from the difficulties in the interpretation of climate science and credibility issues of climate science research authors Edwards-Jones et al. (2009) subscribe to *sustainability positive* views emphasizing the growing politicization of climate change and its sway on purchasing decisions (*Appendix 5 - Table 7*). *Sustainability negative* perceptions can be attributed to the complexity of the science underlying carbon footprint measurement which is a hybrid of earlier environmental concepts such as the *ecological footprint* evolving from a global warming potential indicator to a KPI (Pandey et. al. 2011). The transition of carbon footprint methodology from environmental science to business operational tool is dictated by interpretation of each practitioner or political group's attempts to colonize the implementation of greenhouse gas measurement techniques

(Watson 2006) (Ascui and Lovell 2011). Despite these issues GHG measurement is a useful tool to assist in understanding and mitigating the effects of carbon emissions (Weng and Boehmer 2006).

The establishment of binding carbon reduction targets has eluded governments unsurprisingly SMEs facing similar challenges albeit at a microeconomic level. Management interviewees are divided in their perceptual orientation with *sustainability positive* actions such as emission targets being stated in operational terms e.g. energy efficiency, recycling to enable systematic performance benchmarking (*Appendix 5 - Table 8*).

Rabbies Trail Burners management have taken the extraordinary step to set explicit emissions targets (*Appendix 5 - Table 8*). Technical and non-technical interviewees also display similar *sustainability positive* persuasions but also stress the differences between operational and organisational emissions reduction targets (*Appendix 5 - Table 8*).

Management interviewees of both the Log House People and Moffat Golf Club demonstrate *sustainability negative* orientations revealing the difficulties in target setting and the financial pressures of doing business (*Appendix 5 - Table 8*).

Policymakers wholeheartedly support sustainability positive perceptual orientations of SME interviewees promoting the establishment of carbon emission targets for Scope 1 and Scope 2 emissions or production based emissions as a large proportion of SME carbon emissions are Scope 3 and outside the control of the firm (CEO 2011) (Head of Environmental Economic Analysis 2011).

Contemporary research mirrors these findings suggesting an unconscious assessment that results in a perceived value or trade-off between pursuits of purely economic or social objectives (Hopkins 2010). The perceived trade off revolves around economic issues of cost and financial benefit for the firm (O'Higgins 2010).

O'Higgins postulates that firms adopt strategic responses ranging from Sceptical, Pragmatic, Engaged and Idealistic; each form of orientation is not mutually exclusive with firms adopting a combination of approaches in response to external stimuli (O'Higgins 2010). These strategic responses mirror the perceptual orientation of senior management of the SME firms within my research study i.e. *sustainability positive*, *sustainability passive* and *sustainability negative*.

There is a general belief that carbon footprint measurement is a useful tool to combat climate change. This *sustainability positive* orientation is homogenous across organisational functions and SME business sectors within this research study (*Appendix 5 -Table 9*). Management interviewees infer benefits to both business and the planet cost reduction, continuous improvement, benchmarking, marketing strategy, environmental commitment, benchmarking and strategic planning (*Appendix 5 -Table 9*). Technical and non-technical interviewees ascribe definite benefits to the planet through improved environmental impact awareness (*Appendix 5 - Table 9*).

Policymaker opinions reflect *sustainability positive* positioning of SME respondents stating carbon footprint measurement as a tool for reducing the impact of carbon emissions that provides benefits of reduced costs and resource efficiency to SMEs (Head of Environmental Strategy 2011).

As a scientific indicator carbon footprint measurement allows firms to quantify their environmental impact in terms of *global warming potential (GWP)* a comparative index that demonstrates the global warming impact greenhouse gases thereby enabling cost effective mitigation strategies to be implemented (Ascui and Lovell 2011).

However carbon footprint measurement is blunt instrument that quantifies greenhouse gas emissions without monetising costs to businesses (Bowen and Wittneben 2011). Despite this anomaly firms are able to deploy mitigation strategies to reduce environmental impact arising from business operations (Lash and Wellington 2007) (Mackenzie et.al. 2009).

The implementation of carbon foot print measurement is an extension of an organisations risk strategy when viewed from Krysiak (2009) definition of sustainability as “a framework for assessing the impact of present decisions on the situation of future individuals”. This definition sustainability positive positioning acknowledges future impacts cannot be measured with any certainty argues for the incorporation of risk management principles into sustainability strategy to reduce the probability of harm to life on the planet (Krysiak 2009).

#### **6.1.4 Stakeholder Impact**

Social footprints as a tool to engender sustainable business practices solicit *sustainability negative* perceptions from a majority of respondents (*Appendix 5 - Table 10*). Management interviewees express limited influence over social issues exhibiting a lack of awareness of social footprints as a potential management tool with similar *sustainability negative* attitudes being demonstrated by the Moffat Golf

Club technical interviewee and the Capital Cooling non-technical interviewee  
(Appendix 5 - Table 10).

In certain instances social footprints do not factor into future strategic plans in spite of active social engagement by SME firms within their local communities (Appendix 5 - Table 10). Nevertheless *sustainability positive* views on social footprints factor into the future plans of Moffat Golf Club management with Capital Cooling technical interviewees intimating that the strategic decisions to adopt social footprint methodologies are within the remit of senior management (Appendix 5 - Table 10).

Policymaker views generally align with *sustainability positive* perceptual orientation SME interviewees supporting the adoption of social footprints by SMEs however acknowledging the evolving nature of social footprint methodology (CEO 2011). However SEPA policy advisors are encouraging of social footprint measurement are biased towards the adoption of water footprint methodology (Head of Environmental Strategy 2011).

The Social Footprint method assesses organisational sustainability based upon its contribution or stewardship of *anthro* capitals which is viewed as essential for human wellbeing (McElroy 2006). Critics of Social Footprint methods agree with the *sustainability negative* positioning of arguing the idealistic nature of sustainability footprint methodology does not adequately account for the influence by the cultural context on individual concepts of responsibility and may not adequately reflect the overall societal impact of activities such as religion except only from a financial perspective (McElroy 2006). Research conducted by Wartick and Cochran (1985) encourage *sustainability positive* orientations stating corporate social performance as an outcome of the interaction of the principles of social



responsibility, the process of social responsiveness and policies aimed at solving a social issue.

Socio-cultural constructs such as religion as the case in Western society influence *sustainability negative* perceptions whereby individuals and organisations are unable to ascertain the benefits of CSR initiatives such as social footprint measurement (Boyle and Boguslaw 2007) (Matthew 26:11). Leading to entrenched philosophical beliefs such as the *protestant work ethic* which has contributed to the development of a “*Incompatibility Thesis Mindset*” whereby the goals of poverty alleviation are incompatible with profit maximisation (Leavitt 1958) (Marsden 2000) (Gibson 2012). This sentiment manifests itself amongst senior management as the “Friedman condition” – profit or the planet, therefore decisions to adopt sustainability driven strategies is influenced by the ethical and social reference of the decision maker rather than strategic rationale (Porter and Van der Linde 1995) (Marsden 2000) .

Interviewee perceptions of the utility of investments in carbon footprint measurement are generally biased towards *sustainability positive* orientations (*Appendix 5 - Table 11*). Management interviewees highlight long term payback, cost reduction, a stimulus for R&D to reduce carbon footprint, revenue from recycling, marketing USP and a tool that can save the planet (*Appendix 5 -Table 11*). Technical and non-technical interviewees state similar views indicating carbon footprint measurement as a good investment that assists organisations in pre-empting future environmental legislation and combating climate change (*Appendix 5 - Table 11*). However the Moffat Golf Club management interviewee displays *sustainability passive* orientation advocating the need to link carbon reduction initiatives to financial return (*Appendix 5 - Table 11*).

Opinions amongst policymakers affirm the *sustainability positive* perceptual orientation of the majority of SME interviewees highlighting opportunities to identify efficiencies from the analysis of scope 1 and scope 2 emissions sources with the benefits of the measurement activity dependent on the efficiency and effectiveness of actions to reduce carbon emissions (Head of the Environmental Economic Analysis 2011). Policymakers recommend that carbon footprint methodology is tailored to the firm's size & environmental impact with a "lighter" touch approach for SMEs (Head of Environmental Strategy 2011).

Prior studies infer *sustainability positive* leaders will create organisational environments that fulfil the criteria of *Embracers* aligning their corporate strategy with sustainability principles as opposed to *Cautious Adopters* – that pursue reduced cost outcomes i.e. eco-efficiency, material efficiency and risk mitigation (MIT 2011). A finite balance must be struck between the pursuit of corporate objectives and environmental rejuvenation or renewal (Kolk and Pinkse 2007) (Driscoll and Starik 2004 pg. 26) (Bendheim et.al. 1998) (Gibson 2012).

Businesses have limited options but to pursue objectives that limit climate change risks by improving the carbon efficiency of their commercial assets and products, building new low carbon businesses and increasing environmental regulation (Enkvist et al. 2008)(KPMG 2012) (Lash and Wellington 2007). Hart (1995, 2010) proposed the Natural Resource Based View of the Firm (NRBV) that integrated pollution prevention, product stewardship and sustainable development strategies to assist firms in overcoming the risks arising from climate change.

Villalonga (2004) supports *sustainability passive* views by defining "sustainability is measured the persistence of firm specific profits" highlighting the influence of

intangibles such as reputation, corporate culture, brand image and technology insomuch that firm competitiveness being determined by the level of investment in “intangibles”.

Carbon footprint measurement is perceived by most interviewees as a value added exercise for SME firms. Management interviewees adopt a *sustainability positive* orientation demonstrating energy savings, emissions reduction, CSR, carbon impact awareness, competitive differentiation, market leadership, development of a caring organization and strategic focus with short term costs offset by potential long term profits as value added outcomes (*Appendix 5 - Table 12*). Both the Moffat Golf Club technical interviewee and Capital Cooling non-technical interviewee share *sustainability positive* perceptual orientations suggesting reduced consumption and benefits to the planet as benefits derived from carbon footprint measurement (*Appendix 5 - Table 12*). However *sustainability negative* sentiments are expressed by the Capital Cooling technical interviewee are due to an inability to ascertain the value of carbon footprint measurement to SME businesses (*Appendix 5 - Table 12*).

Scottish government policy advisor supports *sustainability negative* perceptual positioning amongst SME interviewees indicating limited value arising from SME adoption carbon footprint measurement within the context of Scottish GHG emissions (CEO 2011). However the majority of policymakers support sustainability positive orientations of SME respondents stating the potential contribution to the bottom-line, reduced carbon emissions, increased market share and innovation in goods and services (Head of Environmental Economic Analysis 2011).

Contemporary studies such as the FTSE Carbon Disclosure Project Index support *sustainability positive* views indicating investors are searching for  $\alpha$  i.e. new

window(s) of potential value in companies, strategically analysing emissions data to determine as the likelihood of emission regulation and the cost of emissions offsetting (Sullivan and Kozak 2009).

Alternative research infer that carbon footprint measurement is a misallocation of resources whose costs are prohibitive except for those businesses with near monopolistic profits and provides limited insight when used as to business sustainability or unsustainability when used as a criteria in reporting frameworks such as the GRI (Gray and Bebbington 2007).

When viewed from the perspective of value creation and benefits to society these can be seen to also encompass carbon footprint, corporate reputation, technological innovation, employee and customer satisfaction (Hart and Milstein 2009) (Laugel & Laszlo 2009). However value go beyond bottom line considerations to *telos* or creation of a higher purpose by making a difference in the lives of all stakeholders such as creating a “caring organisation” thereby aligning organisational goals with societal aspirations (Fisk 2010) (Lindblom 1994).

Small to medium sized enterprises and their supply chain partners generated a full range of perceptual views from *sustainability positive*, *sustainability passive* and *sustainability negative* responses for most interviewees (*Appendix 5 -Table 13*).

Management interviewees are divided in their opinion with respondents demonstrating *sustainability negative* positioning not requiring carbon footprint data with deference being given to price sensitivity in purchasing decisions (*Appendix 5 - Table 13*).

Capital Cooling management display divergence with *Sustainability passive* orientations amongst interviewees arising from perceptions of limited supplier expertise in carbon footprint measurement and the need to actively build carbon emissions awareness amongst supply chain partners (*Appendix 5 - Table 13*). Whilst other managers' exhibit *sustainability positive* orientations suggest the inclusion of carbon management data in the supplier selection process and Moffat Golf Club and Log House Management do not consider the acceptance of carbon reduction as a shared value with supply chain partners (*Appendix 5 - Table 13*).

Technical and non-technical interviewees demonstrate *sustainability negative* perceptual orientations confirming the omission of carbon footprint data from supplier contractual obligations as well as acknowledging lack of awareness of the issue (*Appendix 5 - Table 13*).

Policymakers generally support *sustainability positive* perceptions of SME interviewees highlighting supplier carbon footprint reporting requirement as a mechanism to drive change advocating a flexible approach factoring price concerns balancing act factors such as costs, social and environmental issues (Head of Environmental Strategy 2011). Within this context government policy advisors agree with the sustainability negative positioning of some SME interviewees suggesting supplier carbon footprints are desirable but not feasible (Head of Environmental Economic Analysis 2011).

Recent research supports *sustainability positive* views highlighting the emergent use of greenhouse gas reporting as a criterion in contractor selection as businesses attempt to reduce the supply chain business risks arising from climate change (Hoggart 2008) (Lash and Wellington 2007). Carbon footprint reporting within

supply chains is considered a key criterion in supplier selection has stimulating the creation of “business constellations” within which businesses make carbon emissions risk adverse competitive decisions (Gell 2008).

## **6.2 Challenges and Critical Success Factors (CSFs) in the use of sustainability footprint methodology within Scottish SMEs**

### **6.2.1 Cost Impact**

In terms of the economic outlook for the Scottish Construction Sector within which Capital Cooling and the Log House People are active participants there has been a decline in the sector’s GVA contribution to the Scottish economy from £11.1 billion in 2008 to £8.7 billion in 2009 (Scottish Enterprise 2012). The decline in revenue is as a result of low private sector demand for housing which contributed to increasing business insolvency within the sector with SMEs firms reducing investment in training, skills and innovation (Scottish Enterprise 2012). There is also intense competitive rivalry within the Scottish golf tourism market with 70 golf courses accounting for over 75% of the revenue a scenario that does not augur well for Moffat Golf Club as an SME (SE 2009). Potential entrants into the Scottish golf tourism industry require substantial capital investment to compete yet this has not deterred investors (Trump Golf Scotland 2012). Rabbits Trail Burners is also affected by declining visitor spend which has reduced revenue earnings within the coach tour segment of the tourism market (VS 2012).

*Sustainability positive* perceptual orientations are supported by a majority of policy leaders indicating lower levels of consumption, resource use, staffing and cost reduction amongst SMEs as symptomatic of challenging economic conditions that

has contributed to the pursuit of carbon emissions reduction (Head of Environment 2011) (Head of Environmental Strategy 2011) (Head of the Environmental Economic Analysis Unit 2011) (CEO 2011).

Within this economic context interviewees demonstrate a *sustainability positive* orientation acknowledging the influence of reduced economic activity on the adoption of carbon footprint measurement leading to process efficiency, cost reduction, financial returns from the sale of recyclable waste contributing £52,945 in revenue in the case of Capital Cooling Ltd (Capital Cooling Environmental Cost & Revenue 2011), improved raw material use and efficient fuel consumption (*Appendix 5 - Table 14*). However some managers within Capital Cooling project a *sustainability negative* orientation though engaged with sustainability as a concept are pessimistic suggesting that the economy has little or no impact on emissions with carbon footprint measurement activity an extravagant and costly exercise diverting valuable resources (*Appendix 5 - Table 14*). Echoing similar views expressed by Hicks (2010) who surmised that initiatives such carbon footprint measurements are costly except for SME firms with near monopolistic profits. The perception of extravagance is masked by an inability to quantify benefits arising from sustainability footprint measurement which may also account for the *sustainability passive* positioning of non-technical interviewee who are unsure of the impact of economic conditions (*Appendix 5 - Table 14*) (Demos 2006).

Capital Cooling employees view of the cost of carbon footprint measurement range from a *sustainability negative* positioning of the sheer impossibility of the calculation to a *sustainability passive* stance of general unawareness of costs or a *sustainability positive* evaluation of carbon footprint measurement costs in terms of

non-financial criteria such as man hours (*Appendix 5 - Table 15*). Specifically technical personnel at Capital Cooling consider the financial return received from the sale of recyclable material as compensatory despite the cost. Non-technical personnel and some managers are unaware of the costs this is a legacy of the lack of cost evaluation (*Appendix 5 - Table 15*). The Log House People senior management adopt a *sustainability positive* orientation perceiving the cost of carbon footprint measurement are ameliorated in the absence of financial data mainly due to participation in the Crichton Carbon Centre project which absorbed any upfront consultancy costs (*Appendix 5 - Table 15*).

Similar views are expressed by Moffat Golf Club whose participation in the Crichton Carbon Centre project created a low cost threshold for the firm in terms of implementation costs, unsurprisingly the technical staff interviewee are unaware of the costs (*Appendix 5 - Table 15*). Management of the club calculate that £1000 of consultancy effort was allocated to the by the Crichton Centre to measure the organisations carbon footprint. Although financially driven in decision making the management of the firm do not consider the calculation of carbon footprint measurement costs to be a business imperative. Rabbits Trail Burners though committed to carbon footprint measurement has also forgone the opportunity to assess the resource allocation requirements and costs of the carbon footprint measurement (*Appendix 5 - Table 15*).

Surprisingly policymakers also share similar attitudes with SME practitioners regarding an inability to accurately quantify the cost of GHG measurement with annual estimated costs ranging from less than £1000 for SBC to a maximum £200000 for the Scottish Government (Head of Environment 2011) (Head of



Environmental Strategy 2011) (Head of the Environmental Economic Analysis Unit 2011)

In regards to SMEs operating in the tourism sector the provision of free consultancy support and advice was a motivating factor in the adoption of carbon footprint measurement. It should be noted that these SMEs pursue carbon footprint measurement without a complete understanding of the cost implications inherent with the activity therefore are unable to quantitatively assess the value of the carbon measurement as a strategic option as discovered in earlier research by Epstein and Roy 2001.

Jolly et. al. (2010) and Hermosilla et. al. (2009) both imply that access to advice and support from the governmental or non-governmental institutions will encourage uptake of sustainability initiatives as well as De Groot et.al. (2001) and Defra (2010a) also identified the effect of incentives such as free advice on SME decisions to pursue carbon footprint measurement.

### **6.2.2 Innovation Impact**

Interviewees wholeheartedly demonstrate a *sustainability positive* orientation towards the strategic adoption of carbon footprint measurement as a strategic tool (*Appendix 5 -Table 16*). Capital Cooling management interviewees indicate a link between carbon reduction and cost reduction, legislative pressure, benchmarking, to be seen as being green, corporate responsibility, corporate policy as stimuli for the implementation of carbon footprint measurement (*Appendix 5 -Table 16*).

Nontechnical interviewees suggest promotional of environmental achievements and process improvement opportunities as motivational factors whilst technical

interviewees perceive environmental impact awareness as the key reason for carbon footprint measurement (*Appendix 5 -Table 16*). Marketing, CSR and eco-tourism factors dominate the Log House People's rationale for carbon footprint measurement being underpinned by senior management belief in caring for the environment (*Appendix 5 - Table 16*).

At the Moffat Golf Club cost reduction is the main factor contributing to senior management commitment to carbon footprint initiatives; a commitment that influences the opinions of technical staff (*Appendix 5 – Table 16*). However within Rabbies Trail Burners, management perceive carbon footprints as a sustainability performance measurement tool (*Appendix 5 –Table 16*).

Policymakers also agree that cost reduction and corporate responsibility as key reasons for the adoption of carbon footprint measurement as well as a desire to assist consumers in making informed choices, commitment to climate change, supply chain pressures and resource efficiency (CEO 2011) (Head of the Environmental Economic Analysis Unit 2011).

The CSR element of carbon footprint measurement was identified by Bowie (1999) who expounded the need for business to evolve beyond the expectations of tax contributions to assist in the achievement of wider societal goals. The promotion of environmental awareness, the desire to be seen as being “green” with accompanying marketing and eco-tourism programs have been identified in earlier studies by Saha and Darnton (2005) as businesses benchmark performance and utilise carbon footprint performance as a differentiating factor (Bhattacharya and Sen 2004). As a performance measurement tool carbon footprints meet the criteria of ease of use and

interpretation that supports both cost and carbon reduction as indicated in previous research studies (Fiskel, McDaniel and Spitzley (1998) (Pies et al. 2010).

Interviewee perceptions mirror a recent study into sustainability initiatives within supply chains that identified three reasons for organizational pursuit of “green” initiatives viz. the “desire to be a thought leader for green/sustainability”, “rising cost of energy/fuel” and a “competitive advantage/differentiator” (Schechterle and Senxian 2008).

Knowledge of carbon footprint methodology is limited to the interviewee’s personal contribution to the data gathering process. Capital Cooling management are divided in their understanding of carbon footprint methodology from *sustainability passive* unawareness or exclusively the domain of the technical specialists to *sustainability positive* views that include recycling, energy monitoring and human attitudes towards consumption whilst nontechnical interviewees view office recycling as a carbon footprint methodological approach (*Appendix 5 - Table 17*). The senior management of the Log House People *sustainability passive* in outlook concerning this issue expressing uncertainty regarding carbon measurement techniques.

(*Appendix 5 -Table 17*)

A similar *sustainability passive* sentiment is stated by the senior management of Moffat Golf Club despite stating a preference for reporting performance in financial terms. However the technical staff interviewee perceives carbon footprint methodology as the reserve of senior management. (*Appendix 5 – Table 17*). Rabbits Trail Burners Management interview project a *sustainability positive* position in that recycling and energy monitoring are considered as a component of carbon footprint methodology (*Appendix 5 - Table 17*).

It is apparent that interviewees are familiar with the data collection methods that support carbon footprint measurement e.g. energy monitoring and recycling data but not specific methodologies e.g. GHG Protocol. This may have arisen from a perceived technical exclusivity that occurred from the evolution of carbon footprint methodologies translating itself within SMEs as the domain of management or sustainability specialist (Ascui and Lovell 2011) (Bowen and Wittneben 2011).

The majority of Capital Cooling interviewees display sustainability positive orientation regarding customer interest in carbon footprint measurement with a close congruence in views between managers and non-technical staff whereby customers are perceived as considering carbon footprint measurement as a high profile issue and a tender requirement (Appendix 5 - Table 18). Management consider the increasing need to demonstrate appropriate carbon footprint methodology and supply chain pressure from corporate clients as evidence of continued customer interest in carbon reduction performance. Contemporary researchers agree with interviewee perceptions alluding to the increasing use of greenhouse gas measurement as a contractual requirement and a differentiating factor in supplier selection (Gell 2008) (Hoggart 2008). Capital Cooling Technical interviewee suggests that customers are particularly interested in the carbon reduction potential that may arise from carbon footprint measurement; however some management interviewees within the organisation are unaware of customer interest in carbon footprint measurement (Appendix 5 - Table 18). The Log House People carbon champion is *sustainability passive* in outlook perceiving carbon footprints to be a useful tool despite no customer expressions of interest whilst personally harbouring concerns as to the fairness and weighting of carbon footprint measurement (Appendix 5 - Table 18). Management interviewees of both Moffat Golf Club and Rabbits Trail Burners

demonstrate *sustainability passive* orientation perceiving limited interest in carbon footprint measurement from customers with the technical staff interviewee adopting a sustainability negative position by subscribing to the view that customers are motivated by self-interest focusing on affordability (Appendix 5 - Table 18).

Research by Edwards-Jones et. al. (2009) and Lindgreen et. al. (2008) both propose divergent views highlighting the growing importance of carbon footprint data in the purchasing decision process.

Capital Cooling interviewees overall perceive synergistic benefits to the organization demonstrating a *sustainability positive* orientation highlighting direct financial returns from recycling and improved operational efficiency through management oversight. However this *sustainability positive* orientation is not homogenous amongst interviewees with some managers adopting a *sustainability negative* orientation (Appendix 5 - Table 19).

Amongst the Log House People senior management team there is a perceived generational gap affecting the full incorporation of sustainability footprint techniques such as the carbon footprint despite the *sustainability positive* perceptual positioning of the firm's champion (Appendix 5 - Table 19).

Although eager to reap the benefits of lower operational costs that arise from carbon management senior management at the Moffat Golf Club display a *sustainability negative* orientation consider carbon footprint measurement as not a key issue.

Technical staff interviewee's adopt a *sustainability passive* deferring responsibility for carbon footprint implementation to senior management. This attitude may be reflective of senior management approach to carbon management or a default

position influenced by the technical staff interviewee's sub-ordinate role in the organisation (Appendix 5 - Table 19).

Rabbies Trail Burners management display *sustainability positive* orientation affirming the inclusion of carbon management issues at management meetings (Appendix 5 – Table 19).

Management interviewees overall displayed a *sustainability positive* orientation on regarding the discussion of sustainability footprints at management meetings being reflected in the general *sustainability positive* congruence amongst technical and non-technical (Appendix 5 - Table 19).

Policymakers are optimistic that the inclusion of carbon footprint measurement on the business agenda of SME management boards will assist in the transition from traditional “bottom-line” measures to “triple bottom-line” measures and support Scottish government carbon reduction initiatives (Head of Environmental Strategy 2011) (Head of the Environment 2011).

Porter and Kramer (2006) and Porter (2011) identified the need for *Responsive CSR* and *shared values* regarding the implementation of sustainability/CSR initiatives within the organisation. The disenfranchisement expressed by some management and technical interviewees regarding the discussion of carbon footprint data at management meetings may have arisen as a result of a failure to ably communicate or understand the importance *shared values* within organisation.

Management and staff interviewees across all four SMEs organisations are generally inclined toward a *sustainability negative* orientation suggesting a range of potential barriers to placing sustainability on the agenda such as financial costs, lack of

knowledge, sustainability competing with other issues on the agenda, time constraints, the transience of sustainability, inability to recoup carbon footprint costs, failure to recognise benefits, generational issues and communication (Appendix 5 - Table 20). Interestingly some interviewees mainly managers exhibit *sustainability positive* views perceiving that barriers to placing sustainability on the agenda are non-existent due to senior management commitment that transcends barriers, potential financial dividend from the sale of carbon credits and an environmental dividend from carbon sequestration (Forestry Commission 2012)(Appendix 5 -Table 20). Policymaker perceptions align with *sustainability negative* views of SME interviewees agreeing cost, communication time, resource constraints and culture as key barriers (CEO 2011).

