Understanding & Communicating Climate Change in the Business Sector

Enabling Meaningful, Profitable & Sustainable Engagement in Cornish SMEs to Innovate the Low Carbon Economy

UNIVERSITY OF EXETER

Submitted

by

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Abstract

The risks and opportunities that climate change presents for Small and Medium-Sized Enterprises (SMEs) have been largely overlooked by previous research (Schaefer et al. 2011, Williams & Schaefer 2013). The subsequent lack of knowledge in this field makes a meaningful, profitable and sustainable engagement of SMEs with climate change challenging. Current research has difficulty explaining (1) why SMEs rarely engage with climate change (2) how climate change is currently communicated to SMEs and (3) how SMEs overcome the knowledge gap between business practice and climate change science (cf. Hoffman 2004, 2006, Hart 2007, Goodall 2008). In this thesis I critically examine 31 SMEs which engage with climate change knowledges, 5 Innovation-Support-Organizations (ISOs) which communicate climate change knowledges and 2 business-led communities of practice that discuss climate change-related business practices. Over a three-year period, I explore why and how business leaders approach the knowledge gap between climate change science and business practice, drawing on a variety of ethnographic research methods: (1) in-depth semi-structured and open interviews; (2) participant observations; (3) practitioner's workshops; and (4) an online survey. My research demonstrates that the participating ISOs communicate climate change in an overly simplistic way. The participating ISOs focus on persuading business leaders to engage with climate change. The participating business leaders who hear this persuasive message are already willing to engage with climate change. Their motivations to engage are lay-knowledge-dependent, derived from personal values, space and place identity. What the participating business leaders require is practical advice on how to mitigate the impact of, and adapt to, climate change, and they therefore try to overcome the limitations of current climate change communication through forming and joining communities of practice. By doing this, they can make sense of climate change in specialist niche communities and benefit from social belief systems. To enhance the number of SMEs engaging with climate change, I recommend that the participating ISOs target the personal values of business leaders and actively use these specialist niche communities niches within which the participating business leaders develop business practice to learn about climate change-related business practices themselves. Overall, my PhD shows that to create meaningful, profitable and sustainable engagement with climate change, business leaders and ISOs, as well as governments and society, need to address their *'confusion and anxiety about the goals, ambitions and destinies [they] foresee'* for themselves (Hulme 2013: 298).

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List of Abbreviations

°C	Degree Celsius
3CAP	Cornwall Climate Change Action Plan
ANT	Actor-Network Theory
AOGCM	Atmosphere-Ocean General Circulation Model
AONB	Area of Outstanding Natural Beauty
BIS	Department for Business, Innovation and Skills
BL4LC	Business Leaders for Low Carbon
BREEAM	Building Research Establishment Environmental Assessment Method.
CCA	Climate Change Agreements
CCC	Committee on Climate Change
CCL	Climate Change Levy
CDC	Cornwall Development Company
cf.	confer (*consult*)
CO_2	Carbon Dioxide
CoaST	Cornwall Sustainable Business Network
CRU	Climatic Research Unit
CSEP	Cornwall Sustainable Energy Partnership
CSP	Cornwall Strategic Partnership
CSR	Corporate Social Responsibility
CUC	Combined Universities in Cornwall
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
e.g.	exempli gratiā (*for example*)
ECEHH	European Centre for Environment and Human Health
ESF	European Social Fund
et al.	et alii (*and others*)
EU	European Union
FIT	Feed-In Tariff
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GVA	Gross Value Added
HMRC	HM Revenue and Customs
Ibid.	ibidem (*the same place*)
IPCC	Intergovernmental Panel on Climate Change
IOD	Institute of Directors
IS	Organization for Standardization
ISO	Innovation-Support-Organization
LEP	Local Enterprise Partnership
m	metre
MBI	Market Based Instrument
MCA	Medieval Climate Anomaly
MLP	Multi-Level Perspective
mm	millimetre
MWh	megawatt-hours

MWP	Medieval Warm Period
NGO	Non-Governmental Organization
OED	Oxford English Dictionary
PAYE	Pay As You Earn
RCP	Representative Concentration Pathway
RSC	Regions for Sustainable Change
SME	Small and Medium-Sized Enterprise
SRES	Special Report on Emissions Scenarios
THC	Ocean Thermohaline Circulation
UK	United Kingdom
UKCIP	United Kingdom Climate Impacts Programme
UNESCO	United Nations
UNFCC	United Nations Framework Convention on Climate Change
USA	Unites States of America
VAT	Value-Added Tax

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1. Introduction & Purpose of this PhD

This PhD demonstrates the opportunities for Small and Medium-Sized Enterprises (SMEs) to offer leadership and innovation to mitigate the impact of, and adapt to, climate change in meaningful, profitable and sustainable ways. The thesis offers an account of the social reality around climate change that has too long and too often been ignored within climate change debates. It therefore challenges some of the *'organizing binaries'* (Gregory et al. 2009: 7) with which contemporary research, policymakers and economic actors view climate change. I will show how SMEs understand climate change and I deliver personal insights into the challenges that the participating business leaders face when they intend to engage with climate change. I also present how the participating business leaders tackle these challenges in their quest for meaningful, profitable and sustainable engagement with climate change.

1.1. Research Context and Knowledge Gap

The risks caused by climate change to the socio-economic system(s) (cf. Chapter 2) present one of the most pressing challenges to humanity (IPCC 2013). Climate change could cost the world economy up to 20% of global Gross Domestic Product (GDP) each year (Stern Review 2006) and jeopardise social and economic prosperity (Jackson 2009). Being primarily caused by human fossil-fuel burning activities climate change is clearly linked to the pursuit of economic growth and self-interested consumption, described by, and enabled through, the current socio-economic system. Here, consumers and producers meet on the market to produce and exchange goods in order to maximize profits and economic growth through an optimal but subjective, rationally bounded allocation of resources (Simon 1959, Harris 2001, Douma & Schreuder 2002, Göbel 2002). This socio-economic system aims to benefit the welfare of the economy and society through meeting individuals' self-interests (Friedman 1970, Smith 2005). The increasing pressures of climate change have subjected these socio-economic systems to scrutiny (cf. Chapters 2 & 3) (Jackson 2009) because individuals are unable to meet '*the needs of the present without compromising the ability of future generations to meet their needs*' (1987: 1). Different kinds of economic exchange, new economic models, and innovative proxies to measure prosperity are needed to address these new challenges.

Consequently, there has been a rapid expansion of literature that explores how society could transition to a new economy to ensure continuing prosperous societies (cf. Jackson 2009, Seyfang 2009, Heinberg 2011). Businesses play a key role in shaping and being shaped by the socio-economic system. Businesses use natural resources to produce products, supply individuals with consumable commodities and most obviously (are understood to) aim for constant growth and profit, as was famously explained by Friedman (1970: online): '*There is one and only one social responsibility of business - to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud'*. While the notion of profit maximization is still dominant in the sphere of doing business and (business-related) policy making (Douma & Schreuder 2002, Göbel 2002, Carter 2007), it is argued that the assumption that businesses seek to maximize profits should only be treated as a tendency; businesses have the responsibility to fulfil economic and legal obligations but they also have the responsibility to fulfil ethical and philanthropic obligations (Loew et al. 2004, Carroll 1991). It is now widely accepted that businesses are dependent on a healthy society, while society is dependent on well-functioning businesses: Businesses should contribute to a prosperous economy through identifying *'the particular set of societal problems that it is best equipped to help resolve and from which it can gain the greatest competitive benefit*' (Porter & Kramer 2006: 14, Hart 2007, Loew et al. 2004). Porter & Kramer further illustrate something that is fundamental to the notion of capitalism and the current socio-economic system: businesses and societies are interconnected and dependent on each other's pursuits for greater consumption, profit and growth (cf. Jackson 2009), pursuits that do not accord with the limitations of a finite planet and the fight against climate change. Businesses are therefore crucial in the move to establish and facilitate a new economic system.

Businesses are often seen as being at the receiving end of discussions on how to enable a new, more sustainable economy and are predominantly told how to act more appropriately with the planet's finite resources. It seems to be forgotten that businesses play an integral role in economic, social and environmental innovation, such as, for example, in the low carbon energy transition or the recent Smart

Specialization (cf. Hart 2007, Foxon 2010, Foray et al. 2011, Loorbach & Wijsman 2013) (cf. Chapters 2 & 3). Many discussions seem to overlook the fact that businesses are well placed to stimulate and lead behaviour change across societies, through both their fiscal resources and their social nature. Consequently, businesses might be able to lead by example with regard to how to innovate the capitalist system, and deal with the planet's finite resources more responsibly (cf. Hart 2007, Marshall et al. 2011). SMEs in particular are estimated to have a greater carbon saving potential than larger businesses, and due to their social nature (often embedded in, and closely linked to, their localities and communities), SMEs are well placed to stimulate behaviour change across society. SMEs can therefore be central to a reduction in the rate and magnitude of climate change and its associated socio-economic risks (IPCC 2013). Nevertheless, the risks and opportunities presented by climate change for SMEs have been largely overlooked by previous research. There are only a few studies - such as, for example, a study by Williams & Schaefer (2013) and Schaefer et al. (2011) - which explore SMEs' relationship with climate change. These studies have, however, been carried out simultaneously to my study and have only recently been published. Additionally, the contemporary studies exploring the relationship between SMEs and climate change are very limited and do not adequately explain how businesses understand and interpret climate issues (cf. Hoffman 2004, 2006, Hart 2007). The subsequent lack of knowledge in this field makes a meaningful, profitable and sustainable mitigation of, and/or adaptation to, the impact of climate change by SMEs difficult. Furthermore, current research cannot yet explain why SMEs rarely mitigate and/or adapt to climate change (cf. Hoffman 2004, 2006, Hart 2007, Goodall 2008).

1.2. Purpose of the PhD & Research Questions

In this study I investigate SMEs across sectors in Cornwall that have the intention of engaging with the risks and potentials of climate change. Although it is difficult to draw a definite distinction between intended and actual engagement with climate change, as well as between engagement with climate change and the environment more generally, I investigate the '*intentional*' engagement of business leaders with climate change only (cf. Corner et al. 2014). '*Engagement*' with climate change in this respect therefore refers to any behaviour a business leader associates with climate

change. I do not distinguish between mitigation and/or adaptation strategies, as '*both synergies and trade-offs exist between adaptation and mitigation options*', but '*neither adaptation nor mitigation alone can prevent all*' climate change-related impacts (IPCC 2007: 61). The interdisciplinary and complex nature of climate change (cf. Chapters 2 & 3) further requires an eclectic, transdisciplinary and open approach regarding what this engagement might look like (Moser 2010, Nerlich et al. 2010, Geoghegan & Brace 2011, UNESCO 2013, Leyshon *forthcoming*). Importantly, this investigation does not seek to evaluate the effectiveness and appropriateness of mitigation and/or adaption actions that individual businesses adopt. The sole focus is to understand the ways in which SMEs and their business leaders make sense of, and engage with climate change and why. I investigate SMEs that intend to engage with climate change instead of SMEs that do not engage with climate change because a lack of a '*successful diffusion of a new product, process or service*' (Hildreth & Kimble 2004: 81) is often a result of looking too much at organizations that are wedded to current socio-economic systems (Christensen et al. 2006, Seyfang 2009, Seyfang & Longhurst 2013). In order to unpick the diverse and individual means of engagement of these SMEs, it is the sense-making of climate change, which shapes and is shaped by (Geoghegan & Brace 2011) the actual engagement, on which this study focuses. The research questions are:

(1) Which climate change knowledges are communicated to SMEs and how?
(2) Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?
(3) How do SMEs overcome the gap that exists between business practice and climate change science?

These research questions will be answered primarily through qualitative research methods but also through quantitative methods. Over a three-year time period, I critically examine 31 SMEs across sectors in Cornwall, the United Kingdom (UK), which engage with climate change knowledges and 5 Innovation-Support-Organizations (ISOs), major knowledge providers for SMEs, which communicate climate change knowledges (cf. the discussion on ISOs in Chapter 2). This approach allows me to: (1) explore climate change knowledges from both the communication

and business perspectives; and (2) uncover the complex constructs around climate change formed by individual experiences and social processes (Winchester & Rofe 2010, Hulme 2011, Hoffman 2012, cf. Eisenhardt 1989). This approach ties in with current studies of climate change communication, which mainly use qualitative research methods such as focus groups, personal interviews or case studies (cf. Wolf & Moser 2011).

By answering the research questions, the thesis presents recommendations on how to enhance the number of SMEs engaging with climate change, to maximize the potential socio-economic value and minimise the associated risks of climate change, and to help to establish a low carbon economy, an economy in which all economic actors mitigate the impact of, and adapt to, climate change with the most effective possible means (cf. RSC 2014). The thesis also delivers insights into the wider communication of climate change knowledges.