O'Higgins (2010) endorses *sustainability positive* views conceiving the business as a social entity that surmounts or traverses boundaries should they exist. Lopez-Perez et. al. (2007) seemingly supports *sustainability negative* perceptual positioning stating a negative link between performance indicators and sustainability initiatives. The dominance of finance as the language of business has created a reliance on accounting data as the absolute measure of business performance with some commentators advocating sustainability and CSR initiatives should be expressed using accounting conventions to determine the profitability of these activities (Gladwin et al. 1995). The adaptation of carbon footprint measurement methodology to align with accounting practices may assist with the communication of carbon footprint methodology to the business community.

Capital Cooling management interviewees perceive carbon reporting as a requirement for product certification schemes as well as the Enhanced Capital

Allowance. Although a strongly *sustainability positive* orientation this view is not universally shared amongst all managers and staff of the organisation (*Appendix 5 - Table 21*). A *sustainability passive* position is adopted by some management and technical interviewees who consider reporting as a purely management or environmental specialist concern (*Appendix 5 - Table 21*). However Technical interviewees demonstrate a *sustainability passive* positioning being unaware of participation in carbon reporting schemes although suggesting that carbon reports are reviewed internally. Non-technical staff and management interviewees also display a *sustainability negative* orientation demonstrating lack of awareness of carbon reporting by the organisation (*Appendix 5 - Table 21*). Similar *sustainability negative* positioning persist with the management interviewees of the Log House People and the Moffat Golf Club who state non participation in carbon reporting schemes (*Appendix 5 - Table 21*). The management at Rabbies Trail Burners display an overtly *sustainability positive* orientation when confirming the firm's participation in carbon reporting schemes e.g. Mayday Network (*Appendix 5 - Table 21*).

*Sustainability positive* positioning of interviewees align with the recommendations of policymakers advocating participation in reporting schemes however SBC interviewees support *sustainability negative* orientations highlighting the proliferation of reporting schemes and the administrative burden incurred by SMEs (Head of Environment 2011)

Although this group of 4 SME firms is a small sample, 50% of these organisations actively report their carbon footprint this fact closely aligns with research by Kolk 2008 that European and Japanese firms display a tendency to actively report carbon performance with 58% of FTSE 250 firms generating carbon reports (IEMA 2008).



Capital Cooling management interviewees generally display a *sustainability positive* orientation confirming independent verification of product energy performance and acceptance of consultancy support to manage carbon emissions (*Appendix 5 - Table 22*). The non-technical interviewee also adopted a *sustainability positive* orientation perceiving external verification of the firm's carbon footprint. Management interviewees of the Log House People, Moffat Golf Club and Rabbits Trail Burners display *sustainability positive* orientation inferring verification is acquired through participation in reporting schemes e.g. Mayday Network (*Appendix 5 - Table 22*).

Despite this *sustainability positive* stance other Capital Cooling managers and Moffat Golf Club's Technical interviewee are *sustainability negative* expressing a lack of awareness of external verification (*Appendix 5 - Table 22*).

Policymakers agree with *sustainability positive* orientations recommending the use of both independent consultancy support and government advice in carbon footprint measurement (Head of Environmental Analysis 2011).

This *sustainability positive* orientation is convergent with studies conducted by Kolk 2008 that identified a penchant amongst European firms to seek verification or assurances for their sustainability/CSR reports.

There is an overriding *sustainability positive* perceptual positioning of carbon footprint management as being beneficial to SME's cost reduction, green credentials, strategic planning, benchmarking, measuring carbon reduction, influencing personal consumption patterns, assisting firms to be seen as being green, market leadership and marketing strategy (*Appendix - Table 23*). However the Log House People management interviewee expresses concern regarding the fairness and weighting of

carbon footprint methodology in terms of boundary setting (*Appendix - Table 23*). The *sustainability positive* perceptual positioning remains constant regardless of sector operational variations (*Appendix - Table 23*). A study conducted by IEMA (2010) suggests that cost savings, competitiveness and reputation are amongst the benefits that are derived from a pursuit of carbon footprint measurement stating observations that are similar to the sentiments expressed by interviewees (*Appendix - Table 23*). The policymaker sentiments also view sustainability footprint tools as useful to SME growth thereby converging with the *sustainability positive* orientation of SME interviewees perceiving sustainability footprints as an evolutionary mechanism for SMEs to measure Scope 3 emissions and tools for SMEs to reduce scope 1 and scope 2 emissions (CEO 2012).

Interviewee's perceptions align with contemporary views that suggest that product or service demand is affected by perceptions of its social and environmental sustainability in relation to customer expectations (Isaksson and Garvare 2003). As such external environmental pressures e.g. benchmarking contribute to the adoption of a strategic option (Bendell and Kearins 2004) (Adams and Zutshi 2004, Bond 2005, Ogrizek, 2002). Schecterle and Senxian (2008) converges with sentiments expressed by interviewees identifying the desire to be perceived as being "green" as a factor in the adoption of sustainability initiatives such as greenhouse gas measurement

The dual purpose nature of carbon footprint reporting is a recurring sentiment amongst management interviewees. Capital Cooling management interviewees exhibit sustainability positive intimating carbon footprint measurement as supporting public relations initiatives, marketing tool, highlighting opportunities for carbon footprint reduction and improving communication of environmental initiatives to stakeholders (*Appendix 5 - Table 24*).

Capital Cooling Technical interviewee displays sustainability positive perceptions convinced of the dual nature of greenhouse gas reporting however Moffat Golf Club's technical interviewee is sustainability negative in orientation unaware of the purpose of carbon footprint reporting (*Appendix 5 - Table 24*). Previous studies by (Naeem and Welford 2009) state a bias in favour of reporting greenhouse gas performance when compared to other sustainability indices such as safety.

Policymaker perceptions align with the sustainability positive orientation of the majority of SME interviewees however are torn between alternatives such as a phased or sector specific approach to carbon reporting as well as its overall purpose as an internal reporting tool to improve resource efficiency or external reporting to improve stakeholder awareness and report on carbon footprint (Head of Environmental Strategy 2011)

Beresford also agrees with interviewee perceptions by identifying information disclosure as a dimension of CSR including environment, equal opportunity, society, product and shareholders (Beresford 1973, 1974, 1975, 1976).

A divergence in perceptual positioning exists amongst interviewees with management of the Log House People, Rabbits Trail Burners and Moffat Golf Club displaying *sustainability negative* perceptual positioning as customers are considered as having limited interest in sustainability initiatives such as carbon footprint measurement (*Appendix 5 - Table 25*). Moffat Golf Club Technical interviewee exhibit a similar *sustainability negative* orientation viewing customers as motivated by self-interest (*Appendix 5 - Table 25*). *Sustainability negative* perceptual orientation is also adopted by Capital Cooling management who express limited awareness of customer opinions concerning carbon footprint initiatives (*Appendix 5 - Table 25*). However *sustainability positive* views abound amongst Capital Cooling employees intimating that customers regard carbon footprints a high profile issue, tender requirement, supply chain pressure from corporate clients, customers are interested in methods rather than figures and carbon footprint reduction(*Appendix 5 - Table 25*).

Research conducted by Pridahm (2001), Jayne and Skerratt (2003) support *sustainability positive* perceptual positioning that environmental issues are a consideration in investment decision making amongst fund managers with Amaeshi and Grayson (2008) postulating that sustainability and CSR issues are not rated in investment decision making. Lindgreen et. al. (2008) also supports *sustainability positive* orientations stating that sustainability initiatives create a USP in the minds of target customers. Similarly Bhattacharya and Sen (2004) observed that consumers are sensitive towards negative CSR/sustainability as both product quality and CSR initiatives in the purchasing decision. However internal and external benefits of CSR/sustainability initiatives such as carbon footprint measurement affected by factors such as marketing strategy, industry sector e.g. tobacco, existing reputation,

demographics, competitor CSR initiatives, segment characteristics and size (Bhattacharya and Sen 2004). Therefore accounting for the *sustainability positive* views expressed by Capital Cooling Ltd the SME with the highest turnover and personnel in this study.

The implementation of sustainability footprint methodology such as the carbon footprint provides a platform for dialogue with organisational stakeholders regarding sustainability performance. Stakeholder dialogue can be achieved through four main philosophical approaches:

1. Proactive dialogue and collaborative learning
2. stakeholder relationship management as part of a wider business resilience strategy
3. Engaging stakeholders as part of risk management planning
4. Gaining competitive advantage by developing stakeholder dialogue channels and communication programs (Van Hijstee and Glasbergen 2008)

The perceived lack of customer interest relegates sustainability initiatives to a component of the overall strategy and not driving force leading organisational strategic response.

As stakeholders clamour for companies to grow sustainably managers are propelled to adopt sustainability as a core business strategy by assimilating factors that drive sustainability performance and develop the operational capability to enhance corporate social performance

Management interviewees express differing views concerning the impact of carbon footprint measurement on product/service development. Capital Cooling management interviewees reveal *sustainability positive* positioning stating policy to market low environmental impact products , GHG Footprint reduction a influencing

factor in product development, Product Leadership, carbon footprint reduction initiating the use of zero ozone depleting and for further R&D in zero ozone depleting alternatives (*Appendix 5 -Table 26*).

Parallel *sustainability positive* views are expressed by Moffat Golf Club management interviewee perceiving carbon footprint measurement as a contributing factor in the decision to invest in building improvements and reductions raw material consumption (*Appendix 5 - Table 26*). Notwithstanding these benefits the Moffat Golf Club technical interviewee displays *sustainability negative* stating affordability as a key issue influencing the adoption of technical innovations (*Appendix 5 - Table 26*).

Management interviewees of the Log House People and Rabbits Trail Burners express a *sustainability negative* outlook suggesting disconnect between carbon footprint measurement and product development (*Appendix 5 - Table 26*).

Policymakers support sustainability positive perceptual orientations highlighting promotional effects through participation in environmental award schemes, differentiating factor in purchasing decisions that improves SME competitiveness (Head of Environmental Economic Analysis 2011) (Head of Environment 2011).

Prior studies by Van der Ven (2008) support *sustainability positive* attitudes identifying *ethical product differentiation* and *product stewardship* (Hart 1997) as a strategic approach to CSR/sustainability. Arguably sustainability reporting and strategies involving *ethical product differentiation* and *product stewardship* are unproven being the luxury of firms with near monopolistic profits, thus converging with *sustainability passive* sentiments (Hicks 2010).

Researchers also contend that dematerialisation, although readily quantifiable does not consequentially lead to improved material consumption (Heiskanen & Jalas 2003). However as indicated by interviewees investments in green innovation and sustainability initiatives are perceived to be a response to stakeholder pressures (Saha and Darnton 2005) (Christman 2000, James 2000, Wood 1991).

### **6.2.3 Environmental Impact**

Perceptions around carbon footprint as a KPI elicited the full spectrum of perceptual positioning from *sustainability positive* views by management linking lower carbon emissions with business growth, market leadership and carbon footprint monitoring also advocated by the Moffat Golf Club Technical interviewee underlining its importance as a KPI (*Appendix 5 - Table 27*).

Similar *sustainability positive* perceptual orientation is demonstrated by the Capital Cooling non-technical staff interviewee suggesting carbon footprint monitoring is a factor in the use of greenhouse gas measurement as a KPI (*Appendix 5 - Table 27*).

The Moffat Golf Club management interviewee subscribes to a *sustainability passive* orientation intimating cost reduction as a primary outcome of greenhouse gas measurement with carbon footprint reduction a secondary outcome (*Appendix 5 - Table 27*). *Sustainability negative* perceptual orientation is also displayed by a Capital Cooling management interviewee alluding to the time consuming nature of greenhouse gas measurement in a resource constrained SME operational environment (*Appendix 5 -Table 27*).

Policymakers overwhelmingly agree with *sustainability positive* perceptual orientations highlighting the importance of carbon footprint measurement in

achieving emissions reduction targets, an indicator of senior management performance, as well as a confirmation of senior management buy-in advocating its use as a KPI for SMEs in high carbon emission sectors (CEO 2011).

Critics agree with *sustainability negative* views indicating that the pursuit of sustainability/CSR indices that include carbon footprint may generate costs that are prohibitive except for firms with near monopolistic profits giving no indication of sustainability or unsustainability (Demos 2006)(Gray and Bebbington 2007)(Hicks 2010).

Researchers infer that greenhouse gas measurement does not aid in SWOT analysis nor incorporate the views of future generations requiring specialist skills which may be unavailable to SMEs (Holland 2003) (Kolk et al. 2008) (Ascui and Powell 2011).

Researchers that support *sustainability positive* views caution that sustainability indicators should be relevant and capture the environmental impact of a product/service during its value creation process (Fiskel, McDaniel and Spitzley 1998).

Respondents are overwhelmingly *sustainability positive* regarding the influence of carbon footprint methodology on the understanding of environmental impacts (*Appendix 5 - Table 28*). Management interviewees highlight improved carbon and environmental impact awareness, carbon impact indicator and adoption of eco-friendly practices e.g. green fleet policies. Technical and non-technical interviewees also draw attention to the contribution of carbon footprint methodology to environmental impact awareness and the adoption of eco-friendly practices (*Appendix 5 - Table 28*).



Contemporary research supports *sustainability positive* positioning of respondents as such businesses must seek to measure their carbon footprint, understand their carbon related risks, build new competitive strategies to decarbonise processes and implement carbon related abatement strategies more efficiently than competitors. (Lash and Wellington 2007) (Mackenzie et. al. 2009)

Policymakers share the *sustainability positive* perceptual orientation of SME interviewees highlighting the capability of carbon footprint measurement to provide insight into high carbon emission activity thereby acting as a catalyst for emissions reduction. (Head of Environmental Economic Analysis 2011)

Alternatively critics of carbon footprint measurement contend greenhouse gas measurement record historical impact, providing limited input into the SWOT analysis of strategic risks faced by firms due to climate change or incorporate the views of future generations, the use of tools such as LCA to greenhouse gas measurement requires expertise which may be outwit the capability of SME organisations (Holland 2003) (Kolk et al. 2008) (Ascui and Powell 2011).

#### **6.2.4 Stakeholder Impact**

The SME firms within this study have all implemented GHG measurement for at least one year. Therefore unsurprisingly nearly all respondents exhibit *sustainability positive* orientations (*Appendix 5 - Table 29*). Management interviewees affirm longer organisational involvement mainly due to greater affinity with the process of greenhouse gas measurement (*Appendix 5 - Table 29*). Unpredictably management interviewees also display *sustainability negative* perceptions professing lack of awareness of company implementation timelines (*Appendix 5 -Table 29*). Capital

Cooling technical and non-technical interviewees also demonstrate *sustainability positive* perceptual orientation suggesting organisational commitment to carbon footprint measurement for at least one year with the Moffat Golf Club's non-technical interviewee considering implementation timeline issues as being the domain of senior management (*Appendix 5 - Table 29*) despite transparency in corporate reporting is a much lauded trait of European and Japanese firms (Kolk 2008). The absence of a consensus based approach to management in the UK businesses compared to corporate culture that exists in Germany and Japan may have been a contributing factor in marked differences in responses amongst interviewees indicating a lack of timely communication of sustainable initiatives to internal stakeholders (Haake 2002). Implementation of voluntary reporting and participation in voluntary sustainability reporting schemes are pursued by organisations due to fear of direct legislative action or reputation damage arising from non-disclosure or poor performance (Kolk et. al. 2008). Therefore external communication usurps the need for timely and effective communication with internal stakeholders. The long time horizon between the communication of sustainability initiatives and the achievement of outcomes makes the determination of sustainability effectiveness challenging (Epstein and Roy 2001).

Contributions to the GHG measurement exercise within SME firms are described by interviewees from mainly a task oriented perspective. Nevertheless interviewees exhibit *sustainability positive* orientations with management respondents keen to stress their contributions through recycling, emissions reduction, environmental aspect monitoring, marketing, supervision and engineering design (*Appendix 5 - Table 30*).

Technical and non-technical interviewees also express similar views recycling, engineering efficiency and environmental aspect monitoring (*Appendix 5 - Table 30*). Despite these contributions some Capital Cooling management interviewees exhibit *sustainability negative* perceptual orientation being unaware of their specific role in the carbon footprint measurement exercise (*Appendix 5 - Table 30*).

Individual disconnect from the environment is one of the main features of rapid globalisation, this disconnection affects not only perceptions of the natural environment as well as the development of innovations to solve environmental issues such as carbon emissions and personal environmental impact i.e. individual carbon footprints.

This disquiet has created apathy amongst individuals contributing to the potential environmental consequence of irreversible climate change despite the immediate cessation of carbon emissions (CDP Project 2012)

Interviewees consider policymaking institutions have a vital role to play in the adoption of carbon footprint measurement by SMEs. Management interviewees' exhibit *sustainability positive* orientations stressing the need for fair competition by including carbon footprint data as a criterion for access to grant funding, tax relief for SMEs that participate in voluntary carbon footprint reporting schemes, mandatory guidelines for SMEs, legislation fines, carbon emissions league table and access to technical information to assist carbon footprint measurement implementation (*Appendix 5 - Table 31*). Technical and non-technical interviewees express similar sentiments the need for grant funding, tax incentives for voluntary GHG measurement and provision of technical information (*Appendix 5 - Table 31*).

Government policy advisor recommendations suggest that SMEs must be proactive by seeking to understand government guidance on carbon footprint measurement where necessary being supported by external consultancy support (Head of Environmental Economic Analysis 2011). However the majority of policymakers interviewed support *sustainability positive* perceptual orientations exhibited by SME respondents emphasising policymaker's role in promoting best practices, inspection, establishing carbon emission targets provision of guidance and clarifying performance expectations (Head of Environmental Strategy 2011).

Large organizations have been the beneficiaries of favourable UK greenhouse gas policy initiatives with limited support provided to assist SME's in greenhouse gas emissions reporting. Therefore three policymaking options are available to policymaking institutions viz. mandatory free energy audits of SMEs, free energy assistance from local authority or regional SME support organizations and competitive energy pricing schemes to encourage energy efficiency measures (Bradford and Fraser 2008). Deployment of equitable policy options can ameliorate the effects of firm size, competitive position and energy intensity that influence the rate of adoption of sustainability initiatives and perceptions of environmental policy (de Groot et al 2001).

Cost reduction is has arisen as the key factor driving the implementation of carbon footprint measurement. Interviewees generally adopt *sustainability positive* attitudes with management interviewees indicating the potential for future climate change legislation, senior management commitment, potential operational efficiency gains, energy efficiency, carbon measurement program participation, CSR, emissions reduction and continuous learning as drivers for carbon footprint implementation

(Appendix 5 - Table 32). Technical and non-technical interviewees also display *sustainability positive* orientation highlighting the importance of senior management commitment, waste reduction and the need to pre-empt future greenhouse gas legislation carbon management driving factors (Appendix 5 - Table 32). In spite of these benefits not all Capital Cooling management interviewees are fully aware of the drivers influencing carbon footprint measurement and as a result exhibit a *sustainability negative* perceptual orientation (Appendix 5 -Table 32).

Policymakers' sentiments correspond with the *sustainability positive* orientation of SME interviewees cost reduction, employee engagement, market leadership and CSR.

Aligned to the *sustainability positive* sentiments a study into supply chains of best practices identified three reasons for the pursuit of “green” initiatives as firstly “desire to be a thought leader for green/sustainability” secondly “rising cost of energy/fuel” and thirdly “competitive advantage/differentiator” (Schechterle and Senxian 2008).

The adoption of sustainability initiatives such as requiring the provision of carbon footprint data reduces exposure of firms to regulatory, litigation and reputation risks arising from operational factors which are taken into consideration account by institutional investors such as pension funds as detailed in the Pension Act 1995 (Pridahm 2001) (Jayne and Skerratt 2003) (Lash and Wellington 2007) (Saha and Darnton 2005). The exposure to legal and regulatory risks increases due to the cross border nature of global business that necessitates that firms pursue the higher purpose of corporate citizenship (Matten and Crane 2005).

### 6.3 Conclusion

Arising from the analysis of interviewee responses there is a convergence in perception of the contribution of sustainability footprint initiatives such as the carbon footprint to business across the four dimensions *Cost Impact*, *Innovation Impact*, *Environmental Impact* and *Stakeholder Impact* in the following areas *Process Improvement*, *Cost Reduction*, *Corporate Social Responsibility* and *Market Leadership* (Table 6.1)

Cost Impact	Innovation Impact	Environmental Impact	Stakeholder Impact
<ul style="list-style-type: none"> <li>• <b>Cost Reduction</b></li> <li>• <b>Process Improvement</b></li> <li>• <b>Market Leadership</b></li> <li>• Financial Risk Management</li> <li>• Legal Risk Management</li> <li>• Environmental Risk Management</li> <li>• Customer Requirement</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Process Improvement</b></li> <li>• <b>Market Leadership</b></li> <li>• <b>Corporate Social Responsibility</b></li> <li>• Multipurpose role of sustainability footprint</li> <li>• Benchmarking</li> <li>• Performance measurement tool</li> <li>• Financial returns from recycling</li> <li>• Catalyst for further R&amp;D</li> <li>• To be seen as being green</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Market Leadership</b></li> <li>• Carbon footprint monitoring</li> <li>• Relationship between carbon footprint and climate change</li> <li>• Environmental impact awareness</li> <li>• Carbon impact indicator</li> <li>• Carbon footprint an important KPI</li> <li>• Emissions Reduction</li> <li>• Sustainable development</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Cost Reduction</b></li> <li>• <b>Process Improvement</b></li> <li>• <b>Market Leadership</b></li> <li>• <b>Corporate Social Responsibility</b></li> <li>• Contributes to a “Caring organisation”</li> <li>• Strategic focus</li> <li>• Carbon footprint considered a good investment</li> </ul>

Table 6.1 Interviewee perceptions in relation to research themes

Analysis of interviewee perceptions also identified new dimensions such as Financial returns from recycling, *catalyst for further R&D*, *to be seen as being green* and the

*development of a caring organisation* thereby linking the adoption of sustainability initiatives both financial success and a *caring organisation* analogous to earlier concepts of good *global corporate citizenship* (Pies et al. 2010). Overall there are similarities between SME *sustainability positive* perceptual positioning and policymaking sentiments which illustrates the effect of the policymaking context on managerial and personal decisions regarding sustainability.

Despite these similarities there is a distinct bias towards carbon footprint measurement in relation to other footprint methodologies such e.g. water footprint. This state of “*carbon myopia*” creates a limited view of environmental and social impact of operational activities and is asymptomatic of a general lack of awareness amongst SME interviewees of water footprint and social footprint methodologies.

The *carbon myopic* focus of SME sustainability initiatives translates into *sustainability negative* perceptual positioning regarding the importance of management water consumption and social impacts as the ability of SMEs to influence social change is considered to be negligible. *Sustainability negative* perceptual views are expressed regarding the cost and manpower utilized in sustainability footprint measurement with some interviewees suggesting customers are interested in affordability rather than environmental friendliness.

*Table 6.2* illustrates the perceived challenges and critical success factors in the implementation sustainability footprint.

<b>Challenges</b>	<b>Critical Success Factors</b>
Sustainability footprint considered a luxury	Sustainability footprint considered a useful tool
Sustainability Footprint reduction not cost neutral	Cost reduction imperative
Difficulties in determining implementation cost	Customer requirement
Lack of awareness of Sustainability Footprint measurement	Multi-purpose use of CO2 reporting
Lack of knowledge	Inclusion of GHG measurement as a KPI
Sustainability competing with other issues on the agenda	Use of sustainability footprints as an impact indicator
Time constraints	
Sustainability is a transient goal	
Inability to recoup carbon footprint costs	
Poor implementation	
Manpower	
Perception of limited customer interest in sustainability footprints	
CO2 reporting considered the domain of environmentalist and senior management	

**Table 6.2 Sustainability Footprints Challenges and Critical Success Factors**

Critically interviewees state *sustainability negative* views regarding *sustainability competing with other issues on the agenda, time constraints, the transience of sustainability, inability to recoup carbon footprint costs, failure to recognise benefits, generational issues and communication* as barriers to sustainability footprint measurement adoption.



## **Chapter 7 Conclusion**

## 7.0 Introduction

The evolution of the concept of CSR and Sustainability from Sustainability/CSR Awareness to Sustainability/CSR Integration (*Figure 2.1*) reflects global society's concern over increasing dependence on fossil fuels to generate the energy that powers our homes and businesses the effects of which has contributed to climate change. This consumption of fossil fuels was created by our fascination and fixation on the internal combustion engine a contributing factor to global industrialisation. Growing industrialisation of global society has created both a social and agricultural revolution such that we now live further from our natural resources such as food, water - an increasing urbanisation. This distancing of human beings from the resources upon which our lives are dependent has led to the desensitising of individuals regarding the impact of their lifestyles, businesses on our planet. Within this mix there have emerged social inequities between the affluent nations and less affluent nations with attitudes to sustainability influenced by cultural factors. Forming the basis for the sustainability/CSR dilemma i.e. profits or the environment whereby firms are faced with overcoming the *cultural, philosophical* and *strategic* challenges.

To address the issue of measuring impact of business (and indirectly our lifestyles) on the planet, practitioners and academics have devised the carbon footprint, social footprint and water footprint concepts.

The key issue with the use of sustainability indicators such as the carbon footprint is the inability of such tools to confirm whether an organisation is sustainable whereby SMEs are unable to quantify benefits and justify the costs of carbon footprints (Hicks 2010, Demos 2006). Fundamental to the mainstreaming of sustainability

footprints is the verification of sustainability reports to instil confidence in markets and society at large, regarding environmental claims (Ball et al. 2000).

Although a valid criticism of sustainability footprint tools it is quite a limited view of the process of footprint measurement which although cannot claim to speak for future generations yet it reveals opportunities for organisations to reduce immediate impact either through resource optimisation, reduction or substitution with less harmful alternatives.

The use of the four SME case studies and the development of the *conceptual framework* (Figure 3.2) assisted in exploring of the aim of “*Develop a conceptual framework within which perceptions of sustainability footprints can be understood and sustainability footprint methodology utilized within Scottish SMEs*” and achievement of the first research objective i.e. *to critically analyse the context, perceptions of contribution of sustainability footprint tools to Scottish SMEs* highlighted the rationale for the adoption of sustainability footprints methodology by SMEs and identifying the business case for implementation with interviewees expressing improved environmental risk reduction as a result of sustainability footprints implementation.

This has contributed to environmental impacts being viewed from the lens of carbon emissions resulting in “*carbon myopia*” an exclusive focus on carbon footprint measurement. Therefore there has arisen a limited understanding of water footprint methodology and impacts as well as social footprint measurement due to a perceived lack of influence over social issues.

Amongst case study SMEs the development of carbon policy is a reaction to external stimuli arising from government policy and supply chain pressure necessitating reliance on third party consultancy support for carbon footprint measurement.

Sustainability footprints methodology is interpreted from the perspectives of *continual improvement, recycling, carbon reduction, reduced fuel consumption, emissions reduction and monitoring.*

Divergent views emerge regarding the relationship between carbon footprint and climate change. Emissions reduction targets amongst SMEs are not explicit nor the use of carbon footprint measurement mandatory for sub-contractor or supplier pre-qualification.

Carbon footprint measurement is considered both a useful tool and a good investment and a value added activity contributing to *cost reduction, marketing leadership, differentiation, strategic focus, reduced consumption, emissions reduction, carbon impact awareness and CSR.*

Arising from the pursuit of the second objective i.e. *to identify the challenges and critical success factors (CSFs) in the use of sustainability footprint methodology within Scottish SMEs*; interviewees draw attention to the differing views regarding the impact of the economy on GHG emissions.

Perceptions of carbon footprint measurement costs are ameliorated by *access to free consultancy support or potential financial benefit* e.g. cost reduction or income generation. SMEs implement carbon footprint measurement as a result of *legislative pressure, benchmarking, CSR, cost reduction, senior management, marketing, performance measurement, process improvement, promote environmental*

*achievements, to be seen as being green, care for the environment and environmental impact awareness.*

There is a general lack of awareness regarding GHG measurement mechanisms as well as limited customer interest in GHG measurement except in the form of supply chain pressure which is perceived to be an influencing factor in the adoption of carbon footprints amongst SMEs despite perceived limited contribution to new product/ service development. Barriers to carbon footprint measurement amongst SMEs are *cost, communication, lack of knowledge, time, manpower, equipment availability and sustainability being a transient goal* despite *senior management commitment* being an enabling factor. Poor internal communication of external GHG reporting and a limited understanding of GHG verification amongst SMEs are challenges that prevent SMEs from realising the benefits arising from GHG measurement. Carbon footprint is considered by interviewees as a useful tool for *benchmarking, marketing leadership, cost reduction, green credentials, strategic planning* and a good KPI improving understanding of environmental impacts.

Conflicting views emerge regarding carbon footprint being an item for management discussion. GHG reports are both an internal and external reporting tool. SME interviewees suggest policymaking institutions can contribute to the uptake of GHG measurement by SMES through ensuring *fair competition, access to grants, mandatory guidelines for SMEs, tax incentives, fines, legislation, emissions league table* and *pre-qualification criteria for government contracts*.

Drivers for GHG measurement amongst SMES are to pre-empt *legislation, process improvement, cost reduction, senior management commitment, emissions reduction, CSR and waste reduction*.

## 7.1 Contributions to knowledge

Prior studies have identified that SMEs are unable to quantify the benefits of sustainability footprints which provide data regarding historical impacts and in essence do not predict the future. This largely voluntary exercise requires the allocation of scarce organisational resources is cost prohibitive with prior capability be a prerequisite for successful implementation. Therefore to aid SMEs in developing and measuring sustainability objectives that are pertinent to their specific organisation context and to define the practical relevance of *philosophical, cultural* and *strategic* challenges on organisation's Sustainable Development the **Sustainable Strategic Growth Framework** was developed and is based on the implementation approaches adopted by the case study SMES and on the following principles;

- *do no harm, engage and listen to all stakeholders (White 2009) (Lacy et al 2009)*
- *there are no barriers or limits to sustainable growth only challenges - sustainability is an ever changing goal (Weizsacker von et al. 2010) (McDonough and Braungart 2002)*
- *there is no "silver bullet"- sustainability strategy is ever evolving to meet society's present and future expectations (White 2009) (Flower 2009)*
- *Sustainability is measurable - use both sustainability footprints and traditional financial indicators to benchmark sustainable growth and performance (Holland 2003) (Villalonga 2004) (Lueneburger and Goleman 2010).*

Using these principles and my research findings a practical framework proposed for sustainability strategy deployment within small to medium sized enterprise (SMEs). The following is a diagrammatic illustration of the **Sustainable Strategic Growth Framework** (*Figure 7.1*) which incorporates existing theory from identified from the literature review to describe the possibilities of the application of technology, research and development to develop products and services that increases resource efficiency and improves carbon productivity (Enkvist et al. 2008). Building on existing literature reviewed in *Chapter 2* the framework aims to guide firms along the process of decoupling strategic growth from greenhouse gas emissions whilst fostering the implementation of strategic and social objectives that yield value to the business and its stakeholders through the implementation of five stages:

- **Learn**
- **Develop**
- **Implement**
- **Optimise**
- **Sustain**

The SME case study adoption approaches discussed in *Chapter 5* mirrors each of the five key stages of the Sustainable Strategic Growth Model. Operational expression is given to each stage of the **Sustainable Strategic Growth Framework** as follows:

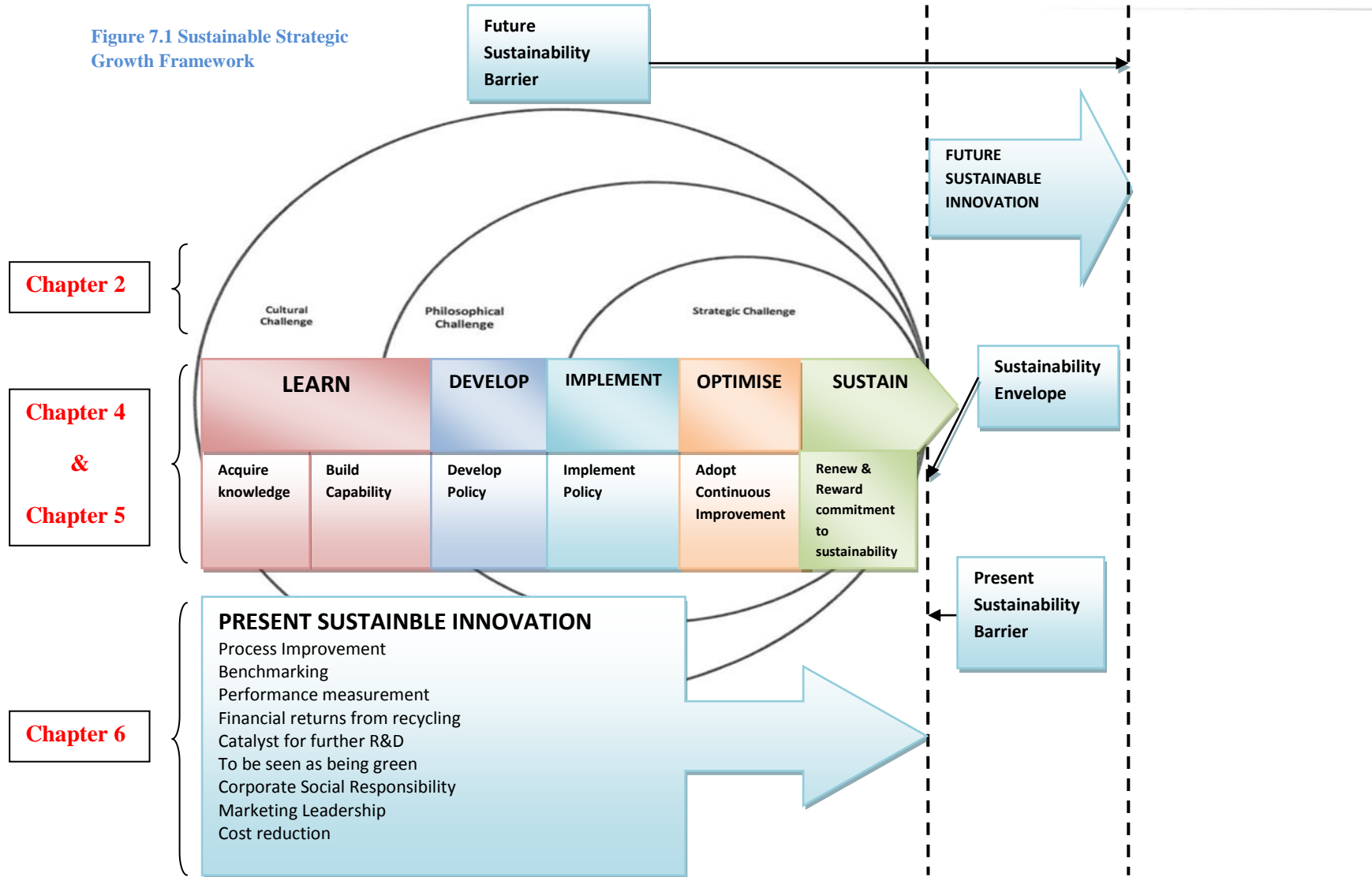
**Learn** consists of two key constructs *Acquire knowledge* and *Build capability*

*Acquire Knowledge* – a review of all potential external risks and opportunities arising from actions or demands from strategic groups such as customers,

government, nongovernmental organisations, competitors, companies in other industrial sectors, industry groups, business support organisations which can affect the present and future sustainable growth of the business (*Figure 7.1*)



Figure 7.1 Sustainable Strategic Growth Framework



*Build capability* - a review of the all the products, processes, human resources and infrastructure within the direct control of the firm e.g. employee and information technology systems to determine competence, capability and suitability of these assets to sustain growth (Finn et.al 2006). This necessitates examination of all existing best practice, standards and legislation in sustainability and CSR e.g. ISO 14001. Benchmarking existing organisational arrangements against current best practice to determine performance gaps and assist the organisation in developing business models specific to its competitive situation. The process of assimilating information gathered from to generate organisational goals, structure and responsibilities in regards to sustainability pertinent to an organisation and its competitive landscape. This internalisation and assimilation aspect is critical to the success of the program as it defines the strategic boundaries in which the organisation seeks to compete effectively either through the development of new products, services and process, modification of existing products, services and process, divestment of existing products portfolios and entering new markets (*Figure 7.1*).

## **Develop**

*Develop Policy* – a consultative process of translating goals into policy statements seeking to identify sustainability benchmarks that are relevant to the organisation in relation to its size and competitive environment. Consultation may be initiated by *passive* stakeholder engagement in the form of employee surveys and customer satisfaction surveys or *active* stakeholder engagement by the inclusion of customer representatives on decision making teams (*Figure 7.1*).

**Implement** involves the commitment of senior management to engage stakeholders in embedding sustainability policy.

*Implement Policy* – a process of disseminating sustainability policy across all operations within the organisation utilising tools such as training, instruction, supervision, review and reporting to engage stakeholder’s emotional commitment to the organisations sustainability policy. This emotional commitment of stakeholders is critical to the success of sustainability policy implementation as it aligns individual stakeholder motivations with the sustainable goals of the organisation. *Sustainability Policy Implementation* involves the development of departmental or site specific procedures that are aligned to the organisation’s sustainability policy (Figure 7.1).

### **Optimise**

*Adopt continuous improvement* – there are immediate measurable benefits to the company and society from sustainability initiatives like improved reputation, environmental impact reduction e.g. reduced greenhouse gas emissions due to energy purchases from renewable suppliers, safety/employee wellbeing programs; resource efficiencies e.g. waste recycling and cost savings that accrue from sustainability initiatives. Value creation at this stage is generated from “greening” strategies with the focus on current products, processes and stakeholders (Hart and Milstein 1999) (Tibbs 2007) (Figure 7.1).

### **Sustain**

*Renew and reward commitment to sustainability* – as the maximum economic, social and environmental returns achievable by the organisation and society from a given

strategy using existing technology and resources, the firm approaches a *Sustainability Barrier*. Beyond which further sustainable growth can be achieved by reinvigorating stakeholders to participate in new low carbon initiatives, supported by investment in training, new technology e.g. wind turbine and solar power, processes, systems e.g. IT video conferencing facilities and R&D. At this stage creative destruction must occur as management and stakeholders review and implement each stage of the **Sustainable Strategic Growth Framework** ; with decision making focused on emerging opportunities to exploit new low carbon technology, enter new markets and engage stakeholders (Hart and Milstein 1999) (*Figure 7.1*). Therefore *telos* or purpose of management is the development of sustainability strategy that continually move organisations beyond the *Sustainability Barrier* to realise the benefits of future growth ensuring the survival of the organisation and maintain both its economic and social value.

*Sustainable Strategic Growth Framework* illustrates an incremental increase in sustainable performance as result of the assimilation and implementation of sustainability practices which enhances organisational knowledge and builds sustainability competencies. Basically as the organisation implements the framework, develops policies, procedures its sustainability knowledge and competencies increases which contribute to organisational resilience to combat the “10 sustainability mega forces” facing business e.g. *Climate Change* (KPMG 2012) (*Figure 7.1*).

Each stage of the framework is influenced by the outputs of previous stages; process synergy is achieved when each stage intersects i.e. the firm moves through the five stages *Learn, Develop Implement, Optimise* and *Sustain* a new low carbon state is

created primed for further investment to generate future sustainable growth. The role of technology investment in generating future sustainable growth is critical if organisations are to succeed in the emerging new global green economy and benefit from the ever growing contribution of university research centres in enhancing long term energy security and prosperity (*Figure 7.1*). Using the model as a framework to adopt CSR initiatives will improve both CSR performance and perception of CSR within SMEs (Dilling 2011). As well as improved CSR performance *Chapter 6* highlights the utilisation of **Sustainable Strategic Growth Framework** as contributing to *Process Improvement, Benchmarking, Performance measurement, provides Financial returns from recycling, Catalyst for further R&D, to be seen as being green, Corporate Social Responsibility, Marketing Leadership and Cost reduction*. Evident from this research each case study organisation developed a culture of continuous learning leveraging knowledge on carbon footprint measurement from both governmental sources and NGO's such as the Energy Savings Trust (*Chapter 6*). Critically this newly acquired knowledge was not retained amongst senior management but disseminated to build consensus concerning the importance of sustainability initiatives, environmental initiatives and capability to implement sustainable change within the organisation (*Chapter 5*). The sensitisation of employees towards environmental concerns laid the foundation for surmounting *cultural challenge* and *philosophical challenges* (*Chapter 2*).

The development and implementation of carbon management and CSR policies expanded the boundaries providing the quality ethos to move beyond customer satisfaction to include the 'needs' of humanity, both present and future. Stimulating innovation that reduced cost provided new revenue streams and created a USP to market the business and its products.

## 7.2 Implications for Future research

The existence of limited research into the application of sustainability footprints by SMEs provides interesting opportunities for further research. Specifically to counter arguments regarding generalizability of findings further quantitative or qualitative research can be conducted using a larger sample of SME organisations as well as aid in the application of advanced statistical techniques. Quantitative research studies may seek to confirm the link between investments in sustainability footprints and SME profitability.

Acknowledging that the political context is a contributing factor in the uptake of sustainability footprints by SMEs, pertinent studies can be conducted to identify if perceptions are homogenous across countries.

Although the **Sustainable Strategic Growth Framework** was developed from research into SME case study organisations there is potential for further research into its applicability to large companies and not for profit organisations. In addition to company typology, the impact of contextual variances such as culture on the effectiveness of the **Sustainable Strategic Growth Framework** maybe topic for future research.

Specifically due to the proliferation of reporting schemes e.g. *Mayday Network* there is a need for research into the regulation of sustainability reporting which is critical if we are to appreciate the true costs of SME investment decisions in sustainability footprint measurements and build confidence in the value of reporting indices, thereby assisting SMEs in making the quantum leap from perceiving an environmental impact as a risk rather than a strategic opportunity.

### 7.3 Implications for Practice

The findings illustrate the overarching influence that perceptions play in the adoption of sustainability initiatives such as the carbon footprint creating ambivalence not only amongst senior management but also stakeholders e.g. employees. This ambivalence is contextual and is dependent on the perceptual proximity of the individual to the issue and varies depending on the context.

The nature of this ambivalence impacts on the adoption of sustainability initiatives by senior management and the buy-in into sustainability strategy by employees/stakeholders. Therefore the pursuit of strategy or the adoption of strategic alternatives may not be based on sustainability principles due to the perceptual orientation of the strategist i.e. *sustainability positive*, *sustainability passive* or *sustainability negative*.

Likewise stakeholder support for sustainability initiatives such as carbon emission reduction may not be forthcoming depending on perceptual orientation. Managers should seek to encourage stakeholders e.g. to remain *sustainability positive* in orientation through appropriate training, instruction, supervision and the promotion of proactive learning (Van Hijstee and Glasbergen 2008).

As evident from this research each case study organisation developed a culture of continuous learning leveraging knowledge on carbon footprint measurement from both governmental sources and NGO's such as the Energy Savings Trust, British Safety Council, Chartered Management Institute and IEMA.

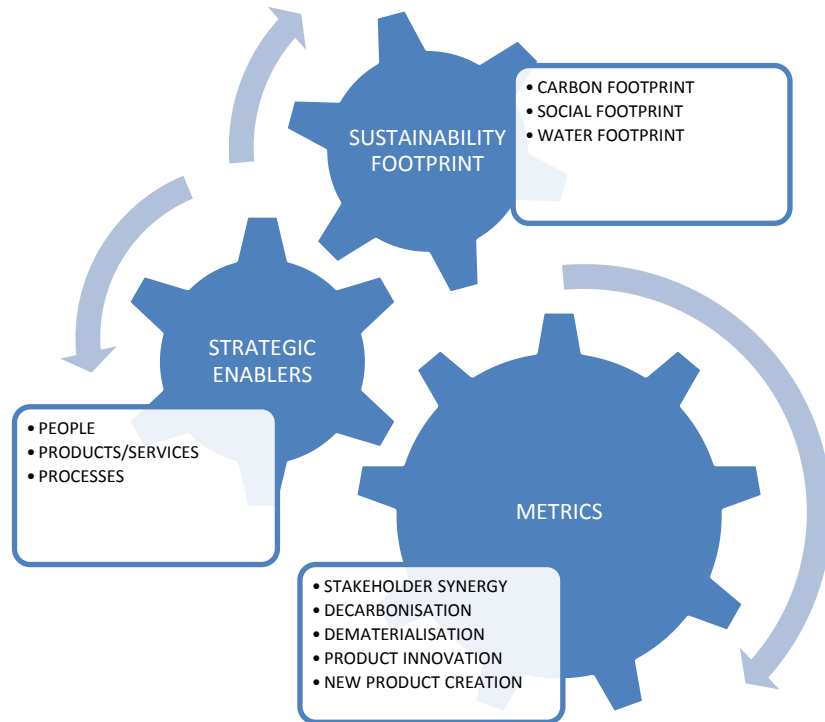
Critically this newly acquired knowledge was not retained amongst senior management but disseminated to build consensus concerning the importance of sustainability initiatives, environmental initiatives and capability to implement sustainable change within the organisation. The sensitisation of employees towards environmental concerns laid the foundation for surmounting *cultural challenge*, *philosophical challenges* and *strategic challenges*.

The cost of GHG measurement is not perceived as being prohibitive due to the availability of NGO consultancy support, yet interviewees justify GHG reporting as mechanism to reduce operating cost and improve performance.

Strategically SMEs must develop internal capabilities to measure not only their carbon footprint but also other methodologies e.g. water footprint.

Each footprint methodology yields its own benefits but when amalgamated – the **Sustainability Footprints** and applied to **Strategic Enablers** - *people, products/services, processes* can lead to *stakeholder synergy, decarbonisation, dematerialisation, product innovation and new product creation* - the new **metrics** of sustainable strategic growth (*Figure 7.2*).





**Figure 7.2 Sustainability Footprint Cycle**

The development and implementation of carbon management and CSR policies expanded the boundaries the quality ethos to move beyond customer satisfaction to include the 'needs' of humanity, both present and future. Stimulating innovation that reduced cost provided new revenue streams and created a USP that markets the business and its products.

#### **7.4 Implications for Policymakers**

SME participants endorse the active involvement of government policymaking institutions in promoting carbon reduction amongst SMEs. The looming threat of further GHG regulation is a driving factor in the adoption of carbon footprint methodologies. There is a perception of the need to create conditions that promote *fair competition* in terms of tax incentives for carbon emissions measurement and reduction and *access to grants* that support carbon management initiatives.

*Mandatory guidelines for SMEs* are recommended by participants as the language and communication of GHG measurement is tailored for larger organisations may at times prove illusory for small organisations. The institution of *emissions league table* and *finer* for poor carbon management though punitive may encourage the adoption of sustainability footprint methodology. The stipulation of carbon footprint reporting as *pre-qualification criteria* for government tenders is considered a useful instrument in the promotion of carbon management amongst SMEs. The use of sustainability footprints by SMEs will improve the accuracy macroeconomic data regarding the true scale of greenhouse gas emissions and so that effective measures can be designed to combat against environmental impact arising from economic growth.

## **7.5 Research Limitations**

The four SME case study organisations provide insight regarding the complexity of sustainability footprint implementation. As phenomenon sustainability footprints are tools to translate *risk* from environmental degradation, creating *shared value* with stakeholders and incorporating notions of *Natural Resource Based View* in the form of a single indicator of performance.

This research demonstrates that views of the multi-faceted nature of sustainability affects perceptions of the utility of a single tool such as GHG measurement to convey social, environmental and economic impact. Although the inference has been drawn it is not generalizable as only a small sample of self-selected SMEs formed the research study (Yin 2003).

The political context cannot be discounted as the Scottish Government, UK climate change policies and EU Directives all interplay to provide an operational landscape that is supportive of sustainability footprint measurement initiatives. Within this fertile ground SMEs can obtain free carbon management support consultancy from NGOs. Therefore should the context change perceptions of sustainability footprints may be influenced. However techniques such as triangulation and the use of data from multiple sources improve research validity despite contextual effects.

Comparative analysis of GHG emissions data amongst SMEs within this research study may be considered relevant but albeit a redundant activity due to differences relative firm size, dissimilarity in operational process and reporting boundary definitions.

## **7.6 Conclusions**

The research study identifies that individuals exhibit ambivalence “love” and “hate” relationship with sustainability footprints. This ambivalence is exacerbated by the nature of issues such as greenhouse gas emissions which are an altogether invisible subject. As a result the challenge for managers is to reduce ambivalence amongst stakeholders thereby ensuring the adoption of sustainable development within the organisation. The **Sustainable Strategic Growth Framework** is a five stage approach is proposed as option to enhance stakeholder engagement and embed sustainability best practice involving *Learn, Develop Implement, Optimise* and *Sustain* that may assist firms to achieve sustainable innovation *Process Improvement, Benchmarking, Performance measurement, provides Financial returns from recycling, Catalyst for further R&D, to be seen as being green, Corporate Social Responsibility, Marketing Leadership* and *Cost reduction*.

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## **Appendices**

## **Appendix 1 Sustainability Footprint Metrics and Measurement Tools**

## **Kyoto Protocol and Greenhouse Gases**

The effect of the consumption of fossil fuels and its potential impact on the global atmospheric carbon cycle was first identified by Arvid Hogbom a Swedish geologist in 1895 (Ascui and Lovell, 2011). His postulations were later expanded by his fellow compatriot Svante Arrhenius based on his awareness of only two greenhouse gases carbon dioxide and water vapour forecasted that continued combustion of fossil fuels may cause the warming of the earth's atmosphere as well as the increase in global temperatures by 5.7°C arising from the doubling of greenhouse gas concentrations, however falsely believing that such effects would not occur for a few millennia (Ascui and Lovell, 2011) (Arrhenius, 1896). The ramifications of these early scientific predictions were not fully comprehended or largely ignored until research in the 1960's using modern test instruments calculated that existing greenhouse gas emissions exceed pre- industrial levels (Ascui and Lovell, 2011). With the burgeoning scientific evidence came increased interest from international policymakers initially through the introduction of UN General Assembly Resolution 43/53 in 1988 identifying that climate change is a "common concern for mankind" and Resolution 45/212 in 1990 which was instrumental in the creation of the UN Framework Convention on Climate Change (UNFCCC 2012a) (UN 1988) (UN 1990). Instrumental to the now politicised climate change awareness debate is the theorising of *global warming potential (GWP)* a comparative index that highlights the global warming impact of individual greenhouse gases to enable cost effective mitigation strategies to be implemented (Ascui and Lovell, 2011).

The concept of greenhouse gas emissions gained prominence with the ratification of the Kyoto Convention in 1992, this document encourages international governments



to accept their responsibility to combat the effects of climate change by acknowledging “common but differentiated responsibilities” between developed and developing economies (UNFCCC, 2012a). Government policymaking actions will involve development of climate change policies, dissemination of information regarding greenhouse gas measurement mitigation and adaptation best practice (UNFCCC, 2012a).

The Kyoto Protocol differs from the Kyoto Convention by committing 37 key industrialised nations and the European Community to binding greenhouse gas emissions targets (UNFCCC, 2012b). The burden however for climate change reduction being borne by developed economies arising from prior industrialisation. Specifically the Kyoto Protocol targets emissions reductions for *carbon dioxide* (CO<sub>2</sub>), *methane* (CH<sub>4</sub>), *nitrous oxide* (N<sub>2</sub>O), *hydrofluorocarbons* (HFCs), *perfluorocarbons* (PFCs) and *sulphur hexafluoride* (SF<sub>6</sub>) now collectively known as greenhouse gases (GHG) (Reilly et. al. 2002). Emissions targets on average amount to 5% on 1990 levels over a five year reporting period 2008 – 2012 (UNFCCC, 2012b).

Signatory nations to the Kyoto Protocol are required to develop their own approaches to climate change and emissions abatement which may consist of climate change adaptation strategies as well as the provision of financial and technical support to developing economies (UNFCCC, 2012b) (Cirman et. al. 2009). However the agreement provides three specific mechanisms to assist nation states with greenhouse gas reduction: *Emissions trading*, *Clean Development Mechanism* (CDM) and *Joint Implementation* (JI) (UNFCCC, 2012b).

## **Emissions Trading**

A market mechanism constructed by the Kyoto Protocol to regulate emissions by giving each country a stipulated level of allowable emissions or *assigned amounts*. The *assigned amounts* are then bundled into *assigned amount units* (AAUs) (UNFCCC, 2012c). Countries with excess AAUs are allowed to sell to signatory countries that have exceeded their stipulated emission targets or *offset* emissions thereby creating a mechanism for claiming a reduction in GHG emissions (BSI, 2010) (UNFCCC, 2012c). This process is commonly described as a *carbon trade* in reference to the most pervasive greenhouse gas carbon dioxide (CO<sub>2</sub>) and involves the transfer of *carbon credits* equivalent to one tonne of CO<sub>2</sub> at a defined currency value (UNFCCC, 2012c). The EU has taken the lead by developing the Emissions Trading Scheme (EU ETS) in 2005 which commoditized greenhouse gas emissions it is now the largest emissions trading scheme in the world (Cirman et.al. 2009). In the absence of mandatory carbon trading regulations similar voluntary schemes such as the Western Climate Action Initiative, Regional Greenhouse Gas Initiative (RGGI), Chicago Climate Exchange (CCX) have been established to serve North American businesses (Bowen and Wittneben, 2011) (Kolk et. al. 2008)

## **Clean Development Mechanism (CDM)**

A scheme that acknowledges investments in emissions reduction projects in developing nations by countries with emissions restrictions (UNFCCC, 2012d). For a project to qualify it must be verified that emissions incurred are below conventional expectations (UNFCCC, 2012d). Qualifying projects are awarded tradable *certified emission reduction* (CERs) credits each equivalent to one tonne of carbon dioxide (CO<sub>2</sub>) (UNFCCC, 2012d).