1.3. Research Location

The study takes place in Cornwall [Figure 1], a county in the South West of the UK. Cornwall has a population of about 537,400 (SQW 2012). Cornwall, together with the Isles of Scilly, was classified as an 'Objective One' region by the European Union (EU) in 2000 (Cornwall Council 2014a). This means that Cornwall received financial support through EU Convergence funding until 2013, which led to the current 2014 EU Growth Programme (ibid.). Cornwall Council describes Cornwall's economic status as being the '*second weakest [economy] in the country*' and it is suggested that '*a lack of jobs, per se, (…) [is] (…) less of an issue than the quality of those jobs*' (SQW 2012: 6). Besides benefiting from major funding support, Cornwall has been supported by the Cornwall and Isles of Scilly Local Enterprise Partnership (LEP) since 2011 (LEP 2013). Two universities, three colleges and three innovation centres contribute to Cornwall's business infrastructure (CUC 2013).
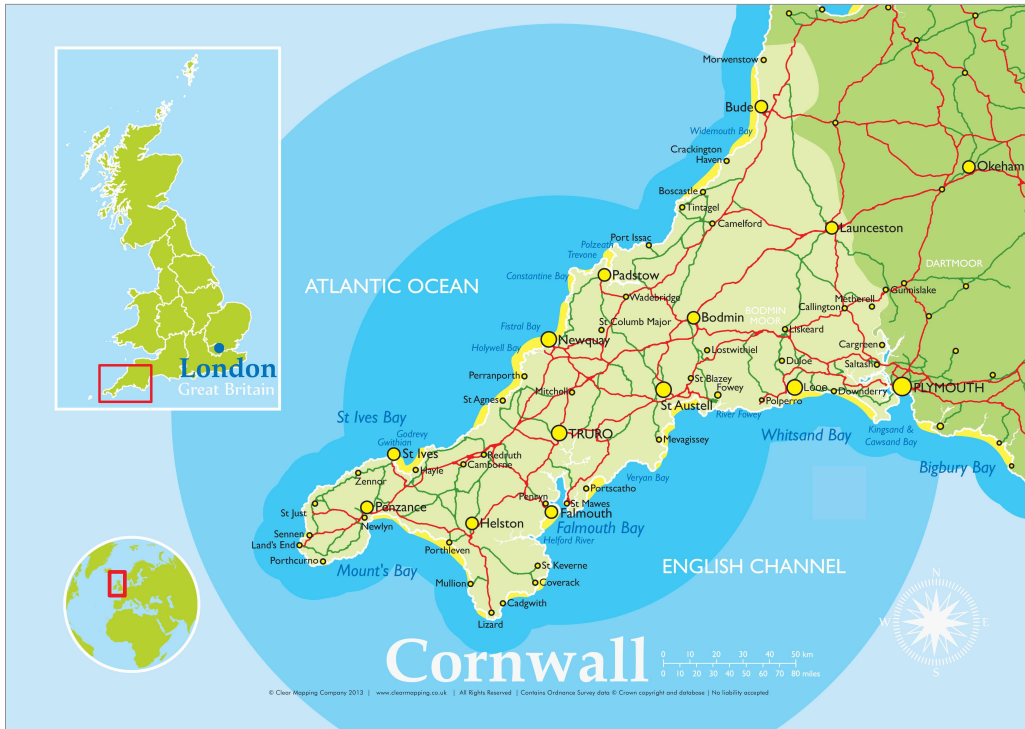
Figure 1: Location of Cornwall1

The figure shows Cornwall's detached location in relation to the rest of the UK. The map shows that Cornwall is characterised by a number of small towns and plenty of rural land. The map also shows that Cornwall is mainly surrounded by the Atlantic Ocean.

25,495 of the 25,540 Value-Added Tax (VAT) and/or Pay As You Earn (PAYE) based enterprises in Cornwall were classified as SMEs in 2012, of which 84% had four or less employees (Office of National Statistics 2012) [Figure 2]. SMEs are defined as '*enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million*' (EU Commission 2003: 39). '*An enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million'* is defined as a microenterprise (EU Commission 2003: 39).

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[1] Produced for the author by the Clear Mapping Company.
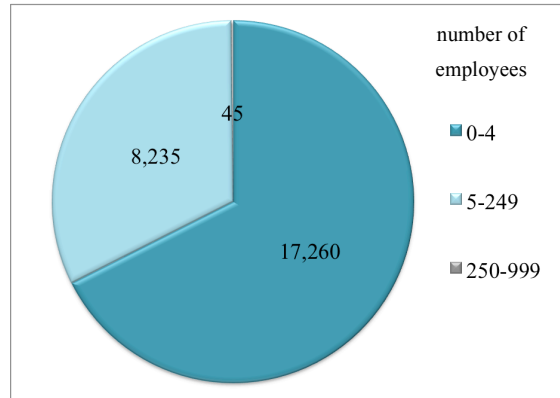
Figure 2: VAT and/or PAYE Based Enterprises by Number of Employees[2]

The majority of Cornish businesses are active in *'agriculture, forestry and fishing'*, *'retail'*, *'construction'* and *'accommodation and food services'* (Office of National Statistics 2012) [Figure 3].
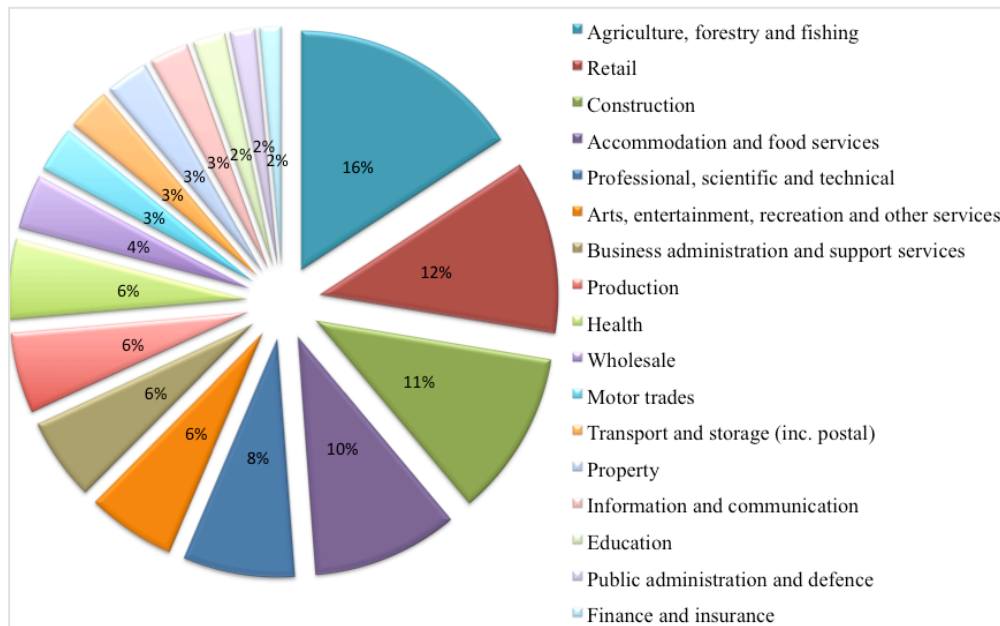
Figure 3: VAT and/or PAYE Based Enterprises by Industry[3]

Greenhouse Gas (GHG) emissions in Cornwall amounted to 4,528,121 tonnes in 2009, these mainly being produced by the transport and agriculture sectors (27% and 20% respectively). Nationally, the agricultural sector contributes about 8% to GHG emissions (Cornwall Council 2010). The high percentage of businesses engaged with the natural environment can be linked to Cornwall's natural resources; Cornwall has a coastline of 697km and the majority of its landscape is classified as an 'Area of Outstanding Natural Beauty' (AONB) (Cornwall Council 2011).

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[2] Own creation based on data from the Office of National Statistics (2012).
[3] Own creation based on data from the Office of National Statistics (2012).

Cornwall is expected to experience several changes in its future climate (Murphy et al. 2009). In a medium (A1B) Intergovernmental Panel on Climate Change (IPCC) Special Report on Emissions Scenarios (SRES), the central estimate of an increase in the winter mean temperature in the South West by 2050 is 2.1 °C; it i*s 'very unlikely to be less than 1.1 °C'* or more '*than 3.2 °C*' (ibid.: 95). Under a medium emissions scenario, the central estimate of an increase in the summer mean temperature in the South West by 2050 is 2.7 °C; '*it is very unlikely to be less than 1.3 °C*' or '*more than 4.6 °C*' (ibid.: 95). Additionally, the relative sea level in Cornwall (based on measurements in Newlyn and in relation to levels in 1990) is expected to increase by 24.5cm by 2050 (UKCIP 2009).

Climate change policies in Cornwall are dependent not only on the national climate change policies designed by the government but also on the proactive local agreements of Cornwall Council (cf. Lehal 2010): The UK government wants to reduce carbon emissions by 80% by 2050 and 34% by 2020 based on 1990 levels set out in the Climate Change Act of 2008 (Committee on Climate Change 2012). Cornwall Council more specifically wants to establish a knowledge-based, green economy and reduce carbon emissions by 40% by 2020 (Cornwall Council 2011, Smale 2006). Cornwall Council is also working on a number of projects to achieve GHG reductions, such as, for example, the Covenant of Mayors which aims to create sustainable energy production (Cornwall Council 2014b). Cornwall Council is also a signatory of the '*Nottingham Declaration on Climate Change*'. Before the introduction of the Localism Bill in 2010, the '*Cornwall Sustainable Energy Partnership*' (CSEP) was initiated to develop a climate change strategy for Cornwall and make Cornwall a low-carbon region (CSP 2009). However, before this work was completed, the Localism Bill was introduced and associated work with CSEP was halted. Cornwall Council also runs '*Green Cornwall*' to reduce carbon emissions within the council (Cornwall Council 2014b). Cornwall Council has also been recognized with the Beacon Council status for its engagement in reducing emissions (Cornwall Council 2014b).

1.4. Funding Objectives

This PhD was proposed to Cornwall's Convergence Funding 2007-2013 opportunity in 2010. Dr. Mike Leyshon and Professor Chris Caseldine (University of Exeter) identified a need for improvements in the way climate change is communicated as a way to increase business engagement with climate change. Convergence funding aims to *'decrease regional disparities'* amongst EU member states by creating economic cohesion and development (Akçomak & ter Weel 2009: 6) and therefore provided an excellent funding partner for this research. Climate change mitigation and adaptation enables businesses to minimize the socio-economic risks associated with climate change and benefit from some of its opportunities to secure *'economic growth in a responsible manner'*, a key goal of the Cornwall's Convergence Operational Programme (LEP 2014). My PhD, which was started in early 2011 and completed in 2014, meshed with this funding period and had at its heart the aim of contributing to the convergence funding objectives.

I documented my research progress in quarterly progress reports and was able to meet the funding objectives thanks to close collaboration with local SMEs and formal and informal business networks. Of particular importance were the 31 participating business leaders who made time for interviews, let me join business meetings and shared - often very personal - life stories. The two formal business networks, the Cornwall Sustainable Tourism Project (CoaST) and Business Leaders for Low Carbon (BL4LC), were equally important for the successful completion of the PhD. Equally valuable were representatives of Cornwall Council who helped identify key problems with current climate change communication. These collaborations necessitated a continuous exchange of knowledge between the participants and my study and therefore I was able to ensure that Cornish businesses and the local economy could benefit from the research findings.

Although the original design of the project was to focus on the marine business sector only, my investigation and detailed review of the literature at the start of the PhD quickly showed that the general field of business and climate change was under-researched. While the need for business engagement in climate change is widely

known, little is understood of why some businesses make a transition towards mitigating and adapting to climate change and others do not. I therefore decided to focus more generally on the wider business community. The project was also structured to look at the role of climate change science in the decision-making processes of businesses. Through early outreach efforts, I learned, however, that businesses have little interest in knowing about the science of climate change. I discovered that businesses' sense-making processes needed to be at the heart of this PhD as these enable SMEs' actual engagement with climate change.

Prior to submission, together with Dr. Mike Leyshon and Professor Chris Caseldine, I published some of the research findings of this thesis (cf. Keasehage et al. 2014). The publication contains the main findings of this research, as provided in Chapter 6. The content, structure and writing of the publication were my responsibility. Dr. Leyshon and Prof. Caseldine were responsible for setting up the project and edited the final text.

1.5. Contribution to Knowledge

Using a trans-disciplinary approach across a range of research disciplines, some of which lie outside my own core areas of expertise, thereby changing the common practices traditionally used in Human Geography, the thesis makes a number of contributions to knowledge in the fields of business studies and climate change communication,

- Revealing the climate change knowledges that are communicated to the business community.
- Uncovering how these climate change knowledges are communicated to, and understood by, SMEs.
- Identifying the reasons why SMEs engage with climate change.
- Displaying how SMEs approach the knowledge gap between climate change science and business practice.
- Uncovering how SME leaders understand and make sense of climate change.
- Demonstrating that climate change communicators treat climate change overly simplistically due to rigid funding structures and the Government that is uncommitted to climate change.

- Revealing that mitigation and adaptation strategies adopted by businesses are lay-knowledge-dependent, and are derived from personal values and space and place identity.

- Finding that SMEs overcome limited climate change communication through forming and joining networks.

- Showing that prevailing social belief systems and socio-economic systems do not support or encourage SMEs to mitigate the impact of, and adapt to, climate change.

- Concluding that SMEs would find it easier to consider mitigation and adaptation actions in meaningful, profitable and sustainable ways if there were prevailing socially accepted beliefs regarding climate change and if the socio-economic systems would support such efforts.

- Recommending that climate change communicators target individual audiences through specialist niches and other citizen-led approaches.

- Recommending that society should re-examine the world(s) that people want to live in.