## **Joint Implementation**

Emissions reduction project investments amongst signatory nations with emissions restrictions or limitations are afforded similar concessions as under the CDM (UNFCCC, 2012e). These tradable market instruments are described as *emissions reduction units* (ERUs) and are equivalent to one tonne of carbon dioxide (CO<sub>2</sub>) (UNFCCC, 2012e).

The measurement of carbon impact has increased in the years following the Kyoto Protocol, a legally binding agreement ratified in 1997 committing industrialized nations to reduce greenhouse gases by 5.2% on 1990 levels. There is now a growing consensus within industry that measuring emissions leads to good management (DEFRA, 2010a).

The carbon trading mechanisms created by the Kyoto Protocol highlighted the need for standardized approaches to greenhouse gas quantification which is challenging when climate science is evolving and there are revisions to the GWP of individual greenhouse gases (Ascui and Lovell, 2011). As the Kyoto Protocol is aimed at nation states governments sought to infer similar responsibilities for greenhouse gas emissions on corporate entities that produced high greenhouse gas emissions such as power stations and industrial facilities (Ascui and Lovell, 2011)

## **Carbon Footprint Reporting and Greenhouse Gas Accounting**

Globally, there has been an emphasis on carbon footprints with most CSR and Sustainability Reports include Footprint data or Greenhouse Gas Reports as they are criteria in most Sustainability/CSR Indices. Greenhouse Gas Reports more commonly known as Carbon Footprints a “corporate carbon footprint” represents the

total direct and indirect emissions that a company is responsible for as a result of its business activities. It is essential to understand the differences between “accounting for” carbon emissions which is concerned with compilation of greenhouse gas data relative to the operations of a company and the “reporting of” carbon emissions i.e. the formatting of greenhouse gas information to suit the needs of stakeholder groups (Ritter et.al. 2005)

### **Types of Carbon Footprints**

Carbon Footprints or GHG footprints within a commercial context consists of two types:

*Organisational Carbon Footprint* – measures carbon emissions that arise from the operational activities of a business (Carbon Trust, 2012). The measurement of an organizational carbon footprint carbon footprint can be achieved by implementing the following six steps:

1. *Decide on the method to be followed* – consistently use a standardised approach to GHG emission calculation.
2. *Define organisational and operational boundaries* – identify all emissions within an organisation’s operations that will be included and excluded from the report giving due consideration to the ease of availability in acquiring the data (Carbon Trust 2012).
3. *Collate the Data* – Collate data arising from the organisations operational activities e.g. fuel consumption.
4. *Apply emissions factors* – Use emissions factors provided by Government sources to determine carbon impact.
5. *Verify the results* – Verification may be achieved through review from an approved verifier or reporting to voluntary third party schemes.
6. *Verify your emissions reduction* – Although optional organisations can seek third party verification of their carbon emission reduction, thereby providing independent confirmation regarding an organisation’s carbon reduction claims to its various stakeholders.

*Product Carbon Footprint* – is a lifecycle view of greenhouse gas emissions generated by a product from raw material extraction to disposal incorporating

emissions arising during production forming part of the organizational carbon footprint (Carbon Trust, 2012) (Christoph et al. 2012).

Carbon footprint is considered a hybrid of earlier environmental concepts such as the *ecological footprint* which is defined as the productive land area required to sustain a human population whilst the carbon footprint can also be described as the productive land area required to absorb CO<sub>2</sub> of mankind during its life as a chemical compound (Pandey et. al. 2011). Originally an environmental science concept the carbon footprint began life as a global warming potential indicator. The term carbon footprint is used interchangeably with terms such as *embodied carbon*, *carbon content*, *embedded carbon*, *carbon flows*, *virtual carbon*, *GHG footprint* and *climate footprint* (Pandey et. al. 2011). *Carbon accounting* is not without its own contradictions in definition depending on the technical orientation of the user group with scientists espousing carbon accounting as a technique for scientifically verifying carbon emissions and guidelines for comparing emissions when defined by diplomats, an account of emission obligations and rights that can be assessed under various trading schemes with carbon finance practitioners considering carbon accounting as the quantification of emissions in relation to a baseline enabling the sale or purchase of carbon credits within carbon trading schemes (Ascui and Lovell 2011). In essence the colonising of carbon accounting to suit commonly shared beliefs and specialist expertise (Ascui and Lovell 2011) (Bowen and Wittneben 2011). These various interpretations contributed to carbon accounting being identified in (*Table 2.1*) as:

estimation calculation measurement monitoring reporting validation verification auditing	of	carbon carbon dioxide greenhouse gas	emissions to the atmosphere removals from the atmosphere emission rights obligations emission reductions  legal or financial instruments linked to the above trades/transactions of any of the above  impacts on climate change impacts from climate change	at	global national sub-national regional civic organizational corporate project installation event product supply chain	level for	mandatory voluntary	research compliance reporting disclosure benchmarking auditing information marketing or other	purposes
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Table 2.1 Carbon Accounting Definition source: Ascui and Lovell 20011 p 980

This definition highlights disconnect between the quantification of GHG emissions and the monetisation of GHG emissions which differentiates carbon accounting from traditional forms of accounting methods (Bowen and Wittneben 2011).

This multivariate interpretation “carbon” has contributed to atmosphere of technical exclusivity, misinterpretation leading to fraud of carbon and greenhouse gas accounting in carbon markets undermining climate change initiatives (Ascui and Lovell 2011) (Bowen and Wittneben 2011).

Despite terminological issues carbon trading and taxation has transformed carbon footprint into a ‘spatial indicator’ of impact hence some scholars have argued for the use of the term *carbon mass* or *carbon weight* (Hammond 2007) (Pandey et. al. 2011) (Jarvis 2007). The quantitative nature of carbon footprint makes it a useful tool for identifying emission sources enabling operational improvements to be implemented this can be achieved through the application of the LCA to identify product/service carbon impacts from raw material extraction to disposal (Pandey et. al. 2011).

## **Carbon Footprint Standards**

The hybrid nature of Greenhouse Gas reporting contributed to the creation of various approaches to its measurement and calculation. The first published international greenhouse gas measurement standard the *GHG Protocol Initiative* was established in 1998 by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) (WBSD/WRI 2004). The GHG Protocol consists of two distinct but compatible documents the *GHG Protocol Corporate and Accounting Standard* that provides guidance for enterprises to report GHG emissions and the *GHG Protocol Project Quantification Standard* which assists organizations in the measurement of GHG mitigation projects (WBSD/WRI 2004). Although a voluntary standard it has gained international acceptance by governments, NGOs, influential bodies such as the OECD has recommended the implementation of the GHG Protocol developed by the WRI and the WBCSD (DEFRA 2010a). The GHG Protocol has formed the basis of the subsequent greenhouse gas measurement standards such as UK Department for the Environment Food and Rural Affairs reporting guidance and the ISO 14064 standard (Pandey et. al. 2011).

**PAS 2050** - Publicly Available Specification (PAS) 2050 provides guidance on measuring the embodied carbon emissions from goods and services. PAS 2050 incorporates existing Lifecycle Assessments standards such as ISO 14040 by focusing specifically on carbon impact measurement (BSI 2011). This British standard may be superseded by ISO 14067 which is due to be ratified by International Organisation for Standardisation (Pandey et. al. 2011). To support organizational compliance with PAS 2050 the Carbon Trust developed an accompanying document **Code of Good Practice for Product GHG Emissions and**

**Reduction Claims** that aids organisations in assessing the carbon footprint of their products with guidance for determining reductions in the GHG emissions of products over time and communicating product carbon footprint assessment and reductions (Carbon Trust 2011).

**PAS 2050** outlines the following steps in determining a product carbon footprint:

1. *Build a Process Map* - detail all the materials, activities and processes that could contribute to each stage of the chosen product's life cycle (Carbon Trust 2012).
2. *Check boundaries and determine priorities* - identify emissions that will be included and excluded (Carbon Trust 2012).
3. *Collecting Data* - from operational activities e.g. actual electricity meter readings and select appropriate emission conversion factors e.g. kg CO<sub>2</sub> /litre of fuel (kilograms of carbon dioxide per litre of fuel (Carbon Trust 2012).
4. *Calculate Footprint* - calculate the greenhouse gas emissions (kg CO<sub>2</sub>e per product unit) from each source (Carbon Trust 2012).
5. *Verify your carbon footprint* - provide an assessment of the margin of error for calculations. This can be a statistical analysis or a simple assessment of data quality (Carbon Trust 2012).

A recent development in sustainable footprint methodology is the market segregation of products by using a 'carbon label' which indicates to consumers of the carbon intensity of a product (Carbon Trust 2010). Leading brands such as Walker Crisps are paving the way for other consumer products by measuring and reducing the carbon intensity of their product (Walker Crisps 2010)

**ISO 14040** – an international standard that specifies the requirements for a measuring the impacts, inputs and outputs of a product or production system during its life cycle using LCA and for performing, interpreting and reporting a Life Cycle Inventory analysis (LCI) and Life Cycle Impact Assessment (LCIA) (BSI 2011).

**PAS 2060** – arising from the adoption of carbon footprint methodology some organisations have claimed *carbon neutrality* or no net increase in the carbon emissions to the atmosphere arising from an entities operation (BSI 2010). Publicly



Available Specification (PAS) 2060 outlines the requirements to be met by any entity wanting to achieve and demonstrate carbon neutrality (BSI 2010).

**ISO 14064 Part 1** – details the requirements for an organisation to actively develop, design, manage and report greenhouse gas emissions (ISO 2012a). The standard assists organisations to establish the *boundaries* within which greenhouse gas emissions occur or *greenhouse gas sinks* are present. A greenhouse gas sink is any mechanism that removes GHG from the atmosphere it may manifest itself as a physical unit or process (ISO 2012a). Greenhouse gas impacts are categorised by the standard in three areas:

*Direct GHG emissions and removals* – organisations are required to quantify GHG emissions arising from operational activities that it owns or is within its control in (ISO 2012a).

*Indirect GHG Emissions* – quantification of GHG emissions arising from the use of energy that was not produced within the operational boundaries of the business e.g. purchased electricity (ISO 2012a).

*Other Indirect GHG Emissions* – these are greenhouse gas emissions that are incidental to the activities of the organisation e.g. emissions from waste and employee travel (ISO 2012a).

As with accounting, GHG measurement must paint a true and fair view of carbon impact by abiding by the following principles:

*Relevance* – defining of the boundaries within which the organisation's GHG emissions occur (Ritter et.al. 2005)

*Completeness* – quantification all greenhouse gas emissions within specified organisational and operational boundaries with the disclosure of any pertinent omissions that may affect the completeness of the report (Ritter et.al. 2005)

*Consistency* – use of standardised techniques, methodologies and measurements to allow comparative analysis of GHG emissions over time with the documentation and disclosure of any factors or material changes (Ritter et.al. 2005)

*Accuracy*- prevention of the over-estimation or under-estimation of reported emissions by identifying any uncertainties providing assurance to stakeholders as to the integrity of the GHG measurement (Ritter et.al. 2005)

*Transparency* - presentation of GHG emission data to facilitate audit and review (ISO 2012a).

**ISO 14064 Part 2** – is primarily focused on GHG projects or projects designed to mitigate carbon emissions outlining the requirements for managing, monitoring and reporting these activities. The standard espouses GHG measurement principles of the ISO 14064 standard such as of *Relevance, Completeness, Consistency, Accuracy, and Transparency* but includes *Conservativeness* thereby preventing overestimation of the benefits of a proposed project.

The overall aims of the ISO 14064 standards are to provide an internationally recognised framework that assists improve the consistency of and transparency of GHG reports that will allow organisations to manage the GHG impacts. Where possible allow the development of suitable schemes that assists organisations to mitigate against carbon impacts through the trade of emissions credits (Weng and Boehmer 2006).

## **Department of Environment Food Rural Affairs (DEFRA) Guidelines**

DEFRA guidelines establish that a standard greenhouse gas report illustrates an organisation's environmental impact in terms of carbon dioxide equivalent (tCO<sub>2</sub>e) per ton (a universal measurement used to indicate the global warming potential of a greenhouse gas expressed in terms of the global warming potential of one unit of carbon dioxide) Carbon dioxide equivalents (CO<sub>2</sub>e) is also defined as a unit to compare the radiative forcing of a greenhouse gas when compared to carbon dioxide (BSI 2011 pg. 2). DEFRA guidelines utilises the GHG Protocol's reporting structure which categorises GHG emissions in three main areas or scopes:

*Scope 1* - Direct emissions arising from activities that are owned or controlled by the business. An example of this is the emissions from company cars/vehicles to the atmosphere.

*Scope 2* - Indirect emissions arising from activities that are not under the exclusive control of the business (James 2010; DEFRA 2009; WBSD/WRI 2004).

*Scope 3* - Emissions arising from activities of third parties who contribute inputs to the organizations various processes. DEFRA's greenhouse gas reporting methodology is one of nine leading carbon emissions schemes of which there exist 30 such schemes globally (DEFRA 2010a).

In 2010 a survey of FTSE 350 companies conducted by the Carbon Disclosure Project a quasi-nongovernmental organization consisting of institutional investors, indicated that 59% of respondents are measuring Scope 1 and Scope 2 emissions (CDP 2010a). Examples of these types of emissions include the use of electricity, heating and cooling systems. The Institute for Environmental Management and

Assessment postulates that there are synergistic dividends from pursuing greenhouse gas reporting initiatives e.g. cost savings, competitiveness and reputation (IEMA 2010). Sustainability footprints are useful indicators for CSR reporting purposes due to its flexibility in measuring the efficiency of carbon management and social performance programs at both the corporate and project level. As a communication tool, sustainability footprints can express both carbon management and social performance to various stakeholder audiences.

Recent research by Hoggart identified the emergent use of greenhouse gas reporting as differentiating criteria in the contractor selection process (Hoggart 2008).

The use of greenhouse gas reports as a differentiating factor in supplier selection has stimulated the creation of “business constellations” involving businesses that examine each other’s carbon footprint and make competitive decisions accordingly (Gell 2008). Gell (2008) in spite of his candid insights did not postulate a strategic model as a launch pad for sustainable growth.

Lash and Wellington (2007) made the first attempt to describe the main risks posed to business arising from greenhouse gas emission induced climate change. In their view businesses must seek to measure their carbon footprint, understand their carbon related risks, build new competitive strategies to decarbonise their processes and implement carbon related abatement initiatives better than competitors by benchmarking carbon management performance as is emerging in the UK Supermarket sector (Lash and Wellington 2007; Mackenzie et.al. 2009).

## **Policy Landscape**

SME reaction to stimuli arising from policymaking is determined by the clarity of communication and the mechanisms adopted to engage SMEs (Parker et al 2009).

Parker et. al. (2009) suggests seven types of interventions policy interventions: *voluntary regulations/standards, compulsory regulation, financial penalties, financial support, self-directed/facilitated education, environmental audits/reviews and business advice/help lines* (Klewitz and Hansen 2014).

In the United Kingdom compliance is a main driver for carbon emissions reporting with 54% of publicly traded companies who reported to schemes such as the Carbon Disclosure Project included emissions data on annual reports (Carbon Disclosure Project 2010a). However 73% of the respondents in the Carbon Disclosure Project Global 500 survey reported emissions in their annual report with 65% of respondents making public disclosures (CDP 2010b).

The continued interest in emissions reporting in the United Kingdom is influenced by the following regulatory policies and legislation viz.

### **Climate Change Act 2008**

Climate Change Act 2008 is the first legislative commitment by any nation to reduce greenhouse gas emissions, commits the United Kingdom to developing a low carbon resource efficient economy. The act binds the United Kingdom to an 80% reduction in greenhouse gas emissions by 2050 below 1990 levels with an interim target of 34% in greenhouse gas emission reductions by 2020. In addition to these ambitious targets are enacted provisions for a carbon budgeting system and mandatory reporting of greenhouse gas emissions by enterprises (IEMA 2010). Scotland's

devolved government are pursuing even more ambitious plans 80% reduction in greenhouse gas emissions by 2020 but with an interim target of 42% in greenhouse gas emissions by 2020 under the Climate Change Act (Scotland) 2009. Although Her Majesty's Treasury has the ability to offset any shortfall in achieving these mandatory reductions by purchasing carbon offsets, the UK Committee on Climate Change advises that carbon budgets are achieved through the implementation of domestic reductions in resource use in the economy (IEMA 2010). This "political" accounting of carbon emissions is considered to influence "market enabled" carbon emissions reporting (Ascui and Lovell 2011 p 979)

**Carbon Reduction Commitment (CRC)** requiring companies consuming more than 6000 megawatt hours (MWh) to participate in mandatory reporting with the purchase of carbon credits on the open market to offset any emission increases.

**Climate Change Levy** a voluntary agreement which enables energy intensive sectors to lower their emissions between two year reporting periods in return for levy reductions.

**EU Emissions Trading System (ETS)** a European wide trading scheme involving electricity, heavy industry and aviation companies that provides limits on carbon emissions and a tradable market value for CO<sub>2</sub>.

**EU Directive on the Energy Performance of Buildings** targeted to improve energy efficiency in the built environment through the issue of mandatory Energy Efficiency Certificates (EPCs). Display Energy Certificates (DECs) provide information on energy usage and are required to be displayed in the public buildings such as large restaurants and hotels.

**Building Regulations Part L 2011** these regulations govern the energy efficiency of new buildings, renovations of existing buildings and extensions such as conservatories, reducing the gap between theoretical energy performance calculated at the design stage and the actual performance during use is reduced and ensuring a 25% reduction in CO<sub>2</sub> emissions relative to 2006 standards.

Therefore it can be inferred that UK regulators are biased to pursuing policies targeted at energy efficiencies (Bradford and Fraser 2008). The usefulness of this policy approach is validated from research that reveals energy consumption reductions savings can contribute economic benefits which are equivalent to a 5% increase in sales (Carbon Trust 2005). However the drawback with this approach is that it excludes emissions arising from other economic activities in the supply chain such as the transport sector which accounts for 21% of UK overall greenhouse gas emissions (DEFRA 2010b) (DEFRA 2012).

Recent UK greenhouse gas policy initiatives are specifically targeted at large organisations and do not provide the institutional support required to assist SME's in greenhouse gas emissions reporting. Bradford and Fraser (2008) recommend three policy options: *mandatory free energy audits of SMEs, free energy assistance from local authority or regional SME support organizations and energy pricing schemes to encourage energy efficiency measures*. Implementation of these policy options may alleviate the effects of *firm size, competitive position and energy intensity* that influence the adoption and perceptions of environmental policy (de Groot et. al. 2001).

Their recommendations are supported by a DEFRA report indicating that there is an indirect relationship between emissions reporting and emissions reduction, a unique

combination other factors such as *investor pressure, transparency, compliance with regulations, senior management commitment, target setting, efficiency saving opportunities, brand management and ethical considerations* influence emissions reporting (DEFRA 2010a).

### **Water Footprint and Water Accounting**

Water is an essential component of life and is a critical business resource due to its use in agricultural systems which accounts for 86% of fresh water consumption (Hoekstra and Chapagain 2007). Therefore the effective management of water resources is integral to both the sustainability of business and the survival of life on the planet. Failure to understand water consumption impacts can expose businesses to potential operational risks arising from a “failure to manage the fresh water issue: damage to the corporate image, the threat of increased regulatory control, financial risks caused by pollution and insufficient freshwater availability for business operations” (Ercin et al 2011 pg. 772). Business sensitivity to water impacts traditional varied depending on factors such as availability, seasonal variability, industry sector, geographic location however globalisation has created a virtual trade in embedded water arising from the purchase of raw materials and goods from countries with water resource constraints (SAB Miller WWF 2009). Water Footprint Assessment and Water Accounting are tools that can assist businesses in determining the environmental impact of their operations in regards to water consumption.

Water Footprint is defined as “an indicator of freshwater use that looks not only at direct water use of a consumer or producer, but also at indirect water use” (Hoekstra et. al. 2011 pg. 2). This method adopts a full lifecycle approach to the calculation of water impacts in producing a product incorporating the volume of freshwater



consumed by the supply chain. Methodologically the water footprint is comprised of three main areas:

**Green Water Footprint** – generally the consumption of all rain water except run-off

**Blue Water Footprint** – consumption of surface and ground water within the supply chain

**Grey Water Footprint** – “the volume of fresh water required to assimilate the load of given pollutants given natural background concentrations and existing ambient water quality standards” (Hoekstra et. al. 2011 pg. 2).

Water Footprint Assessment is an analytically rigorous activity that quantifies and locates the water footprint of a process, product, producer or consumer or geographic area to determine the sustainability of water consumption and formulate strategies to mitigate against any impacts.

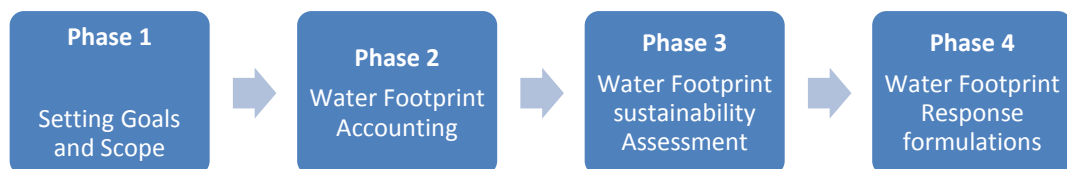
Water Footprint Assessment consists of four distinct phases (*Figure 2.4*):

#### **Setting Goals and scope**

**Water footprint accounting** – the collation of water footprint data within a previously defined scope

**Water footprint and sustainability assessment** – the determination of the sustainability of a specific water footprint from a social, environmental and economic perspective

**Water footprint response formulation** – the development of strategies to reduce water impacts through water efficiency techniques and reduced pollution. *Water Footprint Offsetting* help to ameliorate the negative impacts of water consumption are unavoidable. This can be achieved through direct contribution by the business in the development of sustainable and equitable use of water within the local area of the water footprint impact (Hoekstra et. al. 2011).



**Figure 2.4** Four distinct phases in water footprint assessment (Hoekstra et. al. 2011 pg. 4).

The concept of being *Water neutral* does not imply water impacts are reduced to zero but confirms that all practicable steps have been taken to reduce the water

footprint of a process, product, community or business and all negative impacts have been offset (Hoekstra et. al. 2011). A recent study suggests that 99% of water consumption may be accounted by supply chain activities highlighting opportunities for efficient water consumption but also emissions reduction (Ene et. al. 2013)

### **Social Footprint**

A new approach the *Social Footprint* method seeks to incorporate non-financial capital to quantify the impact of an organisation on society or its social contribution of an organisation's activities to climate change mitigation (McElroy et al. 2008).

This methodology is based on the WRE350 scenario a scientific assumption that global CO<sub>2</sub> emissions will rise steadily and plateau at 350 parts per million by 2050 down from current levels of 385 parts per million with the implementation of climate change mitigation efforts (MAGIC/SCENGEN 2013). Social Footprint methodology classifies non-financial capital into of four main types:

*Natural* (or ecological) Capital - quality of land, air and water

*Human* Capital - health and human ingenuity

*Social* Capital - social networks, governments, when framed from an economic perspective social capital is defined as “the capacity to generate social values like, friendship, collegiality, trust, respect and responsibility” (Klamer 2002 pg. 266)

*Constructed* Capital – man made systems e.g. technology and transportation

The later three groups are described as *anthro* capitals or human produced capital

(McElroy et al. 2008) (McElroy 2006). The Social Footprint method seeks to

determine an organisational sustainability based upon its contribution or stewardship

of *anthro* capitals essential for human wellbeing (McElroy et al. 2008). These non-

financial “capitals” are allocated using the Social Footprint process via a new unit

“*People Feet (PF)*” calculated as the number of employees multiplied by the

proportion of time they spend working (McElroy 2006). The *Social Footprint* is

based on the principle of individual responsibility for personal choices as well as the actions of societal leaders. As such an organisations or an individual *Social Footprint* is expressed as a societal quotient – “*Total Social Imprint*” (*social contributions by individuals/organizations*) divided by “*Own Share of Supply Gaps in Related Capital*” (the identified social need) therefore a Social Footprint  $\geq 1$  is considered sustainable (McElroy 2006 pg. 2). Critics of Social Footprint methods argue its idealistic approach to the valuation in that individual concepts of responsibility are influenced by the cultural context and may not adequately reflect the overall societal impact of activities such as religion except only in financial terms (McElroy 2006).

### **Social Standards, Social Accounting and the Social Fingerprint**

Increasing concern regarding business activities that produce negative social outcomes such as poor working conditions, wage exploitation, child labour and environmental degradation has contributed to the adoption of voluntary stakeholder engagement standards (Beschorner and Muller 2007). There are over 100 social standards ranging from sector specific standards e.g. Responsible Care in the Chemical industry to internationally recognised standards such as Social Accountability 8000 (SA8000), Accountability 1000 (AA 1000), Global Reporting Initiative (GRI) (Beschorner and Muller 2007). Social Standards establish a framework for the implementation of management systems that provides information which enables the quantification of social performance through the identification of social costs i.e. “*the costs involved in actions that went beyond those normally required for competitive business reasons*” and the measurement of the “*economic costs of socially relevant actions*” forming the cornerstone of Social Accounting

(Churchill 1974 pg. 4, 5). Early research into Social Accounting theory were bounded by arguments for and against business as a social agent within society but identified the nefarious nature of social accounting as “*Social Responsibility is a moving target, socially relevant activities are small and ancillary to the main activities of the corporation*” and the *recency* of the CSR as a management issue (Churchill 1974 pg. 6, 7). These dynamics have contributed to the regular updating of Social Standards such as the SA 8000 leading to the evolution of a complimentary approach the *Social Fingerprint* defined as “*a program of ratings, training and tools designed to help companies measure and improve social performance*” (Social Fingerprint 2013). The Social Fingerprint adopts a proactive approach consisting of two tracks the development of company social performance measurement and the assessment supply chain social performance (Social Fingerprint 2013).

### **Ecological Footprint Analysis**

The use of even more exotic techniques e.g. “*ecological footprint* measured as the amount of productive land and / or water supporting human activities and required to sustain human life” (Holland 2003) or “standardized estimate of the Earth’s biological carrying capacity required to support humanity’s resource use and waste production” (Venetoulis and Talbert 2008 pg. 442) are not yet mainstream amongst businesses even though ecological footprint measurement was empirically tested to be applicable to practical business use more than a decade ago (Rees and Wackernagel 1996). The adoption of ecological footprint methodology by business has been stalled by failure in the development of international ecological footprint standards, *the abundance of modified footprint methods that cloud the distinction between EFA and other kinds of sustainability analyses* creating a need for further

research into the application of EFA in policy, business and lifestyle analysis (Venetoulis and Talbert 2008).

Methodological issues also affect the implementation of Ecological Footprints within industry as it is underpinned by a reliance on the Food and Agriculture Organisation (FAO) global agriculture ecological zone (GAEZ) indices that values bio capacity in terms of human needs thereby discounting the contribution of mountains, deserts and oceans to human survival except in terms of carbon sequestration - the process of storing carbon dioxide in the soil, oceans or underground (Venetoulis and Talbert 2008) (Qian 2003) (Forestry Commission 2012).

## **Appendix 2 Statement of Research**



## Statement of Research

**Is the use sustainability footprint  
methodology perceived to improve  
business performance in the Scottish small  
to medium sized enterprises (SME) sector?**

Lowellyne James

20/10/2011

## Lowellyne James's Personal Summary

Lowellyne James is an Ambassador of the Chartered Management Institute, a Member of the Institute of Chartered Accountants Scotland Advisory Panel on Sustainability Activities and an alumnus of the Edinburgh Business School MBA program, his personal quality policy statement is: "To pursue excellence in innovation and creative thought. Continuously striving for perfection in both my professional and family life"

With approximately fifteen (15) years' work experience ranging from Quality and Safety Management in the Manufacturing Sector to Advertising Management in a consulting firm.

Amongst his academic achievements, he has accomplished the following:

- A Master's Degree in Business Administration (MBA) from the Edinburgh Business School, Scotland, United Kingdom.
- A Degree in Natural Science.
- Member of the Chartered Quality Institute & Chartered Quality Professional MCQI CQP
- Member of the Chartered Management Institute MCMI
- Member of the Association of Business Executives
- Associate Member of the Institute of Environmental Management and Assessment AIEMA
- Member of the Institute of Occupational Safety and Health
- Certified Health and Safety Trainer for General Industry course accredited by the Occupational Safety and Health Administration (OSHA) of the United States of America.
- ISO 9001 Lead Auditor certified

A keen writer he has recently submitted an article entitled "Absolute Zero" which was published in the CA Magazine the official journal of the Institute of Chartered Accountants Scotland. As part of his continuous professional development he reviews management and technical books on behalf of both the Chartered Quality Institute and Chartered Management Institute.



## Introduction

My literature review has identified that the use of carbon footprint methodology has been the subject of recent surveys and reports from both governmental and non-governmental sources. However the use of water footprint and social footprint methodologies has been less well documented. The issue of identifying accurate costs involved with the development of sustainability footprint initiatives has been a research topic of recent studies. These studies revealed that costs differences varied depending on the size of the organisation, pay scales of personnel involved in sustainable footprint measurement, reporting scope, organisational policy, use of external verification, the influence of senior management and the level of integration. Critically firms are unable to quantify the benefits of sustainable footprint reporting. For clarity I have defined *Sustainability Footprints as methodologies for assessing the social and environmental impact of the economic investment in a specific strategic option in relation to other strategic alternatives and their potential risk to the survival of future generations.* Therefore my research seeks to answer the following:

**Is the use sustainability footprint methodology perceived to improve business performance in the Scottish small to medium sized enterprises (SME) sector?**

Embodied within this research question are two main research objectives:

- To critically analyse the perceptions of contribution of sustainability footprint tools to growth and its potential to assist firms in achieving further sustainable growth in four key areas Innovation Impact , Cost Impact , Environmental Impact and Stakeholder Impact

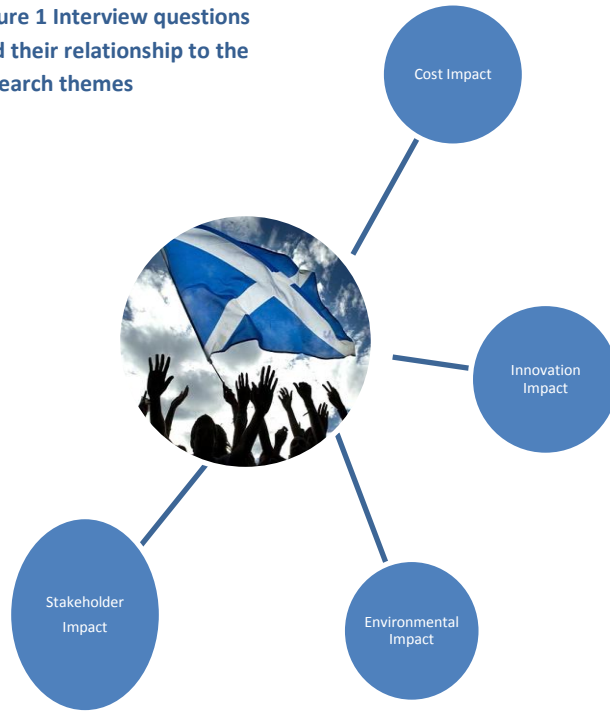
- To identify the Critical Success Factors (CSFs) and challenges in the use of sustainability footprint methodology within SMEs

## Methodology

The main research instrument for case studies is the interview which may be *semi – structured* consisting of pre-planned questionnaires however questionnaires in the case of the semi-structured interview are used to guide the interview process with the interviewer and interviewee having flexibility to explore different avenues of enquiry . The questionnaire’s enquiry themes are built around four main areas *Innovation Impact, Cost Impact, Environmental Impact* and *Stakeholder Impact* which seeks to explore perceptions of sustainability footprints as illustrated in *figure 1* below. The narrative will be supported by useful facts/information, pictures and diagrams from your organisation.

The information collected from each interviewee will be used to build a picture in words of Sustainability Footprint methodology use by illustrating perceptions of SME contribution to reducing our environmental impact. Prior to any scheduled interview exercise all interviewees will be provided with consent forms authorizing the use of data collected as part of this research project.

**Figure 1 Interview questions and their relationship to the research themes**



What value does carbon footprint measurement provide SMEs?

How long has Scotland measured its Carbon Footprint?

Do you think carbon footprint measurement is a good investment of the organisations resources?

In what way do you contribute to the CO2 measurement exercise?

In what way can policy making institutions contribute to the uptake of CO2 measurement by SMEs?

What are the key drivers for SME's measuring your carbon footprint?

Does the Scotland consider carbon footprint reduction as one of its KPIs?

What are Scotland's targets for reducing your carbon footprint?

Does the Scottish Government suppliers and sub-contractors require provision of sustainability footprint data?

Has CO2 footprint improved understanding of environmental impacts?

Are there any plans to measure Scotland's water footprint?

Do you see a relationship between CO2 footprint & climate change?

What do you understand the use of the term Sustainability Footprints?

Why did Scotland choose to measure its carbon footprint?

Is CO2 measurement a useful tool for SMEs to combat climate change?

How important is Scotland's carbon footprint?

Has present economic conditions impacted on your Scotland's carbon footprint?

How much does measuring your carbon footprint cost?

What methods do you use to measure the company's carbon footprint?

Does Scotland have a formal policy for carbon footprint?

Do NGOs, International Agencies express an interest in your sustainability footprints?

Is carbon footprint reduction a key issue for discussion at Ministerial meetings?

What barriers do you face in placing carbon footprint reduction on the agenda?

Was third party assistance procured to measure your carbon footprint?

Is carbon footprint reporting purely for internal use or for external reporting purposes?

Does the Scotland participate in any reporting schemes?

Is Scotland's CO2 footprint externally verified by a third party such as the Carbon Trust?

Has CO2 footprint created interest in the company from new customers and existing customers?

Is CO2 footprint measurement a useful tool?

Has CO2 footprint led to the development of new products/services?

What type of footprints does Scotland currently measure CO2, social, water?

## **Appendix 3 Information Consent Sheet for Potential Participants**

## **Information Sheet for Potential Participants**

### ***Title of your Research project***

*Is the use sustainability footprint methodology perceived to improve business performance in the Scottish small to medium sized enterprises (SME) sector?*

I would like to invite you to participate in a research study into perceptions of sustainability footprint methodology on business performance within the PhD in Management programme at Edinburgh Napier University. The purpose of the research study is:

- To critically analyse the perceptions of contribution of sustainability footprint tools to growth and its potential to assist firms in achieving further sustainable growth in four key areas Innovation Impact , Cost Impact , Environmental Impact and Stakeholder Impact
- To identify the Critical Success Factors (CSFs) and challenges in the use of sustainability footprint methodology within SMEs

You have been invited to participate in the study because you are a key policy maker within the Scottish economic context.

Please note you may not benefit directly from participation in this research study.

If you agree to participate in the study, you will be asked to participate in an interview that will provide the following:

- Information that will build a picture in words of Sustainability Footprint methodology use by illustrating perceptions of SME contribution to reducing our environmental impact.
- Access to company information, reports, memos and brochures
- Interviews will be digitally recorded and transcribed for your authorisation and approval

A copy of the research project will be provided to you upon completion of the research exercise.

You have the option to decline to take part and are free to withdraw from the study at any stage, you would not have to give a reason. All data will be anonymised as much as possible, your name will be replaced with a job role and it will not be possible for you to be identified in any reporting of the data gathered. All data collected will be kept in a secure place (stored on an encrypted remote storage device) to which only the nominated researcher has access.

The results may be published in a journal or presented at a conference.



If you would like to contact an independent person, who knows about this project but is not involved in it, you are welcome to contact Professor George Stonehouse, Dean of Edinburgh Napier Business School, at Edinburgh Napier University, (Tel: 0131 455 4525; Email: [g.stonehouse@napier.ac.uk](mailto:g.stonehouse@napier.ac.uk) or Dr Lois Farquharson, Faculty Director of Research Degrees, at Edinburgh Napier University (Tel: 0131 455 4345; Email: [l.farquharson@napier.ac.uk](mailto:l.farquharson@napier.ac.uk))

If you have read and understood this Information Sheet and you would like to be a participant in the study, please complete the Consent Form overleaf.

### **Consent Form**

#### ***Title of your Research project***

*Is the use sustainability footprint methodology perceived to improve business performance in the Scottish small to medium sized enterprises (SME) sector?*

I have read and understood the Information Sheet and this Consent Form. I have had an opportunity to ask questions about my participation.

I understand that I am under no obligation to take part in this study.

I understand that I have the right to withdraw from this study at any stage without giving any reason.

I agree to participate in this study.

Name of Participant: \_\_\_\_\_

Signature of Participant: \_\_\_\_\_

Date: \_\_\_\_\_

#### Researcher Contact Details:

Name of Researcher: Lowellyne James

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EH14 1DJ

Email / Telephone: [09020663@live.napier.ac.uk](mailto:09020663@live.napier.ac.uk) mobile: 07724477788

## **Appendix 4 Scottish Business in the Community Interviewee Transcripts**

Research Objectives	Concepts & Themes
<p>1 To critically analyse the perceptions of contribution of sustainability footprint tools to growth and its potential to assist firms in achieving further sustainable growth in four key areas</p> <p><i>Innovation Impact , Cost Impact , Environmental Impact and Stakeholder Impact</i></p>	<p><b>Cost Impact</b> (Lash and Wellington 2007) (Porter 2006) (Krysiak 2009) (Teece 1987; Winter 1987) (Hart 1995)</p> <p><i>Risk</i> How important is carbon footprint to the company? 1</p> <p><b>Head of Environment</b> - It is very important for the fact that we are we were really measuring informally it a few years back but quite a lot more informally but only when it became a directive that came from President Prince Charles that all the Princes Charities had to report on Sustainability Reporting. That was quite good in fact that made us as you probably find in Capital Cooling that makes your life a lot easier when somebody who is a Director comes asking you for this information now because we have to have it as apart to doing it quite informally in that respect it is quite as it is something we report on every year. I guess the most important for us is traditionally through Mayday we have had to have asked businesses to report back their Carbon footing we certainly talk about us practicing what we preach so it is important for us to actually report back as well as asking others to do the same.</p> <p><b>CEO</b> – I would echo what Andrew said if you are facilitating brokering and encouraging other people in this behaviour you should make sure you are accountable for your own behaviours in the same way I would be quite interested in just talking in talking about if you got a question later on in terms of the challenges that brings to SME which we are and we are a charitable organisation who puts human resource and time to that when we have to focus on our membership and our outward focusing and getting funding and membership in meeting this challenge it does not mean that it is not critical but how we are meeting this challenge</p> <p>How important is carbon footprinting to SMEs in your opinion in your view as a senior policy maker within the Scottish context?</p> <p><b>CEO</b> - It is critical it is not up for question anymore it is not a nice to do it is a must happen but it is something that has still got a way to go in terms of the SMEs understanding it and I still think we have got work to do in Scotland in positioning it as a bottom line asset that it does bring financial benefit to SMEs if they do this behaviour. I think there is a lot of challenges there but it is absolutely critical to all SMEs behaviour and their growth</p> <p><b>Head of Environment</b> - I think it is hugely important..</p>



I think the challenge is not everyone knows it how important it is for them I think you got a lot of leaders a lot of organisations doing it but when you look at what percentage of SMEs I think it's far too small and I think there is a lot more work to be done on that I think it is hugely important but possibly not well enough subscribed at the moment to do that but I do see change on a number of levels a big push coming from corporates I think more of them are pushing down a level I think more on down there supply chains I think more of them some difference to do that and also just purely as cost savings as Jane said is hugely important and I do believe more organisations are seeing that now there is still a long way to go

*Financial Capital resource allocation*

Has present economic conditions impacted on your companies carbon footprint? 2

**CEO** - No, I won't say it has it depends on how far you go doesn't it has it impacted you have to go back to say what stops us doing it. If what stops us doing it in a consistent way is resource we are not actually affected in here by the economy in terms of our staffing and our resource but we have to prioritise members as I said earlier but I don't think you can actually say the economic environment has affected our own internal carbon footprint

**Head of Environment** - Most of our carbon footprint is from travel that is the vast majority comes from If you look at the building its pretty standard and so there is not a host we can do it is leased premises part of blocks on either side downstairs we share facilities in some respects with them so most of it comes from travel the slight increase comes maybe over the last year could be down to the economic conditions not so sure but will be on trips to London where we are formalising cementing partnerships with a lot of UK wide organisations and businesses down there . So travel is a big part we are still travelling as we did to different meetings

Has the present economic conditions impacted on SMEs footprint?

**Head of Environment** - Yes, I do think it has actually I think it's just a mix between current economic conditions and climate change falling off the agenda but I think it has been in some instances to get SMEs engaged people engaged I think pre – Copenhagen if you like there was a lot more momentum on the whole climate change agenda there was a lot more legislation at the time from the British Government there was a huge momentum building at that time. where I feel now we have lost a little bit of that momentum and I think

we need to do a lot more to bring that back up to speed I do believe there has been changes saying that I think people who have started to measure their carbon footprint have seen the benefits of it and are out there for promoting it and pushing it more and more the challenge is to get people who never thought of it to take those first steps but there is perceived as being a cost to it not a cost savings to it

How much does measuring your carbon footprint cost? 2

**Head of Environment** - Cost SBC. That's a good question we probably spend we have had three of us at least working through it under a thousand pounds

**Head of Environment** - We do it internally we do it all ourselves we do not have any external bodies come in and do it consultancies and it is also not verified by an external agency so we save cost with So that to be honest the biggest cost for us this year is that our accountant left half way through the year last year found out that he had not updated not through his own fault that is just one thing that shows important it is where it fits in terms of peoples level of importance hadn't been passed on updating all of the spread sheets. So we had to go and something you never want to redo after having for the first time as you know is to go and take data from peoples expense forms and refill out templates and three of us sat in this room and filled out that for a day it was fun

**Head of Environment** - It just had to be done so that was so that was probably slightly more expensive than usual so however our new accountant that we have got have got all our processes set up so it feeds straight through every month so it makes it much easier

**Innovation Impact** (Lash and Wellington 2007) (Porter 2006)

*Process Innovation*

What type of footprints do you currently measure CO2, social, water? 1

**Head of Environment** - We don't measure our water footprint at all. In terms of our social footprint that's interesting actually we measure the number of days but we have policies around how much staff volunteering is allowed and encouraged and we monitor how many people are taking up volunteering opportunities and getting into the community it is quite a challenge for us in many respects because it is what we do. So some days I do not know whether I am volunteering and

don't report it or whether I am helping out on a program I was doing mentor training the other now that is having a big impact on the community, it is what we do so defining what we do away from CSR is sometimes a challenge so it should be what we do which is a good thing.

What methods do you use to measure the company's carbon footprint? 2

**Head of Environment** - We use a method that was developed through the Prince's Mayday Network it is an online tool so we use that then I also took the data so we have historically demonstrated through the carbon trust online tool. So I actually took all that data and fed it back through the carbon trust online tool the previous one so we can get year for year comparisons

What methods do you recommend SMEs should use to measure their carbon footprint?

**Head of Environment** - I have always recommended that they use the Carbon Trust tool for carbon purposes. I think at one point a few years ago there was a huge number of tools being developed, I think people were developing tools for tools sake I think that for and SME in particular and especially if you are looking at the smaller size of SMEs it's about keeping it simple it's not necessarily about getting it a hundred % accurate. It's about keeping it simple starting to collect the data it is about acknowledging the costs that you always thought were fixed costs are actually not. So I will always recommend the Carbon Trust thing and that with the new Mayday Calculator of course I am going to say that... It has one benefit that the carbon trust does not have which is a shame is looking at waste. The Carbon.. is very much focussed on carbon rather than waste

Does the company have a formal policy for carbon footprint? 1

**CEO** - Well we have an internal group of people who are what do we call it Andrew

**Head of Environment** - CSR Group

**CEO** – who look at all our internal sustainability policies we don't have a formal policy we have a commitment to work as sustainable as we can so we don't

Should SMEs have a formal policy for carbon footprinting?

**CEO** – I think for SMEs in terms of what sector or business there in they should for their customers and their clients I think it's a good thing to have they should have it on their website they should have their commitment to it on their website they should use it as a marketing tool, sales tool and I think yes it is certainly what we advise all SMEs to do.

**Head of Environment** - Policy can be a scary word though I think it is sometimes good to explain what we mean by policy and I think sometimes just saying to an SME just a statement of intent just put down on paper what are your thoughts towards the environment and what you want to achieve I think when you start getting towards policy people start thinking health & safety, HR and start thinking they have to write reams of information when actually they don't when again just keep it simple

Do NGOs and International agencies express an interest in your sustainability footprints? 2

**CEO** – I don't think I have ever been asked once about our own internal sustainability policies and our footprint

**Head of Environment** – Never been asked we have provided information we have provided case study information to different places and organisations but never been asked

Is carbon footprint reduction a key issue for discussion at management meetings? 2

**CEO** – We do discuss it at management meetings absolutely because we have an internal group of employees who are responsible for it who give updates so it does come on the agenda for it.

Should carbon footprint reduction become a key issue for discussion amongst management in SMEs?

**CEO** – You can say yes, but realistically it's not going to happen if you got an SME let's say a retailer or something like that it's not going to be a priority of management issues the bottom line is going to be a priority. It's going to be a priority amongst management issues if people see or if they have done that journey and they see it as contributing to their bottom line I think you have a real struggle there unless there are an SME who is engaged in that agenda. We know that most SMEs don't even have climate change or sustainability in their mind so

**Head of Environment** – Would we like it to absolutely but not just carbon it is quite narrow I don't think it should be carbon necessarily it could be on the environment more generally also the social impact of what the business is doing should be on the agenda. So we are looking at real triple line reporting be on the agenda. Should it be yes absolutely is it no?

What barriers does the organisation face in placing carbon footprint reduction on the agenda? 2

**Head of Environment** – Resource, businesses talk about lack of resource lack of time lack of money are probably the biggest issues that they face in regards to it perceived cost

**CEO** - I totally agree that's it that's the only barriers that we come up against. No one says it's a load of rubbish we don't want to do it they don't say that That's exactly what they say its cost resource time priority

What barriers do you think SMEs face in putting carbon footprint reduction on their agenda?

**CEO** - I think one of the barriers we have not talked about is language. I think one of the barriers is that your normal SME your average business will see climate change or whatever element within climate change whether it's environmental or carbon or whatever is shared as an area that is owned by policy makers' scientists, eco-warriors, economists. That's who they see as they own it people don't see it as part of their language one of the things we spend an inordinate amount of time doing is trying to get SMEs to feel part of it and we try and use language is everything to us and you have to use a bespoke language to the tourism sector, the retail sector because its exclusive I still think climate change. I think it's an exclusive and we were talking that this morning I think it's an exclusive area. It's not a common problem like poverty or that we can all touch and feel and see as we walk the streets its invisible. I will say it's like God you can be evangelistic about it if you're in that element and you believe in it but you can't touch or feel it the rest of us are going to what is it you believe in it's a difficult agenda

**Head of Environment** – I would echo that I think language is hugely important talking about carbon to business talking about climate change they just start switching off straight away and I think if we can talk about your resources about efficiencies, savings you

now you are talking more of a business language a language they can understand rather than business language and I think everyone has different triggers if you look at the top SME performers in the environment that certainly we have seen if you speak to the CEOs they are very personally driven by the agenda but that's unusual but when I met with East Lothian Council recently they are hugely driven they are doing amazing things the leader of the council is an ex – environmental person that does not happen very often so it's no coincidence and that's the minority and those are the leaders the mainstream that's the rest have to be convinced we have to speak their language we cannot expect them to listen to us speaking a language that they do not understand

Does the company participate in any reporting schemes? 2

**Head of Environment** - Just through the Mayday network

Should SMEs participate in any reporting schemes?

**CEO** - Can I just check what you mean by SME how big are we talking about because SME covers such a big spectrum if you are looking at a business of 250 employees should they be encouraged to yes

**Head of Environment** - Should a business of ten have to go through a reporting scheme I am not convinced I am not sure it depends what the reporting scheme is I think in CSR and sustainability overall there is a lot of reporting schemes I talking about bigger corporate that have confused bigger corporate over the years I mean the FTSE 4Good the Dow Jones the BITC CSR Index what you get is a people filling out endless forms rather than implementing sustainability solutions not to say that any of those individually are bad I think they are great I think what we have to be careful of is that we do not complicate or over burden SMEs That it becomes another health & safety and no offense if you work in health & safety but it does not have the best of images Do you work in health & safety you are quality management aren't you

**Head of Environment** - You are all three but health & safety has got a bit of a bad rep people talk and its difficult to get we need to be very careful that CSR and the environment does not go down that route where people can of frown and walk away from it

**CEO** - I think bureaucratic processes are one of the obstacles and barriers you have got your list of barriers bureaucracy has to be one of them

Is your externally verified by a third party such as the Carbon Trust? 2

**Head of Environment** - No, sorry you can't hear me shake my head can you, It's like my daughter trying to speak on Skype... she does not answer

Should SMEs procure third party assistance in measuring their carbon footprint?

**Head of Environment** – I think there is a challenge for SMEs should they get to measure their carbon only no I think the challenge we've got at the moment is that Scotland's got a very good set up in that you have got Zero Waste Scotland, Carbon Trust, Energy Savings Trust are all great and I am big fans of all the work that they do I think the challenge however is for an SME you don't want to have two organisations coming in to explain the same story the environment is the environment Okay This to somebody who does not have an environmental manager this is an SME the only want one person to come and look across a range of issues and I think that is the challenge we need almost a single portal for those SMEs yes we've designed online one and that's great that's based on the assumption that someone is going to search and use that portal. If they are looking at bespoke consultancy support should they get it yes, I think some of them need it in the first instance and there is a lot of projects out there that do provide that but I think it should be covering a range of issues not necessarily just carbon

**CEO** – I don't think I have anything to add on that I think the carbon word is a problem isn't it the environment is slightly easier but I think what I feel about SMEs when you look at Scotland and when you look at Scotland's target is 42% you have got to incentivise businesses to do more and I and Andrew says there are organisations that do that and I think the government has to go one step further 99% of our business in Scotland are SMEs. That is the biggest group of people that we need to get engaged and if the government does not incentivise them more and properly incentivise them with something that they recognise they are not going to be able to afford to procure anybody or go anywhere I think that the government is got to do the government has a role to play there.

**Head of Environment** - Procurement is where it's at you know if you look at some of the large business that are doing it what are their motivations for doing it I think that they could be doing more now and pushing it down their supply chains. I really do think we should be doing more and in terms of government and councils

if you look at the influence they could have in terms of their purchasing power never mind the legislation in terms of their purchasing power there is a lot more that could be and should be doing and that will drive the SME market a lot quicker.

Is CO2 footprint measurement a useful tool? 2

**Head of Environment** - For what? To measure our carbon

**CEO** - We do not use it for broader yet any tool like that whether it is measuring carbon or anything is good tool because processes are critical and this is a great area where processes are critical. As Andrew says you have got to create action and you create action by creating processes. Trying to change mind-sets is it a useful tool trying to get people focused on what they can do and what they do have an impact. Yes

Is Carbon footprint measurement a useful tool for SMEs?