1.6. Content and Structure

The thesis is divided into three main parts. *Part I* is concerned with the rationale of the research and the associated knowledge gap. I first describe the *Research Context,* which builds the rationale for the research. I then outline the *Research Gap* and set the scene, with describing the *Research Location* and the *Funding Objectives*. I discuss the *Purpose of the PhD,* showing the importance of this research and then state the three central research questions and the aim of the study. The contributions to knowledge that this study makes are briefly outlined before I explore in detail the prevailing literature of this interdisciplinary research subject, with a particular focus on clarifying what is meant by the term 'climate change'. The social dimension of this predominantly physical phenomenon will be given and I will show that it is difficult for individuals to act upon and mitigate climate change. I conclude that the communication of climate change is important and that climate change is increasingly viewed as a social concern. The social and fiscal nature of SMEs thus provides an indispensible opportunity for the mitigation of, and adaptation to, the impact of climate change. To clarify this assumption, I provide how 'doing business' is

currently understood. I also show that most SMEs ignore climate change. I conclude that there is an important need to understand SMEs' current engagement with climate change, their reasons for climate change engagement, and their strategies for overcoming the gap that exists between business practice and climate change knowledges. I then propose the Actor-Network-Theory (ANT) as a means of exploring the interconnection between human and non-human, natural and social, actors with each other to allow for a way of viewing climate change as a social construct distinct from the rational choice-based assumptions of modernity.

In *Part II,* I detail the *Methodology* of the study, showing how I used the research data to answer the research questions. I explain the methodological approach, the identification of data sources, I then discuss the reflexivity and positionality needed to enable a mixed-method approach to data collection. The various tools used for the data collection are also described and discussed in this section. I discuss the ethical considerations accounted for in the research and describe the challenges encountered when researching an 'Objective One' region.

Part III incorporates three chapters on the research findings. *Current Climate Change Communication - From Aspiration to Reality* explores the knowledges which impact on the decision-making processes of the SMEs. I explore: (1) which climate change knowledges are communicated to SMEs; (2) how these knowledges are communicated; and (3) how they are understood by businesses. The results demonstrate that climate change communication does not help the participating SMEs in their intentional engagement with climate change. The participating ISOs treat climate change in an overly simplistic way in order to balance climate change and business practice. The participating ISOs are locked in rigid funding structures and seem to be negatively impacted by the Government that is perceived to be uncommitted to economy-wide mitigation and adaptation behaviours. The chapter concludes that climate change needs to be treated differently to other innovations which have more simplistic and linear development structures. To achieve this, the participating ISOs need to be enabled to communicate climate change over longer time periods and they also need to be empowered to stimulate co-operation between intermediaries, SMEs, scientists and politicians.

The following chapter, *Climate Change and Values, Culture and Beliefs: Learning from Businesses,* focuses on why the participating SMEs mitigate the impact of, and adapt to, climate change. The results demonstrate that the mitigation and adaptation strategies of the businesses are lay-knowledge-dependent, derived from personal values, and space and place identity. To enhance the number of SMEs engaging with climate change, maximize the potential socio-economic value of climate change for society and establish a low carbon economy, communication needs to target the personal values of business leaders. The message should highlight the local impacts of climate change, the potential 'feel good factors' (meaning the benefits of engagement to (the local) society and economy) and the possible financial benefits for the business. Climate change communication therefore needs to go beyond thinking about potential financial benefits and scientific evidence and challenge values, cultures, and beliefs to stimulate economic, political and social frameworks that promote values-based decision-making. Committed business leaders provide a valuable way to address such issues.

The third chapter in this section, *Overcoming Current Socio-economic Systems. Sense-Making for Climate Change,* explores how the participating SMEs approach the knowledge gap between climate change science and business practice. The chapter shows that the participating SMEs try to overcome this gap through forming and joining informal business-led communities of practice, allowing them to: (1) make sense of *'climate change';* and (2) benefit from socially accepted beliefs (systems). The findings demonstrate that climate change needs to be communicated and managed through 'niches', protected spaces *'where new sociotechnical configurations and practices can be experimented with and develop away from the selection pressures of the dominant system* (Seyfang & Longhurst 2013: 882) (cf. Chapter 2) to allow for evolutionary knowledge and policy making.

Part IV concludes the thesis with a short summary of the study and a discussion of the research findings. The discussion shows that SMEs are a misinterpreted audience with respect to their potential to offer leadership and innovation in response to the climate change challenge. Current climate change communication does not help the participating business leaders to develop business practices and make their

engagement with climate change more meaningful, profitable and sustainable. The participating SMEs try to overcome the limitations of current climate change communication and the accompanying lack of business practices through forming and joining climate change-related communities of practices. In this way, they can make sense of climate change with other economic actors and can benefit from social belief systems. My PhD concludes by discussing the implications of the findings for policy and practice and, additionally, by assessing what lessons can be learned regarding the management of climate change in the future. The limitations of the study will be considered and I will make suggestions for further investigations.

Overall, the PhD offers an account of the social reality of climate change with regard to SMEs that has too long and too often been ignored. I will start with a review of the prevailing literature in the interdisciplinary fields connected to business and climate change in the following chapter.

2. Literature Review

In the following chapter, I will provide a review of the prevailing literature in the interdisciplinary subject of business and climate change. I will focus especially on clarifying what individuals mean when they speak about climate change. The social dimension of this predominantly physical phenomenon will be discussed and I will show that it is difficult for individuals to mitigate the impact of, and adapt to, climate change. I conclude that the communication of climate change is complex and that climate change is increasingly viewed as a social concern. I will then argue that the social and fiscal nature of SMEs provides an indispensible opportunity for the mitigation of and adaptation to climate change. To clarify this argument, I provide how 'doing business' is currently understood. I conclude that there is an important need to understand the motivations of those SMEs that intend to engage with climate change and that they can provide a leadership role for both the economy and the society to achieve a more meaningful, profitable and sustainable engagement with climate change.

2.1. What we Mean when we Talk about Climate Change

When individuals speak about climate change, they can mean very different things. Ontological and epistemological differences can especially be observed along the disciplinary divide of the physical and social sciences; I will explore some of these differences in this section.

Climate change is defined by the natural sciences as *'a change in the state of the climate that can be identified [...] by changes in the mean and/or the variability of its properties, and that persists for an extended period [...]. [...] due to natural internal processes or external forcings'* (IPCC 2013: 1450). The climate is the average weather with its variations *'over a certain period of time from months to thousands or millions of years'* (IPCC 2007: 942). Most recently, this change of climate has been identified by changes in the global average surface temperature of *'0.85 [0.65 to 1.06] °C'* from 1880 to 2012 (IPCC 2013: 5). The IPCC (2013: 6) also points to other observed changes in the climate such as an increase in the average global ocean temperature within the upper 75m by *'0.11 [0.09 to 0.13] °C per decade'* from 1971 to 2010, a rise in the global mean sea level by *'0.19 [0.17 to 0.21] m'* over the period 1901 to 2010 and a rise in the global average sea level of *'3.2 [2.8 to 3.6] mm yr^{-1}*

between 1993 and 2010'. There has also been, amongst other changes, an increase in precipitation *'averaged over the mid-latitude land areas of the Northern Hemisphere'* (IPCC2013: 5) since 1901 and ocean acidification. Additionally, there has been a loss of global ice sheets and glaciers; the Greenland and Antarctic ice sheets, for example, have decreased in mass and glaciers have diminished (IPCC 2013).

The IPCC (2007) explains that the above changes in the climate are mainly due to the global average net effect of anthropogenic fossil fuel burning activities: *'The largest contribution to total radiative forcing is caused by the increase in the atmospheric concentration of CO_2 since 1750'* (IPCC 2013: 13). An ever-increasing amount of GHGs in the atmosphere added to internal forcings of the climate (McGuffie & Henderson-Sellers 2005, Houghton 2009) intensify the natural greenhouse gas effect of the climate system. The result is that global average temperatures in the atmosphere, as well as in the ocean, rise [Figure 4] (McGuffie & Henderson-Sellers 2005, Houghton 2009, Pew Centre 2009).
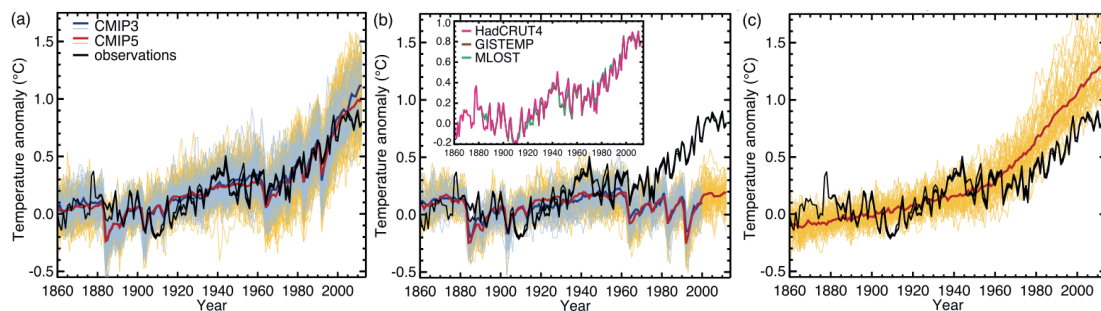
Figure 4: Model Simulations of Global Mean Surface Temperature[4]

In Figure 4, the three graphs display model simulations of the global mean surface temperature since the 1860s based on different models. The thick black line is the observed global mean temperature: a) shows the model simulations of the global mean temperature with anthropogenic and natural forcings; b) shows the model simulations of the global mean temperature with natural forcings only; and c) shows the model simulations of the global mean temperature with greenhouse gas forcings only (IPCC 2013: 62).

These models support the view that current climate change is largely related to human fossil fuel burning activities superimposed on natural climate variability. It is extremely unlikely that the climate would have changed so rapidly without external forcings (IPCC 2013). Nevertheless, temperatures have changed before: during the

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[4] Figure taken from the IPCC (2013: 62).

Medieval Warm Period (MWP), also known as Medieval Climate Anomaly (MCA), from the 11th to the 14th centuries, mean temperatures were considered to be regionally as high as or possibly higher than those of the late 20th century's warming (IPCC 2007). Strong cooling occurred in the 17th to 19th centuries, generally termed the Little Ice Age (IPCC 2007). This was followed by 20th and 21st century warming. The abnormalities of current climate change compared to those past changes are several: past cooling and warming of the climate varied across regions and is described as variability-independent of the global patterns, different from the current largely globally-synchronous change in the climate (IPCC 2007). Additionally, temperatures of the Medieval Warm Period were '*not warmer-than-present global annual mean temperatures*' and therefore the current warming is '*unusual in the context of the past millennia*' (IPCC 2007: 465). Moreover**,** the rate of current warming compared to the rate of past warming and cooling is different: large temperature changes in the past million years took place between ice ages and warm interglacial periods with the change possibly taking over more than 5,000 years, although punctuated at times by very rapid decadal events (IPCC 2007). Current warming since 1880 is therefore much more rapid and unusual. The IPCC (2007: 465) explains it thus: '*If projections of approximately 5 °C warming in this century (the upper end of the range) are realised, then the Earth will have experienced about the same amount of global mean warming as it did at the end of the last ice age; there is no evidence that this rate of possible future global change was matched by any comparable global temperature increase of the last 50 million years.*'

Importantly, it is believed that past and '*continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system*' (IPCC 2013: 19). To project climate development into the future (and also to reconstruct past climate developments), climate models simulate the climate system based on its essential features and mechanisms (Met Office 2011, Edwards 2011). Climate models are '*theory based representations of average atmospheric flows and processes*' (Houghton 2009: 94f) that describe the physics and dynamics of the climate system (Edwards 2011) informed by scenarios that model future socio-economic, technological and political developments (O'Keefe & Keuter 2004, EPA 2011). There are a number of future projections regarding climate change. Global surface

temperature '*for the end of the 21st century is likely to exceed 1.5 °C relative to 1850 to 1900 for all RCP scenarios*' except one (IPCC 2013: 20). This change in global surface temperature is distinct within different regions (IPCC 2013). With regard to the global ocean temperature, this is projected to increase; the ocean temperature, for example in the top 100m, will increase by '*about 0.6 °C (...) to 2.0 °C (...)*' (IPCC 2013: 24). There will also be global but non-uniform changes in precipitation at the end of the 21st century; high latitude regions, the equatorial Pacific Ocean and many mid-latitude wet regions '*are likely to experience an increase in annual mean precipitation*' (ibid.: 23). Mean precipitation in '*mid-latitude and subtropical dry regions*' is likely to decrease (ibid.). Additionally, '*it is very likely that the Arctic sea ice cover will continue to shrink and thin and that Northern Hemisphere spring snow cover will decrease during the 21st century*' (IPCC 2013: 24). The number of glaciers is also projected to decrease further (IPCC 2013). This loss, and the increase in global ocean temperatures, will lead to a further rise in the global mean sea level during the 21st century. The IPCC (2013: 25) provides the following estimates: '*Global mean sea level rise for 2081–2100 relative to 1986–2005 will likely be in the ranges of 0.26 to 0.55 m for RCP2.6, 0.32 to 0.63 m for RCP4.5, 0.33 to 0.63 m for RCP6.0, and 0.45 to 0.82 m for RCP8.5*' (Representative Concentration Pathway). There will also be changes in the water cycle and air quality (IPCC 2013). It is also very likely that heat waves will occur more frequently and with longer duration. Additionally, cold winter extremes will continue to appear (IPCC 2013).