**CEO** - I think in the same way

**Head of Environment** - As I said earlier on I think carbon footprint measurement is very useful for SMEs because if they are not measuring it they are not going to reduce it. Simple as that if you are not measuring it you are not reducing it you are not reporting it then you lose all the benefits surrounding having sound environmental policies and action. Whether that is pure cost savings whether it is the innovation side whether it is up the supply chain

Was third party assistance procured to measure your carbon footprint? 1

**Head of Environment** – We just did it ourselves

Is carbon footprint reporting purely for internal use or for external reporting purposes? 2

**CEO** - Our own reports is primarily internal as I said we've never been asked externally before but we need to be accountable we are a Princes Charity you know we represent a brand we need to be accountable for it We won't push it out there probably we like it better than we are we still got work to do were still developing it and I thinks it's important we are keen to share with SMEs because we understand the challenges ourselves and I think that's the most important thing that you can share your own challenges and that



	<p>sometimes creates a safe environment for a good conversation</p> <p><b>Head of Environment</b> - It is published on the on the main network site but like Jane says we won't push it out but it's there for you if you want to have a look at it.</p> <p>Should SMEs report there carbon footprint for internal or external purposes?</p> <p><b>CEO</b> - It depends how good it is as I mean we've said they should use it for procurement and contract bidding if its sound and honest and measurable and all the rest of it but they should also use it to engage their employees around those behaviours that create good practice about carbon measurement.</p> <p><b>Head of Environment</b> - What's gets measured gets done and I don't think that changes with carbon in the slightest I think that its fascinating even for us when we got our waste and we found that extra expenses because the guy was taking out cardboard from the recycling. When actually our cardboard goes across we can just walk it across just 50 metres we were paying. When he came in nobody told him that he should not be touching I know it's the minimal amounts of money but if you multiply that out you do learn a lot. If I was speaking to an SME I would guarantee them money savings if they have never measured their footprint before, almost guarantee it there is so much that people can do but they have to start measuring it to seeing the savings that can be made.</p> <p><b>CEO</b> - I agree</p> <p><i>Product Innovation</i></p> <p>Has CO2 footprint created interest in the company from new customers and existing customers? 2</p> <p><b>CEO</b> – No, absolutely not</p> <p>Can carbon footprint measurement create interest in a company for new customers especially in the case of SMEs?</p> <p><b>CEO</b> - Yes I think it can, I worked for Boots the chemist and I saw tangible evidence that customers were driving carbon behaviours and sustainability they expected it where they purchase, where they go for their banking, where they buy their electricity, where they buy their beauty products where they get there groceries they expect those companies show some proof of activity around carbon, environment ethical</p>
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behaviour. I think the consumer is demanding it more now I think the public is wising up to it and I think the public is driving a lot of this behaviour even if it is an SME even in the service if its offering any product or service it will be in terms of manufacturing it will be but that is a different conversation

**Head of Environment** - Yes I think it is quite sector specific I think some sectors naturally there will be more of a divide as you can see with the likes of Marks & Spencer, ASDAs what the retailers are doing for their suppliers and really pushing their suppliers in terms of sustainability so in terms of that respect, is it a good thing if you want to get on to the supply chain of those suppliers it is essential. In some other industries mainly in the professional services industries it is still important but maybe less important again depending on who your client base is for example so I think a lot of it is sector specific but it is becoming more important

Has CO2 footprint led to the development of new products/services? **1**

**CEO** - I think understanding of the barriers and obstacles to carbon footprinting and environmental engagement we are certainly developing mechanisms and tools so for us it has enabled us to understand what mechanisms we can produce for our members we doing some quite exciting and innovative work in that area

**Head of Environment** - I think just sometimes I remember the first one we did I got a lot of empathy for large businesses in that we are very small we faced some serious challenges from some of the staff about why we are asking for data about their cars for example Then I only thought WOW! They are an organisation of 2000, 20000 and a 100,000 if you at some of the bigger banks they must face significant material challenges and just how careful of the language you need to be when rolling out some of these things when talking to your staff and the buy in that you need from staff to change their behaviour I think on a small scale we learnt just how careful you need to be.

Can carbon foot print measurement lead to the development of new products and services for SMEs?

**CEO** – Yes it can

**Head of Environment** - Absolutely and understanding when you start measuring it a decision has been taken to start taking the environment seriously for whatever reason that may be As soon as you start look into that you start seeing some of the broader benefits you may

	<p>start seeing and that's when you start getting in to the more innovation side which becomes to me the crux of it all When you are looking at the marketplace and you are looking at your own products and services you are looking at developing maybe even diversifying those products and services this is taking advantage of what is becoming a lower carbon economy</p>
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<p>2 To identify the Critical Success Factors (CSFs) and challenges in the use of sustainability footprint methodology within SMEs</p>	<p><b>Environmental Impact</b> (Lash and Wellington 2007) (Porter 2006) (Hart 1995)</p> <p><i>Energy &amp; Water Usage</i></p> <p>Are there any plans to measure your water footprint? 1</p> <p><b>CEO - No Plans</b></p> <p>Do you think SMEs should measure their water footprint?</p> <p><b>CEO - I think you can if you have the resources to do it I think the only thing we did is that we removed the water cooler we use tap water</b></p> <p><b>Head of Environment – Yes I do</b></p> <p>What do you understand the use of the term Sustainability Footprints? 1</p> <p><b>CEO - Never come across it before I'm not being facetious it has not been something I have come across before because people tend to use sustainability as about the whole package do you know what I mean footprint tends to be about carbon this is just my view this is about my perspective or common belief. So carbon footprint is commonly known as sustainability footprint if not but it is an interesting one.</b></p> <p><b>Head of Environment - I think sustainability has been hijacked by the environment movement I know you can talk which is a shame I would like to ask you that question actually because when we talk about sustainability are we talking about the social, environmental and economic impact and yet most of the time when people come to talk to you about sustainability they talk to you about purely about the environmental side. So my understanding of what I hope sustainability is footprinting is about your environmental footprint, your social footprint and your economic footprint</b></p> <p><i>Emissions &amp; Waste</i></p> <p>Does the company consider carbon footprint reduction as one of its KPIs? 2</p> <p><b>CEO - We have not got formal internal CSR KPIs we always strive to have exemplary internal things in terms of we are having a Health at Work Day the staff get fruit we encourage our staff to volunteer and support them you know but we don't actually have KPIs around it at all</b></p>
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Should SMEs consider carbon footprint reduction as one of their KPIs?

**CEO** - I think that they should have targets it is always useful. I think when you are managing employees you got to assume are not part of this they don't get it, let's assume that most employees don't get it you will have to if the targets are good I think it's good to make a KPI part of the senior manager or middle managers KPIs I think it is a good thing because that will feed down the line as well in bigger companies. I don't know what you think Andrew you probably see them more close hand.

**Head of Environment** - I do agree it's a good thing I think that it should be in KPIs I think the challenge is again so much depends on what an SME is covers such a broad range and some of it I think you have to be really more specific in terms of that because generally it's a nicety because generally when you look at a business of 250 employees then absolutely it should be part of the KPIs it should be on there and then you going to no challenges because this how our senior management buy in. You have got the bottom up push which is most likely happening in a lot of companies and equivalent managers who get scuppered with having to actually deliver on the target which is the real challenge for a lot of businesses. So giving them KPIs and giving them freedom to do that I think goes a long way in supporting that

Do you see a relationship between CO2 footprint & climate change? 1

**CEO** - I think most people would, I think the less informed or the least engaged still think it

**Head of Environment** - Yes I agree 100% and resource depletion and all the other environmental issues that we face.

Have you set targets for reducing your carbon footprint? 1

**CEO** - We don't have a target

**Head of Environment** - We have a target informally has been 10%

**CEO** - Yes

**Head of Environment** - No that's been our target.. that's been informal as being part of the Mayday Network and everything else. That was our target there where we

are we have got a number of challenges without going into too much detail about our carbon footprint there is a number of challenges specifically about how they are made up and obviously our location of where we are so there is limited things that we can do. Our carbon footprint is quite small its minimal in the grand scheme of things and yes we can reduce it by two or three tons and we have been reducing it by two or three tons . Saying that people still need to go to meetings in respects the challenge that we have got is that the more members we have the higher our carbon footprint will probably become Like as with any small business you need to start looking at absolute reduction or are you looking at decoupling your emissions basically from your business growth or not and that obviously is quite a challenge because from based where we are we encourage people to take the trains You know how did you find getting here today.. exactly

**CEO** – We look at that the location of the office was the biggest contributor to our carbon footprint and we are actually reviewing looking at our offices at the moment our lease comes up in January. Well we have the park and ride there are buses but it is not productive use of my staffs time being here either because I have to look at it from a business perspective because if they want to go into town they have got to spend over an hour going to the bus stop and getting a bus productivity is quite important but as Andrew said we always have to be cognisant that our business is absolutely dependent on networking. Networking means everyone is out at meetings quite often

**Do you think SMEs should set targets for reducing their carbon footprint?**

**CEO** - Yes I think it's a good thing to do to get all the staff bought into it but I think businesses if they set targets have to support their own employees helping to achieve them and encouraging then there is car share. There lots of schemes we know albeit from bigger companies that can be shared and adopted for smaller ones

**Head of Environment** - Yes Absolutely there is a lot of things like that we do which a lot of SMEs are doing or could easily do as well like encourage lift sharing, we look at the trains we encourage video conferencing in fact personal one of the best things I have found is with the severe weather last year with all of the meetings I have cancelled I thought it was brilliant with so many meetings I thought that I had over the phone it really made me think about hang on was it absolutely really vital that I was there in person I think it was really interesting if you look at behaviour change The

	<p>key event that happened that actually made me reassess business as usual so I think there is a lot of scope there to reduce emissions by looking at core business processes if you like</p> <p>Has CO2 footprint improved your understanding of environmental impacts? <b>2</b></p> <p><b>CEO</b> - I think we are all probably aware of it, I don't know. NO. I have given you a straight answer your first one</p> <p>Can carbon footprint measurement improve SME understanding of their environmental impacts?</p> <p><b>CEO</b> - Yes again</p> <p><b>Head of Environment</b> – Absolutely but we are in a different position where we work with the environment for an SMEs that doesn't</p> <p>Why did the company choose to measure its carbon footprint? <b>2</b></p> <p><b>CEO</b> - Because you cannot do what your are - One because we are expected to as one of the Prince's Charity and that is one of the key areas for him as our president but also you cannot be selling a membership to a company which is about there sustainability across all areas and not do what you say you do on the tin</p> <p><b>Head of Environment</b> - I remember years ago I was working on a consultancy project with a member company and I measured there footprint for them very informally again and when I was doing it so I thought hang on I have not actually measured ours so I went back and actually practiced on us and went back and did it for them so it's just like what Jane said you got to do what you tell others to do</p> <p>Why do you think SMEs would chose to measure their carbon footprint?</p> <p><b>CEO</b> - Either because they are committed to climate change the whole agenda and or the want to save money</p> <p><b>Head of Environment</b> - Or maybe pushed through the supply chains</p> <p><b>CEO</b> - Or being pushed there is the procurement issue.. those three key areas</p> <p>Is CO2 measurement a useful tool for SMEs to combat climate change? <b>1</b></p>
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	<p><b>CEO</b> - Well if it's a tool that makes them measure their carbon footprint and by that reducing it well yes because they are all contributing to overall emissions</p> <p>Do you see a relationship between carbon footprint measurement and SME success?</p> <p><b>CEO</b> - Not carbon footprint measurement on its own I think, I think carbon footprint measurement is an important factor for their success depending what industry sector they are in I would not want to put it on its own I would want it to be part of the whole the environment the social the whole thing we were talking about that again it is really important when you are talking to SMEs you engage them in the whole package for sustainability of course carbon footprint is part it's got to be part of the whole thing.</p> <p><b>Head of Environment</b> - FTSE 350 companies the big guys that report on their CSR generally outperform others that don't and I know that is not SMEs that is large corporates I don't see why that won't be mirrored in the future but again carbon is quite narrow so I think on the broader CSR issues on the broader sustainability issues then ultimately in the next few years that would start to happen</p> <p><b>Stakeholder Impact</b> (McElroy et al. 2008), (Porter 2011)</p> <p><i>Anthro Capital Resource Allocation</i></p> <p>Are there any plans to measure your social footprint? <b>1</b></p> <p>How long has the company measured its Carbon Footprint? <b>2</b></p> <p><b>Head of Environment</b> – 4 years</p> <p>Do you think carbon footprint measurement is a good investment of the organisations resources? <b>1</b></p> <p><b>CEO</b> - If a good investment means you get a return on the investment I don't think we have seen a significant financial return on it but I think it has been important in terms of our own behaviours as employees</p> <p><b>Head of Environment</b> - I think it is import from a pure cost investment but overall in terms of the other benefits employee motivation, retention, engagement etc well then... Yes</p>
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	<p>Do you think carbon footprint measurement is a good investment for SMEs?</p> <p><b>CEO</b> - Yes, I do I think it depends on how they do it and how they use it but yes absolutely</p> <p><b>Head of Environment</b> - Yes as long as they follow through with actions to reduce but I think one of the challenges at the moment is Zero Waste Scotland, EST they have the same frustrations as us sometimes in that they produce fantastic reports for organisations and they sit on the shelf gathering dust</p> <p>In what way do you contribute to the CO2 measurement exercise? <b>2</b></p> <p><b>CEO</b> - As Chief Executive</p> <p><b>CEO</b> - Well I just facilitate and encourage the internal team allow them the time to focus on it and encourage good results</p> <p><b>Head of Environment</b> - I kind of I guess responsible for putting it all together. Yes so everything else</p> <p><i>Shared Value Creation</i> What value does carbon footprint measurement provide to your business as an SME? <b>1</b></p> <p><b>CEO</b> - As we said the value it's got to give them is bottom line value and reducing their impact on carbon emissions and the environment</p> <p>Do your suppliers and sub-contractors require provision of sustainability footprint data? <b>1</b></p> <p><b>Head of Environment</b> - We don't have that many suppliers to be honest and its not been that huge focus in terms of our cleaners are MITIE they are a member company so I am well aware of their CSR agenda because we helped them with it with any of our suppliers if they are big enough we would ask if they want to work with us we are not big enough really to have a policy but obviously but in terms of office supplies cleaning it's good to know we have member companies that we know who are committed to CSR</p> <p>Do you think SMEs should encourage their suppliers and sub-contractors or require there suppliers and sub-contractors to provide sustainability footprint data?</p> <p><b>CEO</b> - I don't think your answers are very specific there is a yes and a no but there is a big grey area in the</p>
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middle and again it comes no I don't think it should be set in stone. I think it should be flexible but I think where businesses can work with companies who are accountable for sustainability then obviously there is a priority but businesses are going to be driven by price as well. Even in our bakery we had a baker who would buy the most awful stuff from all process artificial additives because he taught cheap was best. So it is a grey area. Your questions are very black & white and I understand why but there is that big grey area in the middle just didn't say yes or no to any of your questions yet so where possible yes but it's got to be price driven as well.

**Head of Environment** - I think that SMEs.. I went off to another question in my head there.. I agree pretty much with what Jane was saying there big difference between a small business and a large business you must always ask the question whether you're business or a consumer you should always be asking the question about the environment, sustainability your suppliers. However I think that there needs to be an understanding of the relative weighting of that you put on it but how seriously do you take it into account so if people got equal pricing and one's got an environmental policy that's great because its an obvious one but its starts to get interesting when you start looking at true sustainability that's a question we always get asked when I am giving talks to SMEs or I am running a workshop workshop always throw it back at me saying you expect me to work in the most super environmentally friendly offices I have no cash and that's where sustainability is so to me it's much more complicated that saying you should be pushing your suppliers yes you should but cost does come into it and I think it's about its about balancing costs, social and environmental impact and coming to a decision I think all decision but I think all decisions do need to be have taught about or taken into account these three aspects and then according to the position that you are in according to the with that you put on to it you need to come to the best position for that business the business can be sustainable.

[In what way can policy making institutions contribute to the uptake of CO2 measurement by SMEs? 2](#)

**CEO** - We do that all the time we are a friendly critic of government we provide them with enormous amounts of data feedback on SMEs we are facilitating a lot of the conversations they are able to have with the private sector we are creating the safe space for feedback from companies and then taking that back to

the government closely watching regulatory and legislative behaviours coming from the Scottish government in this as well and we will represent our companies and our membership if we are concerned about it

**Head of Environment** - On a more practical level a more operational level we run programs for university students we put them through training them let them go in and measure SME carbon footprinting so we do a lot in that field

In what way can SMEs contribute to Scotland's Carbon Footprint measurement exercise?

**Head of Environment** - To Scotland's carbon footprint measurement exercise Well SMEs as Jane said earlier on are 60% of the workforce or 40% one or the other and 99% of businesses so in terms of business emissions there is a huge role that SMEs can play in playing a part in reducing business emissions which in turn plays a huge part

What are the key drivers for measuring your carbon footprint? 2

**CEO** - What we do our business and I think cost saving but it has not delivered cost savings but it will take a long time to deliver cost savings. I think it is good positive sustainable behaviours it is one of the key drivers for me. There is teamwork in there as well there is engaging our employees in the issue which is important because we don't just do environmental stuff we do employability issues we work with schools. We try to ensure that environmental carbon issues is integrated in everything we do so it's obviously good with an internal measurement like that you are engaging staff doing the other projects and you are trying to get this discipline throughout the team which is quite challenging

Key drivers I agree 100% top one practising what we preach, I am very passionate about the environment so it is something that I want to do anyways. Practicing what we preach being who we are and say we are another driver for us definitely lower down the level was the fact that we now have to because our President wants us too

What are the key drivers for SMEs measuring there carbon footprint?

**CEO** - I think we have answered it Cost, procurement and employee engagement

**Head of Environment** – Brand profiling maybe

**CEO** – Brand profiling, Marketing

## **Appendix 5 Moffat Golf Club Interviewee Transcripts**

Research Objectives	Concepts & Themes
<p>1 To critically analyse the perceptions of contribution of sustainability footprint tools to growth and its potential to assist firms in achieving further sustainable growth in four key areas <i>Innovation Impact , Cost Impact , Environmental Impact and Stakeholder Impact</i></p>	<p><b>Cost Impact</b> (Lash and Wellington 2007) (Porter 2006) (Krysiak 2009) (Teece 1987; Winter 1987) (Hart 1995)</p> <p><i>Risk</i></p> <p>How important is carbon footprint to the company? 1</p> <p><b>Greens Convenor</b> – How far background do you want me to go do you want to know what type of man I am or what role I am performing</p> <p>Interviewer – What role you are performing and what led you to perform this role well I want just an overview</p> <p>I am the longest serving member of the golf club committee at 9 years my background is very practical I come from a farming family the land golf courses the turf interest me I have holiday cottages of my own and in the grounds of my holiday cottages I have 5 golf greens So there is an interest at home to learn more of what goes on here so that I can look after my own place better and I am a keen vegetable gardener so the land is really in my blood why did I want to work with the golf club well initially they approached me I had just retired from the fire brigade I am a competent administrator and manager and being a Yorkshire man I am pretty clued with finances as well so I was invited to come on to the committee as a house convenor and manage from a committee manage what goes on in here so how we provide the catering, the drinks and the environment for people in here the cleaning of the place the whole management of the place and I did that for two years and the then greens convenor reigned from the committee and I was asked if I will move across to greens which suited me perfectly and our greens team very practical forthright men and unless you have worked I would suggest in an all-male environment you would have difficulty managing them because they are very robust characters so my profile pretty well fitted what the golf club wanted from the point of view of managing the greens I have a health &amp; safety background I also do the health &amp; safety for the place I also do all accident investigation and that sort of thing so I have a significant role and a fair amount of influence about how the place goes about its business. I am quite passionate about the golf club not because I am a life-long golfer I was a cricketer I took up golf at about</p>

fifty two something like that I have never been a good golfer and would never will be because I still play cricket I am all shoulders and wrist you are obviously a cricketer as well so you know precisely what I mean you will never be a good golfer if you ever play cricket. It is not that I am passionate about the golf it is that I am passionate about the club 127 years unbroken how fantastic is that what has been the commitment of the people that have kept it running all that time I love this environment the fact that I can sit here and enjoy this fabulous view that I can go out and play a game of golf if I want to and the company is good pleasant people the service at the bar is pleasant the whole environment is very nice I don't have to listen to people "f-ing" and "blinding" in the pubs down the town I can bring my wife up here for dinner and know full well that we don't have to listen to rubbish. So that is the reason I'm here and my role in the place at the moment I am doing both house and greens because we don't have a House Convenor so I have a big lump of the clubs budget to manage as well but I am here because I believe in the place I absolutely and utterly believe in the place and I would defend it to the hilt so any attempt to spoil the environment that this golf club sits in is really going to find some opposition from me we are facing a situation where the pylons are going to come right in front of here from the wind farms and the wind farms are going to go just top of those hills over there at the beef dub so that's who I am and why I am doing the job. There were several pieces to your question did I answer all of them

It is not is the truth in isolation it isn't however if it becomes part of our business plan and part of where we are going and if being responsible about the carbon footprint assists us in running this better we are 100% signed up if it just makes life more difficult for us it will be very hard for us to sign up we just do not have any spare money to be nice that is the cruelty about this that is the bottom-line and if you were to ballot our members and ask them if they would pay £10 more subscription so that we could be more responsible regarding the carbon footprint they would not pay it they just would not that is the truth of the matter we do a number of things that do contribute to reducing our carbon footprint like we have thousands of trees consuming CO2 for example and as and when

we harvest those we will plant another thousand trees but not because they convert CO2 because we need to landscape the golf course not because we have a social conscience or conservation conscience it will be of practicality we are very pragmatic people. We certainly looked at how much fuel we consumed in here how much gases how much is LPG how much gas we burn we've looked at that but it is only because of the finances not because of our conscience. Well I drove you up here in a 4x4 and the reason I have a 4x4 is because it snows a lot around here and my family live my daughter is in Camberley and my son is in Hartford and I want to be able to get backwards and forwards without getting stuck on the motorway. I also remove all my own the rubbish from the site of our cottages and I need to tow a trailer so you can see where I am coming from there it is all about practicalities. If I could find a 4x4 that did 70 to the gallon I would be over the moon it.. you put your finger on it would save us a fortune People are about money there is a huge attack on capitalism at the moment its nonsense right if you think about I don't know Hester's bonus of £900,000 at RBS as soon as he gets that bonus because I think he should have it because it is his contract of employment if he is paying his taxes at 40% how many career benefit claimants is he keeping....

That is a whole other issue

But this is the point we are a capitalist country we are a nation of people who very sadly and this is sad we seem to think the only way we can demonstrate our self-worth to others is by having materialistic objects. If that continues then you will have a massive consumer society and you will be going through raw materials and consuming energy at a phenomenal rate we have got to break that chain that will be a damn good thing. My son works for T-Mobile and until the recession the fashion life of a mobile phone was approximately 16 weeks before the teenager felt a need to replace it before Samsung or Nokia or somebody else had produced a flashier phone and it was not about communicating it was about look at me I can afford this you will continue then to consume stuff at a vast rate show me a washing machine you can repair. We are not by looking into the home and saying to people put these little glow-worm bulbs in and that's ridiculous that is not going to make a scrap of difference. We have to get to the people who are actually creating this consumer society. We had

some friends visiting us from New Zealand and they were coming to us via Paris and they brought for us a box of six chocolates about that big neatly arranged absolutely beautiful five layers of packaging ... five layers of packaging if you include the ribbon. Until we get to the marketing people and say stop it I am perfectly happy to get my carrots in a brown paper bag of recycled brown paper I am perfectly happy to do that in fact if you like you can throw them to the bottom of my bag I will be just perfectly happy I don't need all this nonsense packaging. Things do not be replaced before they are broken or worn out. Clothing young girls in particular many garments are worn a maximum of twice and discarded not to be put in the draw to be used 6 months' time when everyone has forgotten that you had that T-shirt but thrown away whereas most of the clothing is coming from China or India how far is that. My favourite one as a vegetable gardener then you get a little polystyrene pack of runner beans. Runner beans grow in the crack in that concrete and they have come from Egypt why... Why haven't they come from Norfolk, Lincolnshire and Sussex which is some of the finest horticultural land in Britain? The reason why they have not come from there is because we have allowed wages to get to such a level that nobody can afford to grow them I do I am self-sufficient at home year on year we fill our freezers we have our fruit vegetable and venison throughout the year and a local game keeper pal of ours gets us venison, rabbit, pheasant and partridge that is pretty well how we live and I do that because I think it is healthier the fact that it is totally green you can't get any greener that that I don't use any chemicals in my garden not because I believe in organic but I think organic is the biggest con before time began it is not true the truth is fresh if you came for a meal at my house during summer the vegetable garden is in full swing and I put vegetables in front of you they would have been out of the ground no more than one hour I would harvest them an hour before we needed to cook them no more. A tray of runner beans has to come from Egypt so somebody has to pick them one day then presumably they are taken to a warehouse or processing plant or something at least another day if they are coming by truck its three days minimum then they go to a packaging plant in the UK another 4 days.. 2 days rather by the time they hit the supermarket they have got to be 10 days old and umpteen food miles on them



and they will have a week's worth of shelf life up to the sell by date that's not possible if I go to my garden and pick runner beans at 14 days they would be rotten they would be soft unusable and going black so somebody treated those with chemicals there is a big need to address the problems at sources rather than trying to get people to stick Elastoplast on them

**Green Keeper** - Mainly we are just maintaining an 18 hole golf course for our members and visitors we are understaffed because of financial restraints because there is not a lot of people to look after so basically we are looking at a full-time staff of two and we use to have a part time staff of one usually in the summer we used to have a summer boy but that has now dropped but we are working on small budgets so we really have to watch what we are doing to work the best that we can with the little that we have and basically try to work things as we can borrow beg steal do whatever you have to do that is basically it so to provide a good service to people who want to play a round of golf, have a good day and come into the club house

How important is the carbon footprint?

**Green Keeper** - Almost something that is becoming more and more important as the year goes by its just something being an older person it is harder to adapt to adapt to it is something that is going to have issues with our profession anyway in regards to chemical use in the future so we have to look at alternatives which I doing anyway we looking at mechanical operations on the surfaces to try to reduce the amount of chemicals and etc. that we are using and that always is good for the environment but it is also good for us financially these things are becoming more expensive anyway so it is a win win... if you can reduce those kind of things I rather do work and physical input into the greens rather than chemicals but sometimes we can't really avoid fertilisers if we are cutting greens and taking clippings away I am sure that in time these things will change there a people who are trying to expand and use your own soil and things back into your ground yourself but then again we have to look at our financial situation with the golf club and work with what we can

*Financial Capital resource allocation*

Has present economic conditions impacted on your companies carbon footprint? 2

**Greens Convenor** - Yes, in some ways in a positive way as we have less people coming so there are less road miles coming here so there is less diesel, petrol they use to get here as we economise we use less fossil fuels certainly the recession is for example we use to have a member of staff here Mondays Wednesdays and Fridays for four hours during the day it is cheaper for us to tell that member of staff to stay at home than it is for us to heat this place so we are using hundreds of litres less gas because we are not heating the place so the recession in a perverse way has very much reduced our carbon footprint

**Green Keeper** - That's hard to say I suppose we almost like everybody else we have little money at the moment so we are looking to reduce our running course so it will usually go in hand with helping that kind of side like I say we try not to by fungicides pesticides or anything like that I am here again with Michael we had a technical glitch Greens Keeper I am just about to go through these questions quickly and in very rapid fire because of what happened

How much does measuring your carbon footprint cost? 2

**Greens Convenor** - I am not entirely sure you can accurately measure it we don't consciously measure it we would not say we have used 500 litres less gas therefore our carbon footprint has been reduced by at least x kilograms of CO2 we don't do that what we do is say we have used 500 litres less of gas which has saved us £800

**Innovation Impact** (Lash and Wellington 2007) (Porter 2006)

*Process Innovation*

What type of footprints do you currently measure CO2, social, water? 1

**Greens Convenor** - We do measure it all the time. We need too

What methods do you use to measure the company's carbon footprint? 2

**Greens Convenor** - I am not entirely sure you can accurately measure it we don't consciously measure it we would not say we have used 500 litres less gas therefore our carbon footprint has been reduced by at least x kilograms of CO2 we

	<p>don't do that what we do is say we have used 500 litres less of gas which has saved us £800</p> <p><b>Green Keeper</b> - Again that is one for Dick</p> <p>Does the company have a formal policy for carbon footprint? <b>1</b></p> <p><b>Greens Convenor</b> - I suppose in a way we do but it is financially driven not carbon footprint driven but we have changed the lighting system of the clubhouse we have changed the water system up at the green keepers hut we have actually altered the building to reduce the amount of energy that we use but in truth it was not done to reduce the carbon footprint it was done as a result of somebody auditing our carbon footprint so the outcome was directly from that audit that was drove it in the first place but in truth we are much more driven by finance</p> <p><b>Green Keeper</b> - No not at the moment</p> <p>Do your customers express an interest in your sustainability footprints? <b>2</b></p> <p><b>Greens Convenor</b> -No not one jot</p> <p>Green Keeper - Like I said the current membership all vote the way things will suit them because it is a selfish environment in golf courses it is very difficult it is very difficult to get people together as would find out about the wind farm it was a 50/50 split about wind things come out some love them some hate them it is always going to be the case we get companies coming in with regards to coming in trying to sell stuff that is going to go down that road everything is based on how much we can afford as far as the membership is concerned it is very difficult if you've got 300 people with 300 hundred opinions and you need them all on side it is always going to be all hard work</p> <p>Is carbon footprint reduction a key issue for discussion at management meetings? <b>2</b></p> <p><b>Greens Convenor</b> – No</p> <p><b>Green Keeper</b> - I am not involved in management meetings I am only involved in the green side and if it is my convenor will be doing that job for us</p> <p>What barriers does the organisation face in placing carbon footprint reduction on the agenda? <b>2</b></p>
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**Greens Convenor** – No there would be no barriers if I said we need to include carbon footprint on the agenda of the next meeting nobody would say we are not doing that they would say okay we would wait and see what that is about we have had a guy from lets live local up we had an open day in actual fact a full afternoon where we true the golf course open to the public to come and have a look at what we are doing but this was in terms of the possibility to harvest this timber and recycling that and a lot of people came to see what we are about we have done that we have a lose connection with Moffat CAN in truth there is not a lot of common ground between the two of us in truth there is a lot of common ground between us and Lets live local with that statement both Moffat CAN and Lets live Local are carbon footprint driven where as we are definitely financially driven

Moffat CAN that is?

Moffat Carbon Neutral.. If you go on the website and have a look at them they a very well respected they are seen as very much leaders in community carbon footprint reduction very much seen as leaders they are doing all sorts of things. They produce fish from the restaurants that is feed entirely from food waste which is collected around the town things like that.. they created allotments for townspeople they collect plastics and so on for recycling it is actually a carbon neutral organisation there aim is to get Moffat as a Carbon Neutral town. My frustration of that is nobody has done an audit of all this forestry to actually see what we are doing to reduce our own carbon impact you see the government lets you down initially they said if you large areas of forestry then we would give you carbon credits for that and then you can trade those now along with Wishaw Golf Club we were looking very hard and saying we have all this grass and all these trees all of which are converting carbon can we go to BP and sell our carbon credits and the reasons no and the reason we can't do that is if we had said if we planted 20000 trees can we have those as carbon credits Yes... We've got 20000 trees no I can't see the sense in that the 20000 trees today would not be converting as much carbon as these fellas for 30 years but we can't have any credit for what we have got it is for new initiatives why is it for new initiatives because the politicians who are hoping to be re-elected and we have had 6

million new trees planted to combat carbon emissions it's all about them sticking badges on than it is about the environment because I think if you were to drill down for the truth then most of the politicians you would find that the vast majority of them could not care less about carbon emissions they care very passionately about being re-elected like If the public were say we would only elect politicians with an environmental conscious then they have to pretend to have an environmental conscious. I don't think they are committed at all look at the stuff about the London Olympics you want me to put these little light bulbs in my home but you are going to do all this stuff most of the spend is window dressing it has nothing to do about the world class athletes. I would be just as happy to see the world's finest 100 metre runner run on the grass out there provided it was appropriate to run on I don't need fancy stadiums and I don't need fancy opening ceremonies and closing ceremonies at £81 million I would like the see the fastest man in the world or the fastest woman in the world the rest of the stuff do we really need to see the biggest fire work display. I think guys like you are well up against it there are those making deceptive noises pretending to be supporting what you believe in and many of them are just deceiving you If you can make being green financially viable then everybody will sign up.

**Green Keeper** - Only finances and the availability of machinery etc to help us go down that route as far as the golf club is concerned it is a work in progress at the moment

Does the company participate in any reporting schemes? 2

**Greens Convenor** - No

**Green Keeper** - Again not that I am aware of but Dick deals with that kind of things at management meetings

Is your externally verified by a third party such as the Carbon Trust? 2

**Greens Convenor** - Again I have no idea

**Green Keeper** - No, The only people that would have a record of that would be the Crichton Centre

	<p>Is CO2 footprint measurement a useful tool? 2</p> <p><b>Greens Convenor</b> - I think when you get into it probably will be... I will have to say personally I am a way behind maybe laziness in my part but I think it's something we are going to have to do we are going to have to go done that probably going that road I am going to have to educate myself somehow very difficult at my age I will try hard if nothing else</p> <p><b>Green Keeper</b> - Well I do yes purely and simply because I can see where I am spending it would not be a useful tool for marketing nobody ever asks us what our carbon credentials are nobody has ever asked that question so I don't think it is a strong marketing tool. There was a suggestion maybe two years ago that green organisations would attract more customers and there is no evidence of it at all. So it's about if we measure our carbon footprint so it should point at where we are spending money at where we could possibly save I have never seen where it could create more income to enter into the organisation</p> <p>Was third party assistance procured to measure your carbon footprint? 1</p> <p><b>Greens Convenor</b> – Yes</p> <p><b>Green Keeper</b> - If it was it would be dealt by Dick rather than myself</p> <p>Is carbon footprint reporting purely for internal use or for external reporting purposes? 2</p> <p><b>Greens Convenor</b> - Depends what you mean by external reporting purposes it was made available to every member of the golf club and we are completely free with it for any other organisation to look at it there are no secrets in it we are more than happy to share it and of course it would have been used for research at the Crichton Centre I guess the answer is it is both externally available as well as internally available</p> <p><b>Green Keeper</b> - No idea</p> <p><i>Product Innovation</i></p> <p>Has CO2 footprint created interest in the company from new customers and existing customers? 2</p>
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	<p><b>Greens Convenor</b> - No not one jot</p> <p><b>Green Keeper</b> - Like I said the current membership all vote the way things will suit them because it is a selfish environment in golf courses it is very difficult it is very difficult to get people together as would find out about the wind farm it was a 50/50 split about wind things come out some love them some hate them it is always going to be the case we get companies coming in with regards to coming in trying to sell stuff that is going to go down that road everything is based on how much we can afford as far as the membership is concerned it is very difficult if you've got 300 people with 300 hundred opinions and you need them all on side it is always going to be all hard work</p> <p><a href="#">Has CO2 footprint led to the development of new products/services? 1</a></p> <p><b>Greens Convenor</b>- It has led to a change in the way we go about our business in the way we have arranged our premises and so on In terms of products and services nothing outgoing it has changed us on the side of the fertilisers and so we have cut done on what we use in there partly financially driven because the Crichton never looked at the green bit they only looked at this building but many of our suppliers were suggesting different ways of going about things a good organisation to talk to might be agronomists because the majority of the agronomists who would advise us on the technical aspects of our courses are definitely steering people away from the heavy nitrogen applications and that sort of thing to a different way of going about looking after your land and your course and so on I would say they are actually genuine contributors as well and there is a lot of them out there in the agronomy world and the turf maintenance world there are a lot of genuine green people</p> <p><b>Green Keeper</b> - In the green keeping industry there is stuff going about that we can all use then again because you are restricted by what you can afford and what you can't there is always new developments all the time coming through and eventually like I said there is going to be a reduction in the use of chemical etc. that we are going to have to find a way around. I am assuming there is going to be new stuff coming up every year to help us in that kind of thing</p>
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<p>2 To identify the Critical Success Factors (CSFs) and challenges in the use of sustainability footprint methodology within SMEs</p>	<p><b>Environmental Impact</b> (Lash and Wellington 2007) (Porter 2006) (Hart 1995)</p> <p><i>Energy &amp; Water Usage</i>  Are there any plans to measure your water footprint?  1</p> <p><b>Greens Convenor</b> - We do measure it all the time. We need too</p> <p><b>Green Keeper</b> - There probably is but that is again down to Dick as convenor they will take care of that if they need any input from me I keep records of rainfall which has an effect on our irrigation use any way it gives me an idea if I look back into records over the last 2 – 3 years I could see if there is patterns coming for rainfall at the time so I don't put irrigation on it at all and we just leave it at that and 9 times out of 10 it does work if we do get a dry we keep it to an absolute minimum as far as that is concerned we don't really have much use for irrigation these days we have had 7 ½ feet of rain last year</p> <p>What do you understand the use of the term Sustainability Footprints? 1</p> <p><b>Greens Convenor</b> - It is that reduction in carbon footprint that you can sustain year on year rather than just a short term fix to reduce something so if you reduce your fuel consumption by X this year it is x +1 next year and so on to keep the thing going and not do what they do with the wind farms pretend</p> <p><b>Green Keeper</b> - Very little I will have to be honest</p> <p><i>Emissions &amp; Waste</i>  Does the company consider carbon footprint reduction as one of its KPIs? 2</p> <p><b>Greens Convenor</b> - I would be misleading you if I said it did unless it was financially driven but then it would be a secondary outcome in truth</p> <p><b>Green Keeper</b> - My convenor certainly does yes</p> <p>Do you see a relationship between CO2 footprint &amp; climate change? 1</p> <p><b>Greens Convenor</b> - I hope everybody walks on the same road I don't know it is difficult one for</p>
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me to answer not that I am bright the climate is definitely seen a huge change in climate so I am hoping we can all work together and try and do things about that because it is certainly not any good for our business

**Greens Keeper** - It is a very good question carbon footprint is real climate change is such a woolly concept that I have not signed up to it at all I think the whole thing needs reviewing I think it needs to present itself through more credible people than it has done and I think it has got to stop the emotional blackmail of climate change and get into some facts that we could stand and say absolutely right. I can see that the deception that has gone on along with the climate change industry is almost as bad as the MPs expenses they have got to clean up their act so I totally believe the carbon footprint is measurable there is no argument about that is scientific you can measure it the climate change stuff there has always been climate change hasn't there suppose in one way I got to be careful what I say here the thing that is deceptive is the global warming bit

[Have you set targets for reducing your carbon footprint? 1](#)

**Greens Convenor** - If it saves us money that's how the targets would be set is if it saves us money.. Then we would do it would be a secondary outcome it's no good misleading you... you're carrying out research. I could give you all the nice answers and your research would be useless

**Greens Keeper** - On the golf course or in general?

[Has CO2 footprint improved your understanding of environmental impacts? 2](#)

**Greens Convenor** - Yes undoubtedly

**Greens Keeper** - It probably would had I put a bit more time and effort into it I am a lazy sod and I think I am going to have to get my finger out to look into all these things and to just make myself learn and it is pretty difficult to do these things it's like painting the forth road bridge because when you paint one end you have to go back and start again

[Why did the company choose to measure its carbon](#)

footprint? 2

**Greens Convenor** - Finance that was the point  
**Greens Keeper** - People like Dick who are on the committee who actually are quite passionate about it and people like that can push people forward and I think you need people like that who can just push people forward and bring them up to speed on all types of issues to be honest had somebody like Dick had not been on the committee you might have nobody to speak to when you came up here.

Is CO2 measurement a useful tool for SMEs to combat climate change? 1

**Greens Convenor** - A good question really one it is useful tool because small to medium sized businesses are interested in reducing their costs so it is a useful tool from that point of view because one generally relates to the other For those that are in a luxurious position from not having to worry too much about the bottom line so it is a useful tool to know where you are going and there might just be an element in certain industries not this one where your green credentials good be very good business good marketing strategy

**Green Keeper** - I think it should be useful to everybody small or big

**Stakeholder Impact** (McElroy et al. 2008), (Porter 2011)

*Anthro Capital Resource Allocation*

Are there any plans to measure your social footprint? 1

**Greens Convenor** - Yes we do actually that is actually quite important and that would be in our business plan. Actually there is a point here if we go for grants then there is very definitely be our carbon footprint our reports from the Crichton Carbon Centre and all the rest of it will definitely go into that grant application because the council or the government or sports organisations would most certainly want to see some sort of responsibility towards the environment within an application so it would figure very much in grant applications just the same as demonstrating that we are inclusive with the community One thing Moffat Golf Club has done since it opened is the local schools initially the private schools of course and when the

communities and councils started to provide schools and people went on to them the schools in the area had free access to bring students up to learn to play golf and always ever had we active in so much in that we have a lot of expensive and technical equipment so we go to maintain the local football field and rugby field and that sort of thing we go and aerate it for them or roll it for them or whatever on an annual basis we go and look after the bowling green for them so on that end we are quite involved with the community the local schools and sports organisations and that sort of thing

How long has the company measured its Carbon Footprint? **2**

**Greens Keeper** - About four years

Do you think carbon footprint measurement is a good investment of the organisations resources? **1**

**Greens Convenor** - Not unless its linked to financial return

Because if you don't keep your eye on financial return then the organisation ceases to exist and then it contributes nothing... It has to be survival.. survival comes first

**Greens Keeper** - Yes anything that is going to help in that way is good for any business

In what way do you contribute to the CO2 measurement exercise? **2**

**Greens Convenor** - Monitoring of fuel consumption, electricity consumption plant fuel consumption and measurement of water consumption its measuring

**Greens Keeper** - We measure rainfall patterns and the amount of rain that is coming so we could reduce or use of water and our wastage of water because a lot of people just fire a lot of water on them just for the sake of it and it is just too wasteful and apart from anything else it is expensive. I think it is a complete waste. We have borne water supplies up there that we are trying to look to use for washing machinery and stuff to save wasting water etc. and stuff there are ways around it the measuring of the water has been pretty helpful I will have to be honest. We can also time our fertiliser use so we can use natural rainfall rather than wasting more water

	<p>when you know it is going to come anyway waiting for mother nature to help us rather than go around and do it</p> <p><i>Shared Value Creation</i>  What value does carbon footprint measurement provide to your business as an SME? <b>1</b></p> <p><b>Greens Convenor</b> - Reputation, credibility and an indication of forward thinking</p> <p><b>Green Keeper</b> - In my opinion I would find that difficult to answer I would have to be honest but do you see any value from it  I think without a doubt if we have to go down that road the whole place is going to benefit we have to provide good playing surfaces from my point of view so if I can reduce the use of any chemical on my greens for example I think that has got to be good I mean it's not good for stuff in the ground we know that using chemicals for instance are causing harm in other areas killing little things in the ground that are helping produce good healthy plants so when you are actually helping on the disease front then you are actually creating other problems by harming beneficial bacteria and stuff like that there are lots of ways of going around. So I think the more we go down that road the healthier it is going to be for us from a golf course point of view the better it is going to be for the business people will want to come and play</p> <p>Do your suppliers and sub-contractors require provision of sustainability footprint data? <b>1</b></p> <p><b>Greens Convenor</b> - No not as far as I am aware of</p> <p><b>Green Keeper</b> - No If somebody has to haul the sand an extra 30 miles for us to save £5 a ton then that would be fine by us</p> <p>In what way can policy making institutions contribute to the uptake of CO2 measurement by SMEs? <b>2</b></p> <p><b>Greens Convenor</b> - By making it a condition of giving grants that's their big stick you have got to prove your carbon credentials in order to get a grant. It is as simple as that if you really want to force organisations to do it that's the route</p> <p><b>Green Keeper</b> - The likes of us There is no doubt if you even go down the road of grants so we can actually get into it properly without</p>
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actually the business struggling we have very little money anyway at the end of the course you have to prioritise things unfortunately if we have a machine that cuts grass and has to be replaced it gets to take priority over everything else I think if there was grants available to help people go down that road well yes coming from a small business point of view that would be huge

What are the key drivers for measuring your carbon footprint? 2

**Greens Convenor** - You know the answer to this question it is the cost of running the organisation one goes with the other reduce your carbon footprint and in variably you reduce the cost of your organisation. That's the driver then again we have to be totally honest I don't think there is any form of social conscience. I think it is financially driven

**Green Keeper** - I think individuals within the organisation that make sure we go down that path without them I got to be honest we would be sitting here thinking very little about it I think when we have a good team of management with drive and enthusiasm that is probably the main thing without them that is the truth until people come in and tell you that is the way it has to be that is if legislation changes and probably it will at one time will we have got people like Dick that are on that side of things I think we are going to be ready when things change

## **Appendix 6 Analysis of Interviewee Responses**

<b>Concept Risk</b> <i>How important is carbon footprint to the company?</i>	<b>Theme</b> <b>Cost Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>
<p><b>Capital Cooling Ltd</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Financial Risk Management            Legal Risk Management            Customer Requirement            Market Leadership            Cost Reduction         </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Environmental Risk Management         </div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;">           Link Between the future survival of the business &amp; planet         </div>	<p><b>The Log House People</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Measures output in terms of carbon emissions             Environmental Risk Management         </div>	
<p><b>Moffat Golf Club</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Contributes to a reduction in fertiliser and chemical use             Financial Risk Management         </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Process Improvement             Financial Risk Management         </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Business priority         </div>	

**Table 1 Analysis of interviewee response regarding the importance of carbon footprints**

<b>Concept Process Innovation</b> <i>What type of footprints do you currently measure CO2, social, water?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 10px;">           Multipurpose role of sustainability footprint             Opportunity to measure carbon impact of products             Influence on personal consumption patterns         </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Sustainability Passive</p> <div style="border: 1px solid black; padding: 2px 10px; border-radius: 5px; margin-bottom: 5px;">Unaware</div> <div style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Unaware</div> </div> <div style="text-align: center;"> <p>Sustainability Negative</p> </div> </div>		<p><b>The Log House People</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 10px;">           Water impact and social impact assessment from a carbon emission perspective         </div>	<p>Sustainability Passive</p>	<p>Sustainability Negative</p>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 10px;">           Emphasis on Carbon Footprint due to the need to demonstrate environmental commitment for grants             Need to demonstrate social responsibility for grants         </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Sustainability Passive</p> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px; margin-bottom: 5px;">Unaware</div> </div> <div style="text-align: center;"> <p>Sustainability Negative</p> </div> </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 10px;">           Water impacts expressed in terms of carbon emission impact         </div>	<p>Sustainability Passive</p>	<p>Sustainability Negative</p>

Table 2 Analysis of interviewee response to the types of footprints adopted by case study organisations



<b>Concept Process Innovation</b> <i>Does the company have a formal policy for carbon footprint?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b></p> <p><b>Sustainability Positive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Policy encompassing energy and carbon footprint             Appointment of Environmental Manager and procedures to effect policy             Carbon reduction part of policy         </div> <div style="border: 1px solid black; padding: 5px; border-radius: 5px; margin-top: 10px;">           Recycling considered part of policy         </div> <p><b>Sustainability Passive</b></p> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; margin-bottom: 5px;">           Observed but not read in depth         </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px;">           Unaware         </div> <p><b>Sustainability Negative</b></p>	<p><b>The Log House People</b></p> <p><b>Sustainability Positive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Environmental Policy             Carbon Management Policy         </div> <p><b>Sustainability Passive</b></p> <p><b>Sustainability Negative</b></p>			
<p><b>Moffat Golf Club</b></p> <p><b>Sustainability Positive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Informal carbon footprint policy             Carbon footprint influencing energy efficiency and water efficiency initiatives             Cost driven – carbon footprint is a decision making concern         </div> <p><b>Sustainability Passive</b></p> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; margin-top: 10px;">           Unaware         </div> <p><b>Sustainability Negative</b></p>	<p><b>Rabbies Trail Burners</b></p> <p><b>Sustainability Positive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Carbon Management Policy         </div> <p><b>Sustainability Passive</b></p> <p><b>Sustainability Negative</b></p>			

**Table 3 Analysis of interviewee response to perceptions of formal carbon footprint policy**

<b>Concept Process Innovation</b> <i>Was third party assistance procured to measure your carbon footprint?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Consultants monitor and advise on carbon performance             Knowledge transfer in terms of carbon footprint expertise         </div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           External support used to measure carbon footprint         </div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Unaware         </div> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">       External support used to measure carbon footprint     </div>	<p>Sustainability Passive</p>	<p>Sustainability Negative</p>	
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           External support used to measure carbon footprint         </div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Considered the domain of senior management         </div> </div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">       External support used to verify the carbon footprint     </div>	<p>Sustainability Passive</p>	<p>Sustainability Negative</p>	

Table 4 Analysis of interviewee response to the procurement of 3<sup>rd</sup> party assistance

<b>Concept Energy &amp; Water usage</b> <i>Are there any plans to measure your water footprint?</i>	<b>Theme Environmental Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; text-align: center;">Product water consumption awareness</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; text-align: center; margin-top: 10px;">Domain of environmental specialists</div> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> <div style="border: 1px solid black; padding: 5px; border-radius: 5px; text-align: center;">Unaware</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; text-align: center; margin-top: 10px;">Unaware</div> </div> </div>		<p><b>The Log House People</b> Sustainability Positive</p>	<p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; text-align: center;">No plan to measure water footprint</div>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; text-align: center;">Water consumption monitoring</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; text-align: center; margin-top: 10px;">Rainfall trend analysis</div> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> </div> </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; text-align: center;">Water consumption monitoring</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; text-align: center; margin-top: 10px;">Plan to measure water footprint</div>	<p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p>

**Table 5 Analysis of interviewee response to plans to measure water footprint**

<b>Concept Energy &amp; Water usage</b> <i>What do you understand the use of the term Sustainability Footprints?</i>	<b>Theme Environmental Impact</b>	<b>Legend</b> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</div> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</div> <div style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</div> </div>
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 150px;">           Continual improvement            Recycling            Carbon reduction            Sustaining good carbon performance         </div> <div style="text-align: center;">Sustainability Passive</div> <div style="text-align: center;">Sustainability Negative</div> </div> <div style="margin-top: 10px; border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content;">Carbon footprint monitoring</div>		<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">Sustainability Passive</div> <div style="text-align: center;">Sustainability Negative</div> </div> <div style="margin-top: 10px; background-color: black; color: white; padding: 5px; border-radius: 10px; width: fit-content; margin-left: auto;">Unaware</div>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 150px;">           Perceived as emissions reduction and reduced fuel consumption         </div> <div style="text-align: center;">Sustainability Passive</div> <div style="text-align: center;">Sustainability Negative</div> </div> <div style="margin-top: 10px; background-color: #cccccc; padding: 5px; border-radius: 10px; width: fit-content; margin-left: auto;">Unaware</div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 150px;">           Sustainable development         </div> <div style="text-align: center;">Sustainability Passive</div> <div style="text-align: center;">Sustainability Negative</div> </div>

Table 6 Analysis of interviewee response to sustainability footprint terminology

<b>Concept Emissions &amp; Waste</b> <i>Do you see a relationship between CO2 footprint &amp; climate change?</i>	<b>Theme Environmental Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon reduction considered important</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint a contributing factor to global warming</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Contributing to recycling</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Builds awareness of climate change</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Relationship between carbon footprint and climate change</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Mitigation tool</div> </div> <div style="width: 35%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">No relationship between carbon footprint and climate change</div> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"></div> <div style="width: 35%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> </div> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px; width: 60%; margin-left: auto; margin-right: auto;">Relationship between carbon footprint and climate change</div>	
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint provides realism</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Co-operation to combat climate change</div> </div> <div style="width: 35%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Climate change is a complex concept</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Credibility issues amongst climate change supporters</div> </div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"></div> <div style="width: 35%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> </div> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px; width: 60%; margin-left: auto; margin-right: auto;">Relationship between carbon footprint and climate change</div>	

Table7 Analysis of interviewee response to the relationship between carbon footprint and climate change

<b>Concept Emissions &amp; Waste</b> <i>Have you set targets for reducing your carbon footprint?</i>	<b>Theme Environmental Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;"> Emission targets expressed in operational terms   Monitoring of environmental policies contributing to good performance </div> <div style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px; margin-bottom: 5px;"> Benchmarking </div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;"> Emission targets expressed in operational terms </div> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px; width: fit-content; margin-left: auto;"> Unaware </div>		<p><b>The Log House People</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-left: auto; margin-right: auto;"> No explicit emissions reduction targets   Difficulty in setting targets </div>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;"> Emission targets expressed in operational terms   Differences between operational and organisational emissions targets </div> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-left: auto; margin-right: auto;"> No explicit emissions reduction targets   Target setting based on cost reduction benefit </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px; margin-left: 20px;"> Explicit emissions reduction targets </div> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p>

Table 8 Analysis of interviewee response to carbon footprint target setting

<b>Concept Emissions &amp; Waste</b> <i>Is carbon footprint measurement a useful tool for SMEs to combat climate change?</i>	<b>Theme</b> <b>Environmental Impact</b>	<b>Legend</b> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Management</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px;">Technical</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;">Non-Technical</div> </div>
<p><b>Capital Cooling Ltd</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 5px;"> Supports continuous improvement   Demonstrates environmental commitment   Benchmarking </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Environmental impact awareness</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;">Benefits the planet</div>		<p><b>The Log House People</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint considered a useful tool</div>
<p><b>Moffat Golf Club</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 5px;"> Cost Reduction   Green Credentials   Strategic Planning   Marketing Strategy </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint considered a useful tool</div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint considered a useful tool</div>

**Table 9** Analysis of interviewee response to carbon footprint as a useful tool for SMEs to combat climate change

<b>Concept Anthro Capital Resource Allocation</b> <i>Are there any plans to measure your social footprint?</i>	<b>Theme Stakeholder Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: #cccccc; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Domain of senior management</div> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Limited influence over the social environment</div> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Unaware</div> <div style="border: 1px solid black; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Unaware</div> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">No plans to measure social footprint</div> </div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Plans to measure social footprint</div> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: #cccccc; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Unaware</div> </div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Non response</div> </div> </div>			