If both temperature and precipitation increase, the surface water of the oceans will become warmer and additional water will be added to the ocean through, for example, the melting of the Greenland Ice Cap (IPCC 2007). The dense salty water in the North Atlantic will become less dense, potentially reducing or even closing down the Thermohaline Circulation (THC**)** and the poleward heat transport that ensures a '*minimum in the surface warming of the northern North Atlantic Ocean and/or the circumpolar Ocean*' will decrease (IPCC 2001: 562), meaning that less heat will be transported across the Northern Atlantic. This projection is shown by all coupled Atmosphere-Ocean General Circulation Models (AOGCMs) and indicates that the result will be less warming of North Atlantic regions for a short period prior to later

warming. However, within the next century it is considered that there is only a very low possibility of this happpening (IPCC 2007).

Climate change as outlined above is primarily understood as a scientific episteme expressed in a wide variety of physical processes, which entails significant risks for people's future lives (IPCC 2013). Risk in this sense is '*the potential for consequences where something of human value (including humans themselves) is at stake and where the outcome is uncertain*' (Rosa 2003 in Jones et al. 2014). Stern (2006:vi) estimates that, based on a variety of formal economic models, '*the overall costs and risks of climate change will be equivalent to losing at least 5%*' and up to 20% *of global GDP each year*'. The potential impact of climate change on the economy is considered by Porter & Reinhardt (2007: 3) to be powerful and far-reaching: '*Periodically, major new forces dramatically reshape the business world - as globalization and the information technology revolution have been doing for the past several decades. Climate change, in its complexity and potential impact, may rival them both.*' Responding to and minimizing these socio-economic and environmental risks is therefore crucial. The IPCC explains that '*societies can respond to climate change by adapting to its impacts and by reducing GHG emissions (mitigation), thereby reducing the rate and magnitude of change*' (IPCC 2007: 56); it goes on to say that '*both synergies and trade-offs exist between adaptation and mitigation options*' but neither adaptation nor mitigation alone can reduce the rate and magnitude of climate change and its socio-economic risks (IPCC 2007: 61). The IPCC notes that '*limiting climate change will require substantial and sustained reductions of greenhouse gas emissions*'.

The UK's current climate change-related policies are firmly based on the scientific understanding of climate change that I have just outlined above. The literature explains that the reason climate change-related policies are firmly based on such scientific understanding because policy makers assume that scientific consensus would create social consensus (cf. Section 2.3.) (Hulme 2009, Hulme & Blackman 2009, Hulme 2010, Hulme 2013). It is assumed that people's differences in values, beliefs and behaviour patterns could be overridden by scientific information. Climate itself, through its influence on biological evolution and social life, has a much deeper

meaning for people, however, than the natural science that I outlined above can convey (Hulme 2009). The meaning that climate change has for individuals emerges from the entanglement of climate and culture. What climate change means to individuals is, for example, linked to their education, exposure to and/or trust in science and the lay knowledges individuals have accumulated about climate (change) (Geoghegan & Brace 2011, Schuldt et al. 2011, Wolf & Moser 2011). This points towards a cultural understanding of climate change and shows that climate change means different things to different people. Geoghegan & Brace (2011: 285) therefore advise that climate change should not be viewed *as a super-organic entity'* but rather something that allows different ways of knowing (cf. Leyshon *forthcoming*). Some of these aspects, such as, for instance, ideological influences, the role of existing beliefs and differences in terminologies, I will discuss later in relation to the communication of information about climate change. Nevertheless, I would like to state clearly here that the natural sciences alone are insufficient in their capacity to address issues around climate change. Instead, it is necessary to also view climate change from the perspective of the social sciences (cf. Hulme 2009, Leyshon *forthcoming*). Hulme (2013), for example, explains that climate change requires cultural reflections and the analysis of beliefs, social practices and public discourse. It is therefore necessary to involve disciplines other than the natural sciences - such as religious studies, communication science and anthropology - in climate change discussions (ibid.). This means, I believe, first of all, to move away from a view of the world based on *'organizing binaries'* (Gregory et al. 2009: 7) (cf. Chapter 3) because climate change is not just physical or cultural/social but a problem that '*stands in for something else'* (Hulme 2013: 298).

2.2. The Difficulty of Mitigating, and Adapting to Climate Change

The literature suggests three main issues that hinder mitigation and adaptation actions, which I will summarize here: (1) the scientific episteme which explains climate change (cf. Geoghegan & Brace 2011); (2) the time-space temporality associated with climate change (Norgaard 2003, Geoghegan & Brace 2011); and (3) the political and cultural cognitions that influence individuals' perceptions of climate change urgency (Pielke 2005, Schuldt et al. 2011). Each of these will be discussed in greater detail below.

2.2.1. Climate Change as a Scientific Issue Difficult to Comprehend

Climate change is a difficult concept to understand and even though it has been in the public arena since the late 1980s (Hulme & Turnpenny 2004, Moser 2010), individuals still find climate change a difficult topic to discuss (Nerlich et al. 2010, Geoghegan & Brace 2011). Climate change is, as I outlined above, a physically complex phenomenon mainly described through scientific interpretations which are perceived by individuals to be complex. Therefore it is often unclear what is communicated and understood by the term 'climate change'. Consequently, Geoghegan & Brace (2011) state that there is an intellectual ideological loading and a patina of doubt borne by the term. They argue that because of differences in definitions of climate change and the terms associated with it, for example, *'climate variability',* individuals have distinct physical, social and political understandings of it. These terms might be clear to the scientific community but are unclear to individuals outside this field. Additionally, the specific impacts of climate change can still not be predicted accurately in form, time and space (Taylor 2009, Nerlich et al. 2010, Moser 2010, Mueller 2010, Storch 2010) and such uncertainties regarding the impact of future climate change make it even more difficult to understand. Additionally, it is argued that individuals *'can't directly sense'* climate change as it is a scientific episteme used to express a wide variety of physical processes (Sarewitz & Pielke 2000: 56). Furthermore, Hoffmann (2012) stresses that by using the word *'consensus'* - as the IPCC does to describe scientific findings - lay audiences tend to believe that climate change science is a matter of opinion (cf. Section 2.3. for the importance and meaning of consensus). Therefore, scientific evidence and explanations cannot alone '*compel people to change their behaviour'* (Lorenzoni et al. 2007 in Geoghegan & Brace 2011: 294). Added to this is the question of which consensus society is referring to, and hoping for. Leyshon (*forthcoming*) describes in her latest paper the differences in the ways different disciplines perceive climate change consensus. The fact that climate change is a concern of the natural sciences as well as the social sciences, which still do not complement each other enough, leads to the disciplines reaching their own consensus on climate change. Meanwhile a consensus that addresses *'our confusion and anxiety about the goals, ambitions and destinies we foresee for ourselves'* as individuals and for society more generally, is absent (Hulme 2013: 298).

2.2.2. Climate Change as an Issue that is Distant

Another major hindrance to people taking action to mitigate against the impact of climate change and adapt to it is that everybody is in some way implicated in contributing to it. Climate change is therefore described as suffering from the tragedy of the commons. Hardin (1968) explained that common pool resources, non-excludable but rivalrous resources, are doomed to suffer overexploitation and destruction, because individuals are believed to act rationally and aim to maximize their own gains. He suggests that the only solution to the tragedy of the commons would be through an incorporation of forced morality through privatization and law. Even though these would be imperfect solutions, they are better than a lack of action because, he states, such an imperfect action '*is the recognition of necessity*' (Hardin 1968: 1248). Climate change as a tragedy of the commons is complex: contribution to climate change is not visible, not attributable to an individual's actions and most impacts only reveal themselves in the distant future. It is also important to note that mitigating action taken by one person, country or nation alone is insufficient to mitigate climate change because there is a tremendous gap between the impact of an individual's mitigative actions and the difference that this action makes to climate change (Norgaard 2003). Individuals struggle to mitigate against climate change because they are uncertain about the effect such mitigation would have on climate change (Gardiner 2010). In these ways, climate change knowledges produce time-space temporalities that position climate change as a problem of somewhere elsewhere largely because the timescales of climate change projections are too distant for individuals to perceive as an issue of individual importance (Lorenzoni & Pidgeon 2006, Houghton 2009, Geoghegan & Brace 2011). Additionally, climate change is often seen as a global issue, which positions the exploration of climate change outside local and regional spaces. Human decision-making tends to be immediate and issues that are distant in time-space appear to instil an intellectual doubt about the purpose of individual action (Patenaude 2011). The void between the impact of an individual's actions and the development of climate change can then invoke feelings of being overwhelmed and helpless (Norgaard 2003), which has been described as the value-action-gap (Blake 1999, Kollmuss & Agyeman 2002).

2.2.3. Climate Change Politicization and Cultural Cognition

Individuals also tend to perceive climate change as a topic of political interest rather than as an issue of social importance (cf. McCright & Dunlap 2011, Pidgeon & Fischhoff 2011, Schuldt et al. 2011). The main reason for this is that climate change has become a topic of intense political debate (Pielke 2005, Boykoff et al. 2009, Hulme 2009, Hulme & Blackman 2009, Hulme 2013). Ideally, politics should manage the risks of society and create reciprocity amongst societal and economic actors based on the popular will of those actors (Grunig & Hunt 1984, Hill 1997, Beder 2006, Moser 2008). The true ideological battles, visions and ethical values that politics were designed to reflect (cf. Paasi 2004, Ball 2006, Hoppers 2009) are however ignored when creating climate change policies (Hulme 2009). Instead, of implementing the *'good old-fashioned politics and ideologies'* (Hulme & Blackman 2009: 219-220), climate change-related policy focuses on *'scientific evidence'*, especially with respect to discussions on the scientific consensus regarding the scale and source of 20th century warming (ibid., Hulme & Ravetz 2009, Hulme 2010, Pidgeon & Fischhoff 2011). The result of such science-based politics is that there is no room for individuals to respond to and reflect on the consequences that climate change has on their lives (ibid). This results in climate policies that are unable to make individuals change their behaviour with regard to climate change because climate change policies reflect scientific concerns but not people's values, beliefs and concerns (Hoffman 2004, Brass Centre 2008, Helm 2008). Such science-focused climate-change-related policy debates thus *'undermin[e] both politics and science'* (ibid.: 222). This is problematic, Hulme (2009: 228) explains, because individuals overlook the fact that their discussions about climate change science and its associated disagreements are actually about *'political preferences, ethical principles and value systems'*. Establishing *'universal truths[s]'* through scientific evidence without considering *ethical, political and ideological differences* gives science authority over political decisions and consequently society does not create its own consensus regarding what climate change means for people's lives (Hulme & Ravetz 2009: 223). Climate change politics, which are strongly based on scientific evidence, then allows science to enter the political battlefield and define politics (ibid.); it cannot then be critical, reflective and perhaps independent, and politics cannot include the true ideological

battles, visions and ethical values it was designed for (Hulme 2009). This is especially a problem because, Hulme & Blackman (2009) explain, climate change cannot be solved through scientific explorations but needs to be lived (with). Consequently, climate change should (also) be debated as a cultural phenomenon (Hulme & Blackman 2009). Overall, the politicization of climate change shows that society not only needs science but also needs *'political, psychological and spiritual engagement'* to embark on the journey that would enable individuals to live with climate change (Hulme 2010: 285).

Additionally, only few individuals understand climate science well enough to make well-informed decisions about climate change-related mitigation and/or adaptation (Pidgeon & Fischhoff 2011). Individuals thus tend to follow a climate change-related message dependent on who it is that sends the message and how (Boykoff et al. 2009): McCright & Dunlap (2011), for example, found that Liberals and Democrats in the United States of America (USA) are more likely to trust in the scientific evidence of climate change, and are more concerned about the issue than are Conservatives and Republicans. Schuldt et al. (2011: 115) also showed that climate change perception is correlated to political views, finding, for example, that Republicans are less likely to believe that climate change *'is real when it is referred to as global warming'*. Through the largely scientific but politicized debates around climate change, individuals also lose trust in the seriousness of climate change. This is perhaps why Pielke (2005: 549) specifically criticizes the restricted definition of climate change used by the United Nations Framework Convention on Climate Change (UNFCC). This focuses *'only on changes in climate that result from greenhouse gas forcing of the climate system'*, therefore creating a bias against adaptation policies and reinforcing the politicization of climate science. Other studies have shown that differences in wording - using the term 'global warming' as opposed to 'climate change', for example - create different feelings of importance for individuals: 'global warming' conveys a catastrophic meaning, while 'climate change' is perceived as more controllable and less emotional (Gardiner 2010).

That climate change is such a *'high-stakes, high-profile and highly-politicized'* issue (Boykoff et al. 2009: 1) also puts a great deal of pressure on the science of climate

change itself. This is a problem because the science of climate change can never be complete or perfect (Hulme & Ravetz 2009). Science is rather used to reflect the interests of certain groups such as large businesses (Carter 2007). As a result, climate change-related politics has become a partisan issue that increasingly undermines political commitment to climate change (Carter 2007). This, and the public's lack of understanding of climate change science, also makes it easy for those who deny climate change to highlight the scientific uncertainties about climate change. The Climategate case is a clear example of this: Climategate concerns the false accusation of research misconduct on the part of climate change researchers at the University of East Anglia in 2009. Personal emails from the researchers were unlawfully published and used to publically accuse the Climatic Research Unit (CRU) of having committed fraud (Leiserowitz, et al. 2012, Maibach et al. 2012, Hulme 2013). Several studies have shown that even though it was proven that no research misconduct had taken place, Climategate reduced people's trust in the scientific evidence for climate change and associated beliefs in its reality (Leiserowitz et al. 2012, Maibach et al. 2012). The allegation, however, has also created positive impacts in that climate change scientists have realized the need for clear communication, transparency and accessibility of data (Maibach et al. 2012, Hulme 2013: 4). Regardless of its positive and negative impacts, Climategate provided an insight into the ways in which climate change invokes a multitude of feelings and *'world views'* within individuals. Feelings about climate change are not just based on pure scientific evidence but rather, as I argued earlier, on the relationship that scientific knowledge has with politics (cf. Hulme 2009).

2.3. Communicating Climate Change as a Social Concern

The communication and understanding of climate change is complex, as I explianed above, due to the complex scientific nature of climate change, the multiplicity of its social and physical (mainly distant) impacts and the range of possible interpretations. Communicating climate change is therefore thought to make climate change somewhat '*experiencable*' (Sarewitz & Pielke 2000, Boykoff 2008, Nerlich et al. 2010). Weaver (1964) explains however that communication is also complex because it entails all the procedures in which one mind may affect another mind. Often communication is seen simply in terms of language but, importantly, communication

is also conveyed through other forms of human expressions such as music. Weaver (1964) and Shannon (1964) describe communication using a simplified transmission model [Figure 5]. The transmitter selects the message that is to be communicated from a number of possible messages from an information source. The transmitter transfers this message into a signal and sends it over the channel to the receiver. The receiver translates the signal into a message and gives it to the destination. The receiver is another person and the destination his or her person's brain. It is obvious from this description that the messages received by the receiver and the destination might vary from the message sent by the source. While transmitting additional information, so-called noise might be alter the message.
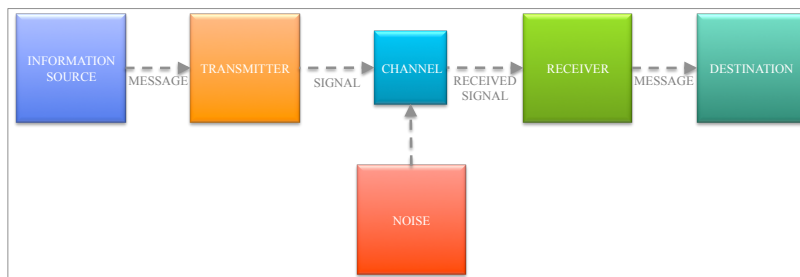
Figure 5: Transmission Model of Communication[5]

This figure shows a simplified transmitter model of communication. A message that is communicated passes through different stages and consequently always has the potential to be understood by the receiver in a different way than the one intended by the transmitter or by the information source.

Similar to the transmission model of communication are the hypodermic model and the deficit model. Now widely discredited, the hypodermic model suggested that individuals receive and accept a message in the way that the sender intended it to be received (Berger 1995). Society is seen as a passive receiver of a message communicated by, for example, the media and consequently all members of society understand the message in the same way (Berger 1995). This message-based approach is referred to as a *'magic bullet'* (Scheufele & Tewksbury 2007: 10) and found recognition through the influence of propaganda communication on societal behaviour during World Wars I and II (du Plooy 1997). It is important to note that even though a communication process might take place without any kind of problem, a communicated message can have different meanings for the transmitter and the receiver. The deficit model, similarly, assumes that providing information is enough

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[5] Own creation after Weaver (1964: 7).

to create behaviour change, and in this sense assumes that it is the lack of information that prevents people from taking action on climate change (Sturgis & Allum 2004, Smith 2005). These message-based models suggest that there is an *'uncomplicated flow'* of information which society simply observes and accepts (Smith 2005: 1473). These message-based models of communication have largely been discredited because of the growing understanding that messages are filtered and changed by people who are interconnected and embedded in personal relationships (du Plooy 1997) (cf. Chapter 3). Smith (2005) believes that, despite this, message-based approaches are still seen as being the main influence on society's opinion about climate change (cf. Chapter 5). However, Smith (2005) believes that the media is just one of many channels providing information and that messages are entangled with other issues such as politics and the construction of society itself. Weaver (1964: 4), for example, identified three levels at which problems can occur during the process of communication. He describes them as follows: (1) *'How accurately can the symbols of communication be transmitted? (The technical problem)'*; (2) *'How precisely do the transmitted symbols convey the desired meaning? (The semantic problem)'; and* (3) *'How effectively does the received meaning affect conduct in the desired way? (The effectiveness problem)'* (Weaver 1964: 4). In respect to the complexity of communication per se, particularly the differences in culture and sociality of different networks, can influence the reception of a message.

Culture is '*that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society*' (Tylor 1871: 1). Culture codes a message according to cultural conventions (Duranti 1997) and consequently a message can have a different meaning for different people. Also, the sociality, the context, in which communication takes place influences a message (Blommaert 1998). Consequently, even though communication appears to be a process which can be reduced to specific components, it is far more dynamic than is assumed at first glance. The transmitter can never fully ensure that the message the receiver receives is the message the transmitter had intended the receiver to receive. Consequently, climate change communication is perhaps best summarized by Nerlich et al. (2010: 98) as *'a very complex undertaking. This*

complexity is a double one, based on the complexity of climate change itself and on the complexity of the communication that is involved.'

Hoffman (2012: 37) explains that even when a scientific consensus on an issue exists, for example, on the health risks associated with smoking, only '*through a process of political, economic, social, and legal debate over values and beliefs* [can] *a social consensus'* arise. Hoffman (2012: 32) describes social consensus on climate change as a '*set of socially accepted beliefs on climate change - beliefs that emerge, not from individual preferences, but from societal norms; beliefs that represent those on the political left, right, and center as well as those whose cultural identifications are urban, rural, religious, agnostic, young, old, ethnic, or racial'*. With social consensus, one generally means 'a *generally accepted opinion or decision among a group* of *people*' (Cambridge 2014: online). More specifically, social consensus can be seen as the result of establishing normative and/or ethical truths which meet the norms and aspirations of the majority of individuals in a society (Habermas 1984). To achieve social consensus in modern society, formal regulatory frameworks ensure that the individuals in each society have an equal chance to participate in the process (Habermas 1984). Consensus is then based on a debate in which the best argument wins. Social consensus then represents a new understanding in society (Habermas 1984). Consequently, knowledge alone of climate change, as proposed by the 'deficit model' (Sturgis & Allum 2004), cannot establish social consensus and behavioural change (cf. Hulme 2009).

Geoghegan & Brace (2011: 295-96) call for a more open understanding of climate change, that sets '*aside the relatively deterministic understandings of climate and the ways it might change offered by the natural sciences'*. This should allow an understanding of how climate change is localized, embodied, practised and lived. Geoghegan & Brace explain that understanding of climate change needs to be shaped by lay knowledges, '*by the associations of the climate in everyday lives […]'* and that people's understanding of climate change is '*circulated – modified by a perhaps tangential, infrequent, incomplete, partial encounter with 'science'* (Geoghegan & Brace 2011: 294). Social consensus is then contingent upon shared, mutually constituted understandings around climate change.

Hoffman (2012: 32) further suggests that individuals are rationally bound through their own personal experiential ideology, which is formed by their social belief systems (cf. Chapter 6). Debates surrounding climate change are therefore not based solely on the reception, interpretation and understanding of scientific evidence and the associated opportunities for action, but also on the interplay of personal values, ideologies and culture. It is for some of these reasons, where underlying '*culturally embedded assumptions, imaginations, and practices*' (Nerlich et al. 2010: 107) occur, that climate change communication can never be '*effective communication per se*' but only offer an opportunity for someone's '*own logic of participation*' (ibid.: 106). However, for most individuals, climate change is still something they can choose to think about, as it does not yet affect them; '*people are thus liberated to argue from, and act upon, pre-established beliefs, convictions, prejudices, and superstitions*' (Adams 2007 in Nerlich et al. 2010: 98). Corner et al. (2014: 418) conclude that clusters of values around self-transcendent and altruistic ideas '*are strongly predictive of positive engagement with climate change*'. Therefore climate change is increasingly understood as a relational, social phenomenon '*with distinctive spatialities and temporalities*' allowing different ways of knowing than just through scientific understandings (Geoghegan & Brace 2011: 297). Curtis & Schneider (2001), for example, suggest that information is needed on the vulnerability of individual population groups to allow them to think more specifically about climate change. Climate change needs to be seen as an issue '*that relates - often in messy, non-linear and diffuse ways - to people's everyday lives, lifestyles and livelihoods*' (Boykoff et al. 2009: 1). Hoffman & Jennings (2012) state that such '*ideological filters*' are ignored in climate change-related policy debates. Only slowly are climate change-related policy debates moving away from physical and rational understandings to social ones concerning the practical implications of climate change (Nerlich et al. 2010). Consequently, methods for effective communication of climate change have gained growing attention with a '*recent explosion of climate change communication from movies to grassroots movements*' (Moser 2010). It has been recognized that people's own experiences of climate change, where people '*develop [their] own logic of participation*' (Nerlich et al. 2010: 107), are important. Geoghegan & Brace (2011: 285), for example, emphasize lay knowledges, which allow '*different ways of knowing*'. In this context, bottom-up movements are also gaining importance as it is

'interested organizations [that] could begin to close the gap between the official consensus on climate change and the public's willingness to do something about it' (Nerlich et al. 2010: 103). Communicating local scale climate change impacts as well as short-term climate change impacts are seen to be crucial to understand climate change (Lorenzoni & Hulme 2009, Geoghegan & Brace 2011), as are individually tailored messages by trusted messengers (Moser 2010). However, as carbon emissions continue to increase and few mitigating and adaptive actions are being taken, it seems individuals still *'prefer to project their anxiety 20 years into the future'* (Hulme & Turnpenny 2004: 105) and the means of communicating climate change to the 'public' effectively remains unclear (Nerlich et al. 2010). Additionally, while it is accepted that communication needs an interdisciplinary approach, it is still unclear how exactly this novel interdisciplinary communication might be established and what it should look like (cf. Pidgeon & Fischhoff 2011). Leyshon (*forthcoming*) points out that the social sciences have become so eager to make this transition and fill the gap in the understanding of climate change through cultural and social interpretations that the social sciences predominantly translate scientific evidence. Social sciences find themselves creating *'a series of meta-narratives'* without any reflection on what those narratives mean for society (Leyshon *forthcoming*). To truly let the social and natural sciences benefit each other in the quest to understand climate change, more must be learned about the individual's understanding and the goals and desires of society.

2.4. SMEs, Climate Change and Innovation

SMEs are central to a reduction in the rate and magnitude of climate change and its socio-economic risks. The reason that these sizes of company can play a crucial role in the mitigation and adaptation of climate change is twofold: SMEs are estimated to have a greater carbon saving potential than larger businesses, and, due to their social nature (they are often embedded in, and closely linked to their localities and communities), they are well placed to stimulate behavioral change across societies and economies. I will explain both these reasons in detail below and then I will outline the size-specific limitations of SMEs and the ways of outweighing these by interacting with other economic actors.

Of the UK's 4.9 million private sector businesses, 99.9% are SMEs, which employ 59% of the employed population (BIS 2013). Businesses in general are said to be closely linked to the UK's total GHG emissions; estimations link up to 50% of the UK's GHG emissions to businesses (Rajgor & Malachowsk 2005). SMEs are estimated to have a greater carbon saving potential than larger businesses, and could collectively save up to 2.5 million tons of CO_2 per year in the UK (Eco-Monitor 2013). Concurrent with this social responsibility of businesses to combat climate change, is the impact climate change will have on business; climate change is predicted to force businesses to reassess their overall strategy by reviewing e.g. their capital resources and/or business culture (Hoffman 2004, cf. Porter & Reinhardt 2007). The social nature of businesses combined with their monetary resources means they are often better positioned than governments or societies to mitigate the impact of, and adapt to, climate change (Hart 2007) and can help society in meeting *the needs of the present without compromising the ability of future generations to meet their needs*' (Brundtland 1987: 1, Loew et al. 2004). The risks and opportunities posed by climate change with regard to businesses, as well as their responsibilities as major greenhouse gas emitters and potential change-makers, have therefore been a focus of recent research (cf. Porter & Reinhardt 2007, Reinhardt & O'Neill Packard 2001, Hoffman 2004, Hart 2007, Patenaude 2011, Koomey 2012).

For SMEs, engagement with climate change could mean the implementation of a variety of business practices. A survey in the South East of England for example identified the activities SMEs pursue in response to climate change (cf. Norrington & Underwood 2008, cf. Williams & Schaefer 2010). The majority of SMEs in that study 'cut waste', 'reduce energy consumption', and 'use new technologies'. Some businesses also 'change transport', 'purchase products locally', 'prepare for extreme weather events', and implement 'other carbon reduction activities'. A small number of SMEs also 'reduce the amount of materials for production', 'include climate change within disaster planning' and 'develop new products' (Norrington & Underwood 2008). More global publications show that an increasing number of large businesses manage climate change through voluntary approaches to reducing carbon emissions (cf. Tahlmann & Baranzini 2004, Gupta et al. 2007, Visser & Adey 2007). Voluntary approaches are agreements in which business, and at times governments,

agree on emission targets, time plans, rewards and penalties (Tahlmann & Baranzini 2004, Gupta et al. 2007). However, there is still little research on these voluntary approaches (Aggeri 1999). Bailey (2007) suggests businesses want to find ways of responding to the uncertainty of climate change regulation and Hoffman (2005) suggests that businesses want to gain expertise and influence policy development.