Table 10 Analysis of interviewee response to plans to measure social footprint



<p>Concept <b>Anthro Capital Resource Allocation</b>  <i>Do you think carbon footprint measurement is a good investment of the organisations resources?</i></p>	<p>Theme  <b>Stakeholder Impact</b></p>	<p>Legend</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px;">Management</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px;">Technical</div> <div style="border: 1px solid black; padding: 5px; border-radius: 5px;">Non-Technical</div> </div>
<p><b>Capital Cooling Ltd</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; margin-bottom: 10px;"> <p>Long term payback</p> <p>Cost reduction</p> <p>R&amp;D to reduce carbon footprint</p> <p>Revenue from recycling</p> <p>Market Leadership</p> <p>Benefits the planet</p> </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; margin-bottom: 10px;"> <p>Combat climate change</p> </div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;"> <p>Time consuming</p> <p>Pre-empt future legislation</p> </div>		<p><b>The Log House People</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; margin-bottom: 10px;"> <p>Carbon footprint considered a good investment</p> </div>
<p><b>Moffat Golf Club</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 10px;"> <p>Carbon footprint considered a good investment</p> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 10px;"> <p>Must be linked to financial return</p> </div>		<p><b>Rabbies Trail Burners</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; margin-bottom: 10px;"> <p>Carbon footprint considered a good investment</p> </div>

Table 11 Analysis of interviewee response regarding carbon footprint as a useful investment

<p>Concept <b>Shared value creation</b>  <i>What value does carbon footprint measurement provide to your business as an SME?</i></p>	<p>Theme  <b>Stakeholder Impact</b></p>	<p>Legend</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Management</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px;">Technical</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;">Non-Technical</div> </div>		
<p><b>Capital Cooling Ltd</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%; background-color: black; color: white; padding: 10px; border-radius: 15px;"> <ul style="list-style-type: none"> <li>Cost reduction</li> <li>Competitive differentiation</li> <li>Marketing leadership</li> <li>“Caring organisation”</li> <li>Strategic focus</li> <li>Short term cost offset by potential</li> </ul> </div> <div style="width: 30%; background-color: #cccccc; padding: 10px; border-radius: 15px; text-align: center;">           Unaware         </div> </div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-top: 10px; width: fit-content;">       Benefits the planet     </div>	<p><b>The Log House People</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;"> <ul style="list-style-type: none"> <li>Corporate Social Responsibility</li> <li>Carbon impact awareness</li> <li>Emissions reduction</li> </ul> </div>			
<p><b>Moffat Golf Club</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%; background-color: black; color: white; padding: 10px; border-radius: 15px;"> <ul style="list-style-type: none"> <li>Marketing leadership</li> <li>Strategic focus</li> </ul> </div> <div style="width: 30%; background-color: #cccccc; padding: 10px; border-radius: 15px; text-align: center;">           Reduced consumption         </div> </div>	<p><b>Rabbies Trail Burners</b>  Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;">       Carbon footprint considered of critical value     </div>			

Table 12 Analysis of interviewee response regarding the value of carbon footprints to SMEs

<p>Concept <b>Shared value creation</b>  <i>Do you require suppliers and sub-contractors to provide sustainability footprint data?</i></p>	<p>Theme  <b>Stakeholder Impact</b></p>	<p>Legend  <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span></p>
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 25%;">           Carbon footprint required             Similar carbon footprint policies         </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 25%;">           Sustainability Passive            Lacking expertise             Need to improve supply chain awareness         </div> <div style="width: 25%;"> <p>Sustainability Negative</p> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px; margin-bottom: 5px;">Unaware</div> <div style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Unaware</div> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="width: 33%;"></div> <div style="width: 33%;">Sustainability Passive</div> <div style="width: 33%;">Sustainability Negative</div> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 20%; margin-left: auto; margin-right: 0;">     Carbon footprint not required   </div>	
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="width: 33%;"></div> <div style="width: 33%;">Sustainability Passive</div> <div style="width: 33%;">Sustainability Negative</div> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 25%; margin-left: auto; margin-right: 0;">     Carbon footprint not required       Price sensitivity   </div> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px; width: 25%; margin-left: auto; margin-right: 0; margin-top: 5px;">     Carbon footprint not required   </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="width: 33%;"></div> <div style="width: 33%;">Sustainability Passive</div> <div style="width: 33%;">Sustainability Negative</div> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 20%; margin-left: auto; margin-right: 0;">     Carbon footprint not required   </div>	

Table 13 Analysis of interviewee response to the provision of carbon footprint data by suppliers and sub-contractors

Concept <b>Financial Capital resource allocation</b> <i>Has present economic conditions impacted on your company's carbon footprint?</i>	Theme <b>Cost Impact</b>	Legend <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</div> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</div> <div style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</div> </div>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="border: 1px solid black; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Unsured of impact of economic conditions</div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Economy having little effect or no impact</div> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Sustainability footprint considered a luxury</div> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px;">Carbon footprint reduction is not cost neutral</div> </div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Process Improvement</div> <div style="background-color: #cccccc; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Economy considered as impacting on carbon footprint</div> <div style="border: 1px solid black; border-radius: 5px; padding: 5px;">Financial Returns from recycling</div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> </div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px;">Perception that the carbon footprint is linked to increased business activity</div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> </div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Cost Reduction</div> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px; margin-bottom: 5px;">Efficient Fuel Consumption</div> <div style="background-color: #cccccc; border-radius: 5px; padding: 5px; margin-top: 10px;">Reduced chemical use</div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> </div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; border-radius: 5px; padding: 5px;">Economy considered as impacting on carbon footprint</div> </div>			

Table 14 Analysis of interviewee response to the impact of economic conditions on the carbon footprint

<b>Concept Financial Capital resource allocation</b> <i>How much does measuring your carbon footprint cost?</i>	<b>Theme</b> <b>Cost Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px;">Non-Technical</span>
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Unaware</div> <div style="background-color: black; color: white; padding: 5px;">Unaware</div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px;">Difficulties in determining cost as it is comprised of many different elements</div> <div style="background-color: black; color: white; padding: 5px;">Time constraints</div> <div style="background-color: black; color: white; padding: 5px;">Impossible to calculate</div> </div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; padding: 5px;">Costs are irrelevant as the objective is carbon footprint measurement</div> <div style="background-color: #cccccc; padding: 5px; margin-top: 5px;">Measurement costs are mitigated by the financial returns from recycling</div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px;">Cost Neutral</div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> </div> </div>	
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: #cccccc; padding: 5px; margin-top: 10px;">Unaware</div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> </div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; padding: 5px;">Low cost threshold due to its participation in Carbon Smart Project</div> <div style="background-color: black; color: white; padding: 5px; margin-top: 5px;">Calculation of carbon footprint measurement cost not considered business critical</div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; margin-top: 10px;">Unaware - time allocation and costs have not been calculated</div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> </div> </div>	

Table 15 Analysis of interviewee response to the cost of carbon footprint measurement

<b>Concept Process Innovation</b> <i>Why did the company choose to measure its carbon footprint?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;">           Legislative pressure             Benchmarking             To be seen as being green             Link between carbon reduction and cost reduction             Corporate Social Responsibility         </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 10px;">           Environmental impact awareness         </div> <div style="border: 1px solid black; padding: 5px; border-radius: 15px;">           Process Improvement             Promote environmental achievements         </div>	<p><b>The Log House People</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;">           Marketing             Eco-Tourism strategy             Care for the environment             Corporate Social Responsibility         </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 10px;">           Cost Reduction         </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px;">           Senior Management Commitment         </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 10px;">           Performance measurement tool         </div>			

Table 16 Analysis of interviewee response regarding the strategic choice to measure carbon footprint

<b>Concept Process Innovation</b> <i>What methods do you use to measure the company's carbon footprint?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Recycling considered a measurement mechanism             Energy consumption considered the means to monitor the carbon footprint             Driver behaviour an influencing factor on the carbon footprint         </div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Aware of the contribution of office recycling to carbon measurement         </div> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Measurement perceived as the domain of the sustainability specialist         </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Unaware         </div> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> </div> </div>		<p><b>The Log House People</b> Sustainability Positive</p>	<p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin: 0 auto;">       Unfamiliar with carbon measurement methodology     </div>	<p style="text-align: center;">Sustainability Negative</p>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Unfamiliar with carbon measurement methodology             Organisational preference to view carbon reduction in financial terms         </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Carbon footprint methodology the domain of senior management         </div> </div> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Negative</p> </div> </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin: 0 auto;">       Recycling, fuel and energy monitoring considered to measurement mechanisms     </div>	<p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p>

Table 17 Analysis of interviewee response regarding carbon footprint methodology

<b>Concept Process Innovation</b> <i>Do your customers express an interest in your sustainability footprints?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>Sustainability Positive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Customers consider carbon footprints to be a high profile issue             Tender requirement             Supply chain pressure from corporate clients             Customers interested in methods rather than figures         </div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-top: 10px;">           Customers consider carbon footprints to be a high profile issue             Tender requirement         </div> <div style="background-color: #cccccc; border: 1px solid black; border-radius: 10px; padding: 5px; margin-top: 10px;">           Carbon footprint reduction         </div> </div> <div style="width: 30%;"> <p><b>Sustainability Passive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; text-align: center;">           Unaware         </div> </div> <div style="width: 30%;"> <p><b>Sustainability Negative</b></p> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 30%;"> <p><b>Sustainability Passive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">           Considered a useful tool             Limited customer interest             Concerns as to the fairness and weighting of carbon footprint measurement         </div> </div> <div style="width: 30%;"> <p><b>Sustainability Negative</b></p> </div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 30%;"> <p><b>Sustainability Passive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; text-align: center;">           Limited interest from membership and customers         </div> </div> <div style="width: 30%;"> <p><b>Sustainability Negative</b></p> <div style="background-color: #cccccc; border: 1px solid black; border-radius: 10px; padding: 5px;">           Customers are motivated by self interest             Focus on affordability         </div> </div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 30%;"> <p><b>Sustainability Passive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; text-align: center;">           Limited customer interest         </div> </div> <div style="width: 30%;"> <p><b>Sustainability Negative</b></p> </div> </div>			

Table 18 Analysis of interviewee response regarding customer interest in sustainability footprints



<b>Concept Process Innovation</b> <i>Is carbon footprint reduction a key issue for discussion at management meetings?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint is an item within the sustainability of the business</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint is a key issue for discussion</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Financial returns from recycling</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Management oversight</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Link between carbon footprint and company growth</div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Carbon footprint not a key issue for discussion</div> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Generational Issues regarding carbon footprint initiatives</div> </div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px;">Not involved with management meetings it is the role of the senior management</div> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Carbon footprint not a key issue for discussion</div> </div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Sustainability Passive</p> </div> <div style="width: 30%;"> <p>Sustainability Negative</p> </div> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-top: 10px;">Carbon footprint is a key issue for discussion</div>			

Table 19 Analysis of interviewee response regarding carbon footprint as a key issue at management meetings

<b>Concept Process Innovation</b> <i>What barriers does the organisation face in placing carbon footprint reduction on the agenda?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: fit-content;">No barriers</div> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: center;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: fit-content;">           Cost            Lack of knowledge            Sustainability competing with other issues on the agenda            Time constraints            Sustainability is a transient goal            Inability to recoup carbon footprint costs         </div> <div style="border: 1px solid black; padding: 2px 5px; width: fit-content; margin: 5px auto;">           Poor implementation            Manpower         </div> <div style="background-color: #cccccc; padding: 2px 5px; width: fit-content; margin: 5px auto;">           Customer Requirements         </div>		<p><b>The Log House People</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: fit-content;">           Generational Issues regarding carbon footprint initiatives             Failure to recognise the benefits         </div>	
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: fit-content;">           Senior management commitment transcends barriers             Potential financial dividend sale of carbon credits             Environmental dividend from carbon sequestration         </div> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: center;">Sustainability Negative</p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; width: fit-content;">           Cost            Availability of equipment         </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: fit-content;">           Communication         </div>	

Table 20 Analysis of interviewee response regarding barriers to placing carbon footprint reduction on the agenda

<b>Concept Process Innovation</b> <i>Does the company participate in any reporting schemes?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border: 1px solid black;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border: 1px solid black;">Technical</span> <span style="background-color: white; padding: 2px 5px; border: 1px solid black;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p><b>Sustainability Positive</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Carbon reporting a requirement of product certification schemes e.g. Enhanced Capital Allowance scheme</div> </div> <div style="width: 30%;"> <p><b>Sustainability Passive</b></p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px;">Carbon reporting considered the domain of senior management</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Reporting considered the domain of the environmental specialists</div> </div> <div style="width: 30%;"> <p><b>Sustainability Negative</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Unaware</div> <div style="background-color: white; padding: 5px; border-radius: 10px; border: 1px solid black;">Unaware</div> </div> </div>		<p><b>The Log House People</b> Sustainability Positive</p>	<p>Sustainability Passive</p>	<p><b>Sustainability Negative</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">No participation in carbon footprint reporting schemes</div>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 30%;"> <p><b>Sustainability Passive</b></p> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px;">Unaware but viewed as a consideration at management meetings</div> </div> <div style="width: 30%;"> <p><b>Sustainability Negative</b></p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">No participation in voluntary reporting schemes</div> </div> </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Participation in reporting schemes</div>	<p>Sustainability Passive</p>	<p>Sustainability Negative</p>

Table 21 Analysis of interviewee response to participation in reporting schemes

<b>Concept Process Innovation</b> <i>Is your carbon footprint externally verified by a third party such as the Carbon Trust?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 60%;"> <p>Independent verification of product energy performance</p> <p>Advice and support in terms of carbon reduction</p> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 20%;"> <p>Unaware</p> </div> </div> <p style="text-align: center;">Sustainability Passive</p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin-left: 0;"> <p>Perceived as being externally verified</p> </div>		<p><b>The Log House People</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 60%;"> <p>Carbon footprint externally verified</p> </div>	<p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 60%;"> <p>Carbon footprint externally verified</p> </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; width: 60%;"> <p>Carbon footprint externally verified</p> </div>	<p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p>

Table 22 Analysis of interviewee response to the external verification of carbon footprints

<b>Concept Process Innovation</b> <i>Is CO2 footprint measurement a useful tool?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;">           Benchmarking             Measuring carbon reduction             Influencing personal consumption patterns             To be seen as being green             Market Leadership         </div> <div style="border: 1px solid black; border-radius: 5px; padding: 5px; margin-bottom: 10px;">           Tool that ensures the sustainability of the planet         </div> <div style="background-color: #cccccc; border: 1px solid black; border-radius: 5px; padding: 5px;">           Universal advantage for both the firm and society         </div>		<p><b>The Log House People</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;">           Considered a useful tool             Concerns as to the fairness and weighting of carbon footprint measurement         </div>		
<p><b>Moffat Golf Club</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;">           Cost Reduction             Green Credentials             Strategic Planning             Market Leadership         </div> <div style="background-color: #cccccc; border: 1px solid black; border-radius: 5px; padding: 5px;">           Considered a useful tool         </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-bottom: 10px;">           Considered a useful tool         </div>		

Table 23 Analysis of interviewee response regarding the usefulness of carbon footprints as a tool

<b>Concept Process Innovation</b> <i>Is carbon footprint reporting purely for internal use or for external reporting purposes?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Sustainability Passive</span> <span>Sustainability Negative</span> </div> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-top: 10px;"> <ul style="list-style-type: none"> <li>Public Relations</li> <li>Market Leadership</li> <li>Highlighting opportunity for carbon footprint reduction</li> <li>Multi- purpose role of carbon footprint reporting</li> <li>Stakeholder communication</li> </ul> </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; margin-top: 10px; width: fit-content;">       External reporting purposes     </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Sustainability Passive</span> <span>Sustainability Negative</span> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-top: 10px; width: fit-content;">       External and internal purposes     </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Sustainability Passive</span> <span>Sustainability Negative</span> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-top: 10px; width: fit-content;">       External and internal purposes     </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; margin-top: 10px; width: fit-content; margin-left: 200px;">       Unaware     </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Sustainability Passive</span> <span>Sustainability Negative</span> </div> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-top: 10px; width: fit-content;">       External and internal purposes     </div>			

Table 24 Analysis of interviewee response the use of carbon footprint for both internal and external reporting

<b>Concept Product Innovation</b> <i>Has CO2 footprint created interest in the company from new customers and existing customers?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Carbon footprints a high profile issue             Tender requirement             Supply chain pressure from corporate clients             Interested in methods rather than figures         </div> <div style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px; margin-bottom: 5px;">           Carbon footprint reduction         </div> <div style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">           Carbon footprints a high profile issue             Tender requirement         </div> </div> <div style="width: 35%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px; margin: 0 auto;">           Unaware         </div> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 35%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px; margin: 0 auto;">           No customer interest         </div> </div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 35%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px; margin: 0 auto;">           No customer interest         </div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-top: 5px;">           Customers are motivated by self interest             Focus on affordability         </div> </div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"></div> <div style="width: 35%; text-align: center;"> <p>Sustainability Passive</p> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px; margin: 0 auto;">           No customer interest         </div> </div> </div>			

Table 25 Analysis of interviewee response regarding carbon footprint generating an interest from new and existing customers

<b>Concept Product Innovation</b> <i>Has CO2 footprint led to the development of new products/services?</i>	<b>Theme Innovation Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;"> <p>Policy to market low environmental impact products</p> <p>GHG Footprint reduction an influencing factor in product development</p> <p>Product Leadership</p> <p>Carbon footprint reduction initiated the use of zero ozone depleting alternatives</p> <p>Catalyst for further R&amp;D in zero ozone depleting alternatives</p> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 10px;"> <p>Stimulated product development</p> </div> <p style="text-align: center;">Sustainability Passive      Sustainability Negative</p>	<p><b>The Log House People</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-left: auto; margin-right: 10px;"> <p>No contribution to product/service development</p> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-bottom: 10px;"> <p>Building redesign to improve energy efficiency</p> <p>Reduced material consumption</p> </div> <div style="background-color: #cccccc; padding: 10px; border-radius: 15px; margin-left: auto; margin-right: 10px;"> <p>Technical innovations restricted by affordability</p> </div> <p style="text-align: center;">Sustainability Passive      Sustainability Negative</p>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 15px; margin-left: auto; margin-right: 10px;"> <p>No contribution to product/service development</p> </div>			

**Table 26 Analysis of interviewee response to the development of new products and services**



<b>Concept Emissions &amp; Waste</b> <i>Does the company consider carbon footprint reduction as one of its KPIs?</i>	<b>Theme Environmental Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="display: flex; justify-content: space-between; align-items: flex-start; padding: 10px;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Link between lower carbon footprint and business growth</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Market Leadership</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Emissions reduction</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;">Carbon footprint monitoring</div> </div> <div style="width: 35%; text-align: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Time consuming</div> </div> <div style="width: 30%;"></div> </div>		<p><b>The Log House People</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="display: flex; justify-content: space-between; align-items: flex-start; padding: 10px;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint an important KPI</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint monitoring</div> </div> <div style="width: 35%; text-align: center;"> </div> <div style="width: 30%;"></div> </div>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="display: flex; justify-content: space-between; align-items: flex-start; padding: 10px;"> <div style="width: 30%;"> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint an important KPI</div> </div> <div style="width: 35%; text-align: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint reduction a secondary outcome</div> </div> <div style="width: 30%;"></div> </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <p style="text-align: center;">Sustainability Passive</p> <p style="text-align: right;">Sustainability Negative</p> <div style="display: flex; justify-content: space-between; align-items: flex-start; padding: 10px;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint an important KPI</div> </div> <div style="width: 35%; text-align: center;"> </div> <div style="width: 30%;"></div> </div>

Table 27 Analysis of interviewee response regarding carbon footprint as a KPI

<b>Concept Emissions &amp; Waste</b> <i>Has carbon footprint improved your understanding of environmental impacts?</i>	<b>Theme Environmental Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon footprint awareness</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon impact indicator</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Adoption of eco-friendly practices</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Environmental impact awareness</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon impact indicator</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Environmental impact awareness</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;">Adoption of eco-friendly practices</div> </div> <div style="width: 35%;"></div> <div style="width: 30%;"></div> </div>	<p><b>The Log House People</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Carbon impact indicator</div> </div> <div style="width: 35%;"></div> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">No explicit emissions reduction targets</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Difficulty in setting targets</div> </div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Environmental impact awareness</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Environmental impact awareness</div> </div> <div style="width: 35%;"></div> <div style="width: 30%;"></div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Environmental impact awareness</div> </div> <div style="width: 35%;"></div> <div style="width: 30%;"></div> </div>			

Table 28 Analysis of interviewee response to carbon footprints improving the understanding of environmental impacts

Concept <b>Anthro Capital Resource Allocation</b> <i>How long has the company measured its Carbon Footprint?</i>	Theme <b>Stakeholder Impact</b>	Legend <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</div> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</div> <div style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</div> </div>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-bottom: 5px;">More than 5 years</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-bottom: 5px;">More than 2 years</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; margin-bottom: 5px;">More than one year</div> <div style="border: 1px solid black; padding: 5px; border-radius: 5px; margin-bottom: 5px;">More than one year</div> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-bottom: 5px;">Unaware</div> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-bottom: 5px;">1 year</div> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> </div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-bottom: 5px;">4 years</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 5px; margin-bottom: 5px;">Domain of senior management</div> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> </div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 5px; margin-bottom: 5px;">4 years</div> </div> <div style="width: 30%; text-align: center;"> <p>Sustainability Negative</p> </div> </div>			

Table 29 Analysis of interviewee response regarding the length of carbon footprint adoption

<b>Concept Anthro Capital Resource Allocation</b> <i>In what way do you contribute to the CO2 measurement exercise?</i>	<b>Theme Stakeholder Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 10px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Non-Technical</span>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">           Recycling Emissions Reduction Environmental aspect monitoring Market Leadership Supervision Engineering design         </div> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px; margin-bottom: 5px;">Engineering efficiency</div> <div style="border: 1px solid black; padding: 2px 10px; border-radius: 5px;">Recycling</div> </div> <div style="width: 35%; text-align: center;"> <p>Sustainability Negative</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin: 0 auto;">Unaware</div> </div> </div>		<p><b>The Log House People</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin: 0 auto;">Carbon footprint measurement</div>	<p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p>
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p style="text-align: center;">Sustainability Passive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Environmental aspect monitoring</div> <div style="background-color: #cccccc; padding: 2px 10px; border-radius: 5px; margin-bottom: 5px;">Environmental aspect monitoring</div> </div> <div style="width: 35%; text-align: center;"> <p>Sustainability Negative</p> </div> </div>		<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin: 0 auto;">Carbon footprint measurement</div>	<p style="text-align: center;">Sustainability Passive</p>	<p style="text-align: center;">Sustainability Negative</p>

Table 30 Analysis of interviewee response to their specific contribution to the carbon footprint measurement exercise

<b>Concept Shared value creation</b> <i>In what way can policy making institutions contribute to the uptake of CO2 measurement by SMEs?</i>	<b>Theme Stakeholder Impact</b>	<b>Legend</b> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px;">Management</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px;">Technical</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px;">Non-Technical</div> </div>		
<p><b>Capital Cooling Ltd</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"></div> <div style="width: 30%; text-align: center;">Sustainability Passive</div> <div style="width: 30%; text-align: center;">Sustainability Negative</div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Fair Competition</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Access to grants</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Tax Relief</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Mandatory guidelines for SMEs</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-bottom: 5px; margin-top: 10px;">Information</div> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; margin-top: 10px; width: fit-content;"> <p style="margin: 0;">Tax incentives</p> <p style="margin: 0;">Access to grants</p> </div> </div>	<p><b>The Log House People</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"></div> <div style="width: 30%; text-align: center;">Sustainability Passive</div> <div style="width: 30%; text-align: center;">Sustainability Negative</div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Legislation</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Fines</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Emissions league table</div> </div>			
<p><b>Moffat Golf Club</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"></div> <div style="width: 30%; text-align: center;">Sustainability Passive</div> <div style="width: 30%; text-align: center;">Sustainability Negative</div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Qualifying criteria for grants</div> <div style="background-color: #cccccc; padding: 5px; border-radius: 10px; margin-top: 10px; width: fit-content;">Access to grants</div> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"></div> <div style="width: 30%; text-align: center;">Sustainability Passive</div> <div style="width: 30%; text-align: center;">Sustainability Negative</div> </div> <div style="margin-top: 10px;"> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Access to grants</div> <div style="background-color: black; color: white; padding: 5px; border-radius: 10px; margin-bottom: 5px;">Information</div> </div>			

Table 31 Analysis of interviewee response to the adoption of carbon footprint measurement amongst SMEs

<b>Concept Shared value creation</b> <i>What are the key drivers for measuring your carbon footprint?</i>	<b>Theme Stakeholder Impact</b>	<b>Legend</b> <span style="background-color: black; color: white; padding: 2px 5px; border-radius: 5px;">Management</span> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px;">Technical</span> <span style="border: 1px solid black; padding: 2px 5px; border-radius: 5px;">Non-Technical</span>
<p><b>Capital Cooling Ltd</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; width: 30%;">           Legislation             Senior management commitment             Process Improvement             Cost reduction         </div> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; width: 30%; text-align: center;">           Unaware         </div> </div> <div style="margin-top: 10px;"> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px; display: inline-block;">Legislation</span> </div> <div style="margin-top: 10px; border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content;">       Waste reduction         Corporate Social Responsibility     </div>	<p><b>The Log House People</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; width: 30%;">       Carbon measurement program participation         Senior management commitment         Corporate Social Responsibility         Continuous learning     </div>	
<p><b>Moffat Golf Club</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; width: 30%;">           Cost Reduction             Emissions reduction         </div> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; width: 30%;"></div> </div> <div style="margin-top: 10px;"> <span style="background-color: #cccccc; padding: 2px 5px; border-radius: 5px; display: inline-block;">Senior management commitment</span> </div>	<p><b>Rabbies Trail Burners</b> Sustainability Positive      Sustainability Passive      Sustainability Negative</p> <div style="background-color: black; color: white; padding: 10px; border-radius: 10px; width: 30%;">       Cost reduction         Process Improvement     </div>	

Table 32 Analysis of interviewee response regarding the drivers for carbon footprint measurement

**Appendix 7 - Sustainability Footprints in SMEs – Strategy and Case Studies for Entrepreneurs and Small Business, John Wiley & Sons 2015**

NB The aforementioned book is provided as a separately bound document.