2.4.1. SMEs Rarely Engage with Climate Change

The fact is that many SMEs do not recognize their crucial role in the mitigation of and adaptation to climate change (IOD 2005, Carbon Trust 2007, 2009, Carbon Neutral 2013, Carbon Trust 2014) and businesses more generally rarely concern themselves with climate change (Hart 2007, Goodall 2008, Global Compact 2010, Patenaude 2011). For example, although more than 70% of global executives do not have emission targets (Enkvist & Vanthournout 2008), a survey by AXA showed that 50% of businesses view a move towards a low carbon economy as important (Carbon Neutral 2013). These businesses, however, often fail to take action (Rajgor & Malachowski 2005). There is little research on why businesses, and SMEs more specifically, fail to address climate change. A number of studies have demonstrated how SMEs find it difficult to engage with environmental issues in general (cf. Tilley 1999, Vernon et al. 2003, Jenkins 2006, Revell & Blackburn 2007, Battisti & Perry 2011, Cassells & Lewis 2011). Tilley (1999), for example, identified poor eco-literacy and environmental awareness as major obstacles to pro-environmental practices. Parker et al. (2009) as well as Cassells & Lewis (2011) suggest that SMEs are unable to engage with long-term environmental concerns because they have to be present-oriented. Hillary (2004) identified internal barriers, such as resources, understanding, and company culture, as well as external barriers, such as lack of support and guidance, as factors that hinder engagement with environmental issues. A study conducted by Vernon et al. (2003) on the tourism industry in Cornwall showed that small businesses feel that their environmental impact is negligible due to their size (cf. Cassells & Lewis 2011, Wilson et al. 2012) and indeed SMEs are largely unaffected by environmental regulation (cf. Carter 2007, Visser & Adey 2007). Additionally, it has been found that owner-managers of SMEs often pass their environmental responsibility on to the government (Cassells & Lewis 2011). Revell & Blackburn (2007) and Tilley (1999) describe this as a value-action-gap in which owner-managers of SMEs believe that the environment is important, but choose not to act. Actions

around wider 'Corporate Social Responsibility' (CSR) are often associated with individual executives, and their personal values, beliefs, and attitudes (Aragón-Correa et al. 2004, Kerr 2006, Visser & Crane 2010). These findings are not particularly surprising as shareholding, management, and ownership are often closely linked in SMEs, and business operations can therefore reflect the characteristics of the owner-manager (Vives 2006). Williams & Schaefer (2013) most recently showed that personal values and beliefs motivate SME leaders to engage with environmental and climate change-related issues.

Patenaude (2011) and Goodall (2008) suggest that one of the main reasons of a lack of engagement with climate change on the part of businesses is that the business community is not treated as an audience of interest in climate change debates. Patenaude (2011) found that climate change issues are not addressed in business schools, which therefore create future business leaders who are climate illiterate. Goodall (2008) discovered that leading business journals fail to address climate change in their articles: only three out of the top 30 management journals listed in the ISI Web of Knowledge addressed climate change or global warming in article titles during the 1992–2008 period inclusively. Businesses replace concerns over climate change with concerns over environmental issues that are directly experienced and, consequently, perceived as more important (Goodall 2008, Patenaude 2011, Wolf & Moser 2011): '*While many companies may still think of global warming as a corporate social responsibility issue, business leaders need to approach it in the same hard-headed manner as any other strategic threat or opportunity*' (Reinhardt & O'Neill Packard 2001: 3, cf. Carroll 1991, Loew et al. 2004). However, Porter & Reinhardt (2007: 1) point out that climate change is too '*tangible and certain*' (cf. Chapter 3) to be addressed by such a philanthropic approach. They propose that operational action as well as a strategic approach - allowing the mitigation of climate change-related costs and reducing vulnerability to the effects of climate change - is needed.

2.4.2. SMEs are Complex, to their Size Related, Businesses Entities

When taking a closer look at SMEs, one can observe that SMEs are business entities which are characteristics and processes which are relative to their size, especially compared to larger businesses (cf. Tilley 2000: 33, Jenkins 2006): SMEs have limited

financial and personnel resources, short-term planning horizons, narrow technical knowhow, limited time and funds and restricted research capabilities to find new and better ways of doing business (cf. Chapter 3) (Deakins & Freel 1998, Bougrain & Haudeville 2002, Klerkx et al. 2009, Cassells & Lewis 2011). They are also said to be unaware of these strategic, organizational, and technological deficiencies (Klerkx et al. 2009). SMEs that are located in economically underdeveloped rural regions like Cornwall also suffer from other pressures that limit their capacity to do business in meaningful, profitable and sustainable ways. Hadjimanolis (1999) explains that in underdeveloped regions, SMEs suffer from inadequate technological and policy infrastructures. Additionally, SMEs in rural areas are smaller than those in urban areas (Patterson & Anderson 2003); in Cornwall, for example, 84% of SMEs have four or less employees (Office of National Statistics 2012) (cf. Chapter 1). Businesses in rural areas are also more affected by a lack of suitable staff and limited training possibilities and they suffer from higher transport costs for resources and products than businesses in urban areas (Patterson & Anderson 2003). Decisions about the intentional development of an SME (Johnson et al. 2008) that can impact its *'survival prospects, well-being and nature'* (Schoemaker 1993: 107 in Ürü et al. 2011) take place in complex and uncertain settings and tend to be less rational than in larger businesses (Busenitz & Barney 1997, Ürü et al. 2011, Murmann & Sardana 2012): SMEs have limited historical data, little experience with decision-making, limited market information and no standard procedures for decision-making (Busenitz & Barney 1997, Ürü et al. 2011). Individual business leaders therefore solely bear the responsibility of decisions made in SMEs (Kotter 2001, Legrand & Weiss 2011, Ürü et al. 2011, Wong 2013). A business leader is a person who formulates a business strategy and has the ability to influence a business so that it achieves the strategic goals (Kotter 2001, Bowerman & Van Wart 2011). The term leadership overlaps with similar but distinct designations such as owner and manager (Kotter 2001, Bowerman & Van Wart 2011). However, individuals in SMEs that hold the powers to decide on the business strategy are not always addressed as managers and/or owners. For simplicity I will therefore refer to someone who is responsible for the management and associated decision-making of the business strategy in an SME as a 'business leader'. The act of setting the direction of and managing a business strategy by having

the choice between two or more (known and/or unknown) alternatives, I term 'decision-making' (Lynch 2011).

2.4.3. SMEs & Communities of Practice

SMEs interact and engage with other economic actors such as businesses, individuals and research organizations in order to compensate for some of their size-related limitations (Mitra 2000, Bougrain & Haudeville 2002, Muller & Zenker 2001, Kaufmann & Tödtling 2002, Street & Cameron 2007). Hadjimanolis (1999) suggests that the higher the internal, size-dependent limitations of an SME, the higher is their involvement in formal and informal relationships and Perrini et al. (2007: 286) conclude that SMEs are *'independent, multi-tasking, cash-limited'* businesses that are *'based on personal relationships and informality [...] actively managed by the owners, highly personalized, largely local in their area of operation and largely dependent on internal sources to finance growth'*. These formal and informal sets of relationships are described through a variety of different terms across the business literature, including terms such as 'business networks' and 'communities of practice'. Even though all the terms describe SMEs' formal and informal relationships, the terms do signify distinct types of relationships, which I shall outline below. In this thesis, however, I will focus on 'communities of practice'.

Business Networks

The term 'business network' describes business relationships which are based on *'thick network[s] of knowledge sharing, which is supported by close social interactions and by institutions building trust and encouraging informal relations amongst actors'* (Breschi & Malerba 2007: 3). Business networks are based on *'reciprocal, reputational, or customary trust, and co-operation-based linkages among actors that coalesces to enable its members to pursue common interests'* (Cooke 2007: 88). Such networks, which can be formally recognized or be of an informal nature, provide support space(s) for businesses in the form of face-to-face interactions, where knowledge is provided and/or decoded (Bougrain & Haudeville 2002, Kaufmann & Tödtling 2002, Street & Cameron 2007). Business networks can be within sectors, across sectors and across communities (Perrini et al. 2007).

Communities of Practice

'Communities of practice' are specific forms of business network because their members are '*bound together by shared expertise and passion for a joint enterprise*' (Wenger & Snyder 2000: 139). Here, business leaders are not only bound together by their relationships with each other, but more specifically through the endeavour to create, refine, share, develop and use knowledge to approach specific problems (Wenger 1998, Wenger & Snyder 2000). Thus, the business leaders in a community of practice are bound together by the common purpose of interactive learning (Wenger 1998). Communities of practice are always informal, self-organized and self-selected. The reason business leaders participate in a community of practice is the passion for and interest in what they do together and in the specific knowledge they share (Wenger 1998, Wenger & Snyder 2000). Wenger & Snyder (2000:143) propose that when communities of practice '*generate knowledge, they re-inforce and renew themselves*'. This definition shows that all communities of practice are business networks but not all business networks are communities of practice. Communities of Practice are thus a specific form of business network.

2.4.4. Innovation

The function of the engagement of SMEs in business networks is to create learning and, more specifically, innovation (Fromhold-Eisebith 2004). Learning is the process in which the business network extracts the knowledge of individual members until the knowledge of the network and all members are similar (Hildreth & Kimble 2004). Innovation is created if, based on this learning, the network is able to '*move into a different direction by challenging the existing*' network (Hildreth & Kimble 2004: 84). Innovation is consequently the '*alteration of what is established by the introduction of new elements*' (OED 2014). More specifically, innovation is the result of applying knowledge in new ways, which leads to '*the successful diffusion of a new product, process or service*' (Hildreth & Kimble 2004: 81). In this respect, (new) knowledge on climate change must lead to the '*successful exploitation and diffusion*' (Hildreth & Kimble 2004: 81) of this knowledge within a business. Climate change-related business practice in this thesis thus describes the '*actual application (…) of an idea, (…) or method*' in relation to climate change (OED 2014). Climate change-related business practice describes the application of the idea, desire or method to mitigate the impact of, and adapt to, climate change.

A concept which serves to make sense of the complex innovations of actors interrelating with each other, is the Multi-Level Perspective (MLP) (Markard et al. 2012).The MLP separates the multi-dimensional complexity of an innovation into 'systems' to highlight the fact that innovation cannot be studied in isolation but must be viewed through the contexts in which they are developed (Geels 2010). Systems, for example, natural and human systems as well as economic systems (cf. Chapter 1), in this sense are *'arrangement[s] of interdependent or interacting things'*, be they purposefully constructed or self-organized, *'operating in a more or less unified way'* (Castree et al. 2013). Central to this perspective is the separation of systems into regime, niche and socio-technical landscape (Markard et al. 2012). A 'regime' involves the prevailing practices, rules and assumptions, in short the *'dominant mental models'* that determine how to do things within a mainstream system (Kemp & Rotmans 2005). A regime includes actors that interact with each other for *'the fulfilment of social and economic functions'* alongside *'institutions, techniques and artifacts, as well as rules, practices and networks that determine the 'normal' development and use of technologies* (Smith et al. 2005). (In this sense regime is similar to my definition of a 'business network' given above.) 'Niches', on the other hand, are protected spaces *'where new sociotechnical configurations and practices can be experimented with and develop away from the selection pressures of the dominant system* (Seyfang & Longhurst 2013: 882). They offer a place where innovation takes place away from, and often in opposition to the pressures of the regime (Geels & Schot 2007). Niches are characterized by social learning, diverse experimentation and multi-actor networking (Markard et al. 2012). Finally, 'landscape' describes the exogenous environment (Geels 2004), the dominant background variables in a mainstream system such as political infrastructure, culture, social values, worldviews, structure of the economy and the natural environment (Kemp & Rotmans 2005). The landscape is *'beyond the direct influence of actors'*. Changes in the landscape such as shifts in cultural values or changes in the natural environment through, for example, climate change can put pressure on the regime and consequently niche developments might break through into the mainstream system (Geels 2004, Geels & Schot 2007, Geels 2010). Throughout the vast literature on innovation, authors refer, somewhat ambiguously, to all three or perhaps just the regimes and landscape as 'mainstream systems' and they also do not specify which

systems they are referring to (cf. Seyfang 2009, Seyfang & Longhurst 2013, Geels 2010). It can however be deduced that they aim to describe the totality of systems, such as the social system and the economic system, that determine how people act. For the purpose of this study, I will call the totality of systems that structure the interdependent interaction of human and non-human actors through dominant mental models of regimes and which are steered by the exogenous background variables (landscape) that determine how individuals and businesses act, as 'socio-economic systems'.

Innovation, I conclude, is a complex, non-linear, evolutionary and interactive process in which numerous actors, networks and institutions interrelate, creating diverse developments that co-evolve with each other and shape and are shaped by each other's developments (Ashby 1957, Rip & Kemp 1998, Edquist & Hommen 1999, Kaufmann & Tödtling 2002, Geels 2004, Kemp & Rotmans 2005, Klerkx et al. 2009). The systematic view of innovation outlined above acknowledges that diverse actors, networks and institutions create innovation together (Boons et al. 2013). Businesses in particular are seen as having a key role in innovation by using and producing knowledge, developing products and services and implementing them within the market (ibid.). Recent studies argue that businesses could be potential *'frontrunners'* to advance the transition to a more sustainable world (Loorbach & Wijsman 2013).

Within these multi-dimensional relationships and innovation processes (cf. Chapter 3), a set of actors called *'innovation intermediaries'* are of specific importance for SMEs to help them overcome their information and managerial gaps and bridge the demand for and supply of knowledge (Kaufmann & Tödtling 2001, Howells 2006, Klerkx et al. 2009). Innovation intermediaries transform *'the ideas and knowledge being transferred'*, using knowledge and providing *'solutions that are new combinations of existing ideas'* (Howells 2006: 716). Intermediaries are therefore seen to determine the speed of innovation in a business through providing a wide range of support. This might include: *'helping to provide information about potential collaborators; brokering a transaction between two or more parties; acting as a mediator, or go-between, for bodies or organizations that are already collaborating; and helping find advice, funding and support for the innovation outcomes of such*

collaborations' (Klerkx et al. 2009: 367). Howells (2006: 720) views innovation intermediaries as agents that deal with *'any aspect of the innovation process between two or more parties'*. Innovation intermediaries can be *'either specialized institutions like technology transfer organizations, particularly designed for this purpose, or organizations which perform this function in addition to other activities like suppliers and consultants'* (Kaufmann & Tödtling 2002: 801). For the purpose of this study, such intermediaries are called 'Innovation-Support-Organizations' (ISOs). An ISO is defined as an organization that acts as an intermediary to stimulate innovation in a business (cf. Howells 2006).

2.7. Conclusion

In summary, climate change describes a change in the climate that is mainly attributed to human fossil burning activities. Past and future changes in the climate have brought, and are projected to bring, substantial changes to natural and human systems. To reduce the rate and magnitude of these changes and the associated impacts, there is an urgent need for mitigating and adaptive action.

My discussion showed that when individuals speak about climate change, they can mean very different things. Such ontological and epistemological differences can especially be observed along the disciplinary divide between the physical and social sciences. Due to the characteristics of the climate as a common pool resource, scholars and policy makers have believed until recently that climate change is best understood and managed through rational-choice-based assumptions. Individuals were thought to require mainly scientific information and incentives to yield the needed mitigation and adaptation. However, in reality, individuals find taking action based on rational choice arguments alone to combat climate change difficult. The climate change-related literature outlined above suggests three issues that hinder mitigation and adaptation actions: (1) the scientific episteme which explains climate change; (2) the time-space temporality associated with climate change; and (3) and the political and cultural cognitions that influence an individual's perception of climate change urgency.

Growing doubt has been cast on approaches based on rational choice-based assumptions for managing climate change in recent years because they ignore the social embeddedness of decision-making. Nevertheless, these assumptions still steer the decision-making of policy makers and climate change communicators. Recent research points towards the role of lay knowledge, culture, practices, values, beliefs and regional impacts to enable meaningful, profitable and sustainable actions on climate change. Climate change is therefore increasingly understood as a relational, social phenomenon requiring social consensus to achieve substantial behavioural change. However, little is known about this social embeddedness, which steers climate change engagement, or how to create social consensus on climate change.

Adaptation and mitigation on the part of SMEs could play a central role in achieving a reduction in the rate and magnitude of climate change, due to their carbon saving potential and their social nature (they are often embedded in, and closely linked to, their localities and communities). SMEs are well placed to stimulate behaviour change across societies and economies. However, SMEs and their potential to be mitigators and leaders in climate change engagement have largely been overlooked within the climate change and business literature.

The extant literature shows that climate change and its associated communication is an important, and widely researched field but that businesses, as an audience of interest, are largely ignored in these investigations. Contemporary research exploring the relationship between SMEs and climate change communication is very limited and does not adequately explain how businesses understand and interpret climate issues (cf. Hoffman 2004, 2006, Hart 2007, Schaefer et al. 2011, Williams & Schaefer 2013). Similarly, little is known about how SMEs make sense of climate change. This makes it difficult for businesses to estimate and engage with climate change risks and opportunities. It also results in a situation in which businesses find themselves in a position where they either ignore the climate change debate, or create methods such as self-regulation to manage the risks and opportunities of climate change. Questions on how to communicate climate knowledge to SMEs have remained largely unaddressed and consequently make SMEs' meaningful, profitable and sustainable engagement with climate change challenging (cf. Goodall 2008). When certain SMEs

do overcome the gap that exists between climate change science and business practice, little is known about why and how they do this. My research questions, aiming to explore these knowledge gaps, must therefore be:

(1) Which climate change knowledges are communicated to SMEs and how?

(2) Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?

(3) How do SMEs overcome the gap that exists between business practice and climate change science?

At the heart of these research questions are the decision-making processes of SME leaders and, more generally, the ways in which modern society manages risks. I will explore these aspects in the next chapter.

3. Theoretical Framework

In the Literature Review (Chapter 2) I demonstrated that climate change is a complex phenomenon requiring an eclectic, interdisciplinary and open approach to understanding, communicating and managing it. Climate change also poses a risk and an opportunity for businesses in their pursuit of operational and strategic goals. In light of this challenge, businesses have to make decisions within society's socio-economic systems that are based on society's perception of risk (cf. Porter 2004). It is therefore important to find a theoretical perspective that reflects on the ways in which society treats risk.

I chose the Actor-Network-Theory (ANT) as my theoretical framework because of the interdisciplinary nature of this PhD. Towards the beginning of the PhD I spent time reflecting on different theoretical methods, in particular those associated with New Institutional Economics. After a few months of reviewing the literature and conducting interviews, I realised, however, that traditional theoretical frameworks such as New Institutional Economics were not appropriate for my data. My data collection at that point predicated on positioning climate change as a social construct as opposed to a purely scientific problem only. Predefined ideas seemed to be too static to allow me to understand the true nature of climate change that I was attempting to explore and that had already manifested itself through my interactions with the participants. My supervisors and other academic colleagues suggested that I should familiarize myself with ANT and after reviewing several studies I saw that ANT was a theoretical viewpoint that would give me the opportunity to explore the interconnection of human and non-human, natural and social actors with each other in this thesis.

I will now outline my reasons for choosing ANT as a theoretical viewpoint. I will especially reflect on the ways in which modern society makes decisions with regard to climate change, risk and innovation. Ultimately this chapter will show that climate change requires a theoretical viewpoint that is different to the way in which society transitorily views climate change. I will propose that ANT allows viewing climate change as a social construct.

3.1. Modernity and the Risk Society

Modernity, *'the processes unleashed by the transformation of traditional societies into capitalist ones'* through industrialization in Western societies, has impacted the ways in which individuals have made decisions since the Second World War (Gregory et al. 2009). Giddens (1999: 3) argues that modernity introduced a way of living which he calls *'after nature'* and *'after tradition'*. By living *'after nature'* Giddens means the *'end of nature'* and explains that few aspects of the natural environment are untouched by humans. This interaction with nature has created problems for society, which are a direct consequence of human's interaction with nature, and not just problems induced by nature itself (ibid.). Living *'after tradition'* addresses the *'end of tradition'* and indicates that people have moved away from traditions such as narratives, beliefs and acting as a collective (ibid.). In pre-modern societies, people viewed dangers such as the unpredictability of nature not as risks but as *'given'*, coming either from God or nature, both of which were outside the realm of human control (ibid.: 3). The notion of risk can therefore be seen as people's desire to control dangers.

Risk is defined in the OED (2014) simply as *'a situation involving exposure to danger'*. Adams (1995: 69), however, adds that risk is *'the probability of an adverse future event multiplied by its magnitude'*. Douglas (1985: 42) defines risk as *'trying to turn uncertainties into probabilities'*. For Beck (2006), risk is more than just potential exposure to danger. He points out that climate change particularly has revealed that modern risk is more complex than this. Modernity has created risks that were previously unthinkable in their spatial, temporal and social forms (Giddens 1999, Beck 2006). Society did not, for example, anticipate the interlinked changes that a changing climate encompasses (Beck 2006). Climate change has in fact shown that *'we do not know what it is we don't know'* (ibid.: 329); society today is confronted with risks that are de-localised, incalculable, and non-compensatable and occur over spatial, temporal and social spaces (ibid.). Giddens (1999: 2) explains that due to modernity, people *'are involved with systems which even they themselves do not understand'*. Beck (1992) further explains that because individuals are faced with these new, unthought-of and unpredictable risks, their desire to minimize and manage

them is greater. Giddens (1999) and Beck (2006) name a society which is increasingly concerned with risk as a *'risk society'*. Beck (ibid.: 332) explains that *'a risk society [...] is increasingly occupied with debating, preventing and managing risks that it itself has produced',* where risk is *'a systematic way of dealing with hazards and insecurities'* (Beck 1999: 221). This society is not necessarily more dangerous, but individuals increasingly desire to control the unknown. Consequently, people are *'increasingly preoccupied with the future [...], which generates the notion of risk'* (Giddens 1999: 3). Risk in this sense must be understood as an anticipated reality.

3.2. Government, Science & Power

In this modern society, *'after nature'* and *'after tradition'* (Giddens 1999: 3), individuals aim to make individual and rational decisions (Beck 1992) in which less scientific considerations such as traditions, collective identity and lay knowledges are overlooked. Society instead yields to the *'mathematicized morality of expert thinking'* (Beck 2006: 333). Scientific evidence then legitimizes and guarantees the ways in which government can and should minimize risks for society (Hollway & Jefferson 1997, Beck 2006). Foucault (1982: 781) explains that governments guarantee this rationality and scientific reasoning by imposing (political) rationality upon citizens (Li 2007, Rutland & Aylett 2008): *'Power applies itself to immediate everyday life which categorizes the individual, marks him by his own individuality, attaches him to his own identity, imposes a law of truth on him which he must recognize and which others have to recognize in him'*. In this context individuals are expected to make decisions in isolation as rationally-reasoned decisions. The model of *'homo economicus'* describes rational-choice-based individuals as aiming to maximize utility through optimal allocation of resources and that, in competition, only the rational minded actor survives (Simon 1959, Göbel 2002). This use of rational, scientific reasoning to minimize risk heavily depends on the availability of scientific knowledge as well as the power of governments to access and use this knowledge. With regard to climate change it is often the case that governments over-emphasize scientific evidence. The risks associated with climate change therefore appear to be solvable, which stops individuals from reflecting on the consequences that climate change might have for their livelihoods. It also means that beliefs and values are ignored in the highly scientific climate change-related policy debates. I can therefore conclude

that, at the heart of the climate change debates, based as they mainly are on scientific evidence, lies the way in which society understands, and deals with, risk.

In terms of climate change, which is uncertain and difficult, governments have to try and find the right balance between deciding which climate change risk is real (and worth following up on) and which is not (Giddens 1999). This means, for example, assessing the importance and validity of controversies such as Climategate. Over-emphasizing and/or undermining scientific uncertainty can lead to an uncertainty becoming a '*high-stakes, high-profile and highly-politicized*' risk (Boykoff et al. 2009: 1). In this respect, knowledge plays a crucial role as knowledge determines the uncertainty, and potential consequence, of risk (Hollway & Jefferson 1997). Knowledge is thus power in modern society and can mean that different actors have different agencies in the construction of power through having power over knowledge. Foucault (1995: 27) explains that '*[w]e should admit rather that power produces knowledge [...] that power and knowledge directly imply one another; that there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations*'. This discussion shows that the drive to minimize and manage risk has created a reliance on science. Science then allows governments to make the best possible decision in the light of uncertainty but this decision is dependent on the power of knowledge.

3.3. The Problem of Science Dependence and Rationalization

It is clear from my discussion above that a rationalized and science-based management of risks entails a question of power and knowledge. Beck (2006: 344) calls it a '*battle[s] over risk*' because the decision over what constitutes a risk and what does not '*come[s] down to social and state order of power*'. Such battles lead towards the state making policy-related decisions on the basis of scientific evidence only. Foucault (1982, 1995) criticises such top-down governance for ignoring the time, space, and spatial conceptions of modern risks. Beck (2006: 344) concludes that this type of risk-governance leads to both '*inefficiency and post-democratic authority*,*' and that the responsibility for risk is yielded to the government to make decisions based on scientific evidence. The notion of modern society yielding the responsibility of risk to government and science also prevents individuals from

understanding the ambivalence and irony of risk (ibid.). Giddens (1999) suggests that people need to think about what it is that governments should protect. What people value needs to be questioned and it is necessary to ask which of these values are worth protection. The question over values is an important one, as modern society cannot solve complex modern risks through 'being modern' alone, Giddens (ibid.) explains. The OED (2014) defines values as '*the principles or moral standards held by a person or social group; the generally accepted or personally held judgement of what is valuable and important in life'*. Thus a question over values requires people to be reflexive about their selves and the world they choose to live in. This means that currently society should be in a state of reflexive modernity, with the ability to constantly adapt to the changes society itself has created (Gregory et al. 2009).

Businesses, '*entit[ies] engaged in commercial, industrial or professional activities'* which '*can be a for-profit, [...], or a non-profit'* organisation (Investopedia 2014), are assumed to aim for profit maximization (Douma & Schreuder 2002, Göbel 2002). They are assumed to be self-interested, aiming to maximize utility through an optimal but subjective and rationally bounded allocation of resources (Simon 1959, Douma & Schreuder 2002, Göbel 2002). While the notion of profit maximization is still the dominant notion for doing business and policy making (Douma & Schreuder 2002, Göbel 2002, Carter 2007), it has in recent years been argued that the assumption that businesses seek to maximize profits should only be treated as a general tendency; businesses also have the responsibility to fulfil economic and legal obligations as well as ethical and philanthropic ones (Carroll 1991, Loew et al. 2004). One approach that addresses these aspects of 'doing business' is called CSR (Carroll 1991, Loew et al. 2004). CSR is quite an ambiguous term and can mean any activity that serves some social good, such as taking care of the natural environment (Wood 1991, Bassen et al. 2005). Businesses increasingly focus their CSR activities on environmental concerns (Williamson et al. 2006, Babiak & Trendafilova 2011), which means they review and improve the ways in which they affect and are affected by the natural environment - for example, through conservation of natural resources and emissions reduction (Porter & Kramer 2006, Montiel 2008). Montiel (2008) explains that CSR activities concerned with the natural environment overlap with more social concerns and consequently it is difficult to differentiate if a CSR activity is of a social or/and

environmental nature. Porter & Kramer (2006: 1) conclude that CSR is *'much more than a cost, a constraint, or a charitable deed - it can be a source of opportunity, innovation, and competitive advantage'*. If it is the latter,, businesses can help society to achieve sustainable development, which is defined as *'meeting the needs of the present without compromising the ability of future generations to meet their needs'* (Brundtland 1987: 1, Loew et al. 2004). This is only possible if social, economic and environmental issues are given equal attention (Brundtland 1987, Loew et al. 2004). It is therefore widely accepted that businesses are dependent on a healthy society, while society is dependent on well-functioning businesses to contribute to a prosperous economy through identifying *'the particular set of societal problems that it is best equipped to help resolve and from which it can gain the greatest competitive benefit'* (Porter & Kramer 2006: 14) (Loew et al. 2004, Hart 2007).

To ensure businesses nevertheless deal appropriately with most internal and external risks and are still able to pursue their individual aims, a regulatory framework exists to create reciprocal reliability (Porter 2004, Beder 2006) and a stable structure for human interaction (North 2004). Climate change-related policies for businesses in the UK have had some success in creating mitigation and adaptation action but generally climate change-related policy is seen as insufficient and, at times, ineffective/inadequate (Bowen & Rydge 2011). For example, only *'quoted companies are required to report their annual emissions in their directors' report'*[6], while it is simply recommended that other UK businesses report their emissions. Larger non-energy intensive public and private organisations that consume over 6,000 megawatt-hours (MWh) of electricity fall under the Carbon Reduction Commitment Energy Efficiency Scheme (Environment Agency 2009). This scheme aims to encourage energy management strategies targeting *'energy supplies not already covered by Climate Change Agreements (CCAs) and the EU Emissions Trading System*[7]*'* through mandatory monitoring and reporting of energy use and purchasing of allowances to offset their emissions (gov.uk 2014c). Businesses can also benefit from the Carbon

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[6] Quoted companies are *'those that are UK incorporated and whose equity share capital is officially listed on the main market of the London Stock Exchange; or is officially listed in a European Economic Area; or is admitted to dealing on either the New York Stock Exchange or NASDAQ'* (DEFRA 2013: 22).
[7] The EU Emissions Trading Scheme covers energy-intensive industrial installations such as power stations (Gov.uk 2014a). The UK has around 1,000 participants within the EU Emissions Trading Scheme, which will provide 50% of the UK's emission reduction targets between 2013 and 2020 (Gov.uk 2014a). The Climate Change Agreement allows *'eligible energy-intensive businesses to receive up to a 90% discount from the Climate Change Levy (CCL) in return for meeting energy efficiency or carbon-saving targets'* (Gov.uk 2014b).

Trust (CCC 2012), a company limited by guarantee, which advises on low carbon activities. Energy-intensive businesses fall under the EU Emissions Trading Scheme (Gov.uk 2014a), the Climate Change Levy (HMRC 2014) and the Climate Change Agreement (Gov.uk 2014b). Some of these policies overlap and cause a carbon price for UK businesses that is triple the EU price. As Bowen & Rydge (2011: 20-21) explain, *'Firms not covered by a Climate Change Agreement (CCA) […] could be paying a form of carbon tax three times over: first, through higher payments for electricity produced by generators subject to the EU scheme and sold by suppliers subject to the Renewables Obligation; second, through the Levy; and, third, through the Energy Efficiency Scheme'.* These policies primarily target larger companies, leaving SMEs unregulated on many mitigation and adaptation possibilities. Instead, policies relevant to SMEs are mainly Market Based Instruments (MBIs) such as the Feed-In Tariffs (FITs) and the Climate Change Levy (Carbon Trust 2012). The Climate Change Levy is an MBI that taxes *'the supply of specified energy products (…) such as electricity, gas and coal' by businesses (…) to reduce energy consumption and/or consider using energy produced from renewable sources'* (HMRC 2014). The FIT scheme for small-scale low carbon electricity generation, introduced in 2010, was set up to help individuals and businesses move towards the use of small-scale low carbon electricity through several financial incentives (DECC 2013). The Organization for International Standardization has created International Environmental Management Standards, called the 14000 series, so that businesses can manage impacts associated with climate change (IS 2014). To mitigate the impact of, and adapt to, climate change, businesses have a variety of options, mainly discussed in the grey literature, such as complying with climate change-related policies, reducing GHG emissions, accounting for carbon, producing and using renewable energies, and waste management (cf. Norrington & Underwood 2008, Chartered Insurance Institute 2009, Adaptation Scotland 2014, Climate South West 2014).

A *'possibility of economic or financial losses or gains, as a consequence of the uncertainty associated with pursuing a course of action'* is seen as a risk in the pursuit of 'profits' and social responsibilities (Verbano & Venturini 2013: 187, cf. Chapman & Cooper 1983). Verbano & Venturini (2013: 187) explain that a risk for a business can have two forms: either *'pure or static risk (…) that only causes damage without*

the opportunity of earning from its occurrence' or *'speculative or dynamic risk (...) that can cause either damages or earning opportunities'*. Risks can therefore have both negative and positive outcomes and can determine a company's development and survival (Amit & Wernerfelt 1990, Pfleeger 2000, Quon et al. 2012). In recent years, risk management has found increasing recognition within business studies. Risk management serves to identify and measure risks according to their probability and possible impact. Management of risk aims also to eliminate or reduce the impacts *'with the minimum investment of resources'* (Verbano1 & Venturini 2013: 187). Risk management is closely linked to business strategy, which means that choices on how to handle risks can support the pursuit of business goals such as CSR (Bowman 1980, Bettis 1983).

More specifically, decision-making in business is also understood to take place in accordance with the rational choice-based assumptions of modernity (Busenitz & Barney 1997, Ürü et al. 2011). Druker (2002), for example, explains that business leaders deal with innovation through systematic decision-making, careful management, hard work, being conscious and being purposeful. Others suggest that business decisions lead to the best outcomes if their decisions are based on (knowing the) facts to serve a healthy society and create wealth for the business (Carroll 1991, Russell 2001, Douma & Schreuder 2002, Druker 2002, Göbel 2002, Goleman 2004, Loew et al. 2004, Porter & Kramer 2006, Hart 2007, Carter 2007). These studies paint quite a value-free rational choice-based picture of business leaders but some scholars emphasize the importance of the individual who makes the decision. Eisenhardt & Zbaracki (1992: 18) explain that the view of decision-making discussed above (cf. Chapter 2) assumes that *'actors enter decision situations with known objectives. These objectives determine the value of the possible consequences of an action. The actors gather appropriate information, and develop a set of alternative actions. They then select the optimal alternative'*. However, this perspective cannot explain why many decisions do not conform to rational explanations (Busenitz & Barney 1997). Many studies therefore question the rational choice-based view of decision-making and suggest that decisions are down to the characteristics, roles and contexts of individual decision makers (Eisenhardt & Zbaracki 1992, Busenitz & Barney 1997, Ürü et al. 2011). Due to the somewhat limiting characteristics of SMEs that I

introduced in Chapter 2 and the fact that decision-making in an SME is down to individual business leaders, Murmann & Sardana (2012) conclude that rational decision-making is too costly and time consuming. Some individuals might also be more rational than others (Eisenhardt & Zbaracki 1992, Busenitz & Barney 1997) and research tries to understand the behavioral aspects of the decision-making of individuals (Busenitz & Barney 1997). Most studies have identified that personality traits and/or cognitive biases influence the decision-making of business leaders in SMEs and found little evidence that business leaders make rational choice-based decisions (Eisenhardt & Zbaracki 1992, Busenitz & Barney 1997, Ürü et al. 2011) (cf. Chapter 6).

The need to be more reflexive about the ways in which individuals understand the world and themselves within it, can also be elaborated when looking at the current approach to dealing with innovation (cf. Chapter 2). My discussion above clearly showed that because of the impact of climate change on physical and human systems, radical, new and better ways of mitigating and adapting to it are needed. However, Lindegaard (2013) explains that the rationalized view of the world which modern society holds creates a linear appraoch to dealing with such innovation. This leads to the tendency to define the complex construct of climate change in oversimplified ways in a push for quick innovation (ibid.). Society therefore believes that innovation and the opportunity to minimise risks *'begins with a discovery in 'basic science,' proceeds with an application or invention derived from […] applied science […], and ends with the development of a new product or process'* (Freeman 1996: 27). Lindegaard (2013) argues that such an understanding of innovation ignores the existing contexts and knowledges, such as traditions, values and practices, that are found in society (Massa & Testa 2008). The idea that it is possible to manage risk though rationally-minded, state orders of power is therefore not sufficient to meet the needs of a modern society which is faced with complex, unthought-of risks (Hollway & Jefferson 1997). If governments are so reliant on the power of science, then risk becomes *'a socially constructed phenomenon'* in a society where *'some people have a greater capacity to define risks than others'* (Beck 2006: 333).

My earlier definition of innovation shows that in order to understand and achieve innovation, one needs to understand the interaction of diverse actors. Actors cannot develop, change or interact in isolation. However, theories of innovation such as the MLP are unable to fully explain for example, how networks of relationships interact and how their interaction develops into innovation. A separation of one actor from another and into segments does not allow the viewing of innovation in its complete form. This is perhaps why the rational choice-based approaches that govern current climate change policies are said to *'ignore the 'social embeddedness' of decision-making where individual choices are continually being shaped and reshaped by the social contexts in which they take place'* (Moloney et al. 2009: 7616). Social influences on an individual's decision making can be traditional knowledges, values, emotions, ethics, and social and institutional contexts (cf. Jackson 2005, De Kirby et al. 2007, Seyfang 2009, Nerlich et al. 2010, Hoffmann & Jennings 2012, Corner et al. 2014). I therefore conclude that government and society both rely too much on the rational, individual and organizing binaries that modernity has created in their quest to reduce the risks associated with climate change. Additionally, climate change-related policies can only have a limited influence on people's decisions (Porter 2004), and their success is dependent on people's perception of the urgency of climate change (Downs 1972). Therefore, it is crucial to enable climate change mitigation and adaptation actions that go beyond what is (and could be) required by policy. This also means that individual actors cannot be seen in isolation from each other either, as only rational or individualistic. Due to the fact that climate change is complex, it requiries an eclectic, interdisciplinary and open approach to how it is understood, communicated and managed, rather than being understood from a theoretical perspective which emphasises a rational, linear and segmented view of the world by highlighting only one concept, theory and/or idea.

3.4. A Better View: Actor-Network Theory

The current view on power and government that I outlined above does not reveal the reality of how society is constructed, or how it changes and deals with risk, as Giddens (1999), Beck (2006) and Lindegaard (2013) explain. They argue that society separates the past, current and future aspects of decision-making too much. Instead, risks must be addressed in a holistic way and cannot be treated through the lens of

rationally-minded, social and state orders of power only (Hollway & Jefferson 1997). Climate change illustrates that society cannot be seen as separate from the risks it has created. True reflexivity *'relies on the boundedness of its practices while acknowledging their potential for change'* and has at its heart the understanding that unintended developments in modern societies are a consequence of modernization itself, which creates risks *'beyond the accepted certainties'* (Gregory et al. 2009: 475). Lindegaard (2013) therefore concludes that agency and power, traditional and modern, formal and informal as well as human and non-human variables and actors need to be seen as interconnected and that the consequence of interdependent agency is an opportunity to understand innovation with regard to climate change. Latour (1993: 61) criticises modern society for explaining the world through drawing a *'division between the material and technological world on the one hand and the linguistic play of speaking subjects on the other'*. An equally dismissive criticism of the notion that the world can be understood within segments of disciplines is made by Law (1999: 3): *'Truth and falsehood. Large and small. Agency and structure. Human and non-human. Before and after. Knowledge and power. Context and content. Materiality and sociality. Activity and passivity ... all of these divides have been rubbished'*. Both scholars suggest that to understand the world, its society and its actors should be seen as an interconnected system. Saldanah (2003: 420) argues that Foucault tried to resolve this impasse by stating that knowledge about the physical world is impossible because it is constructed through language so that there is '*no possibility of distinguishing one way of knowing from another'*. Latour (1993) believes that labelling things leads to a way of dealing with issues in predefined sections so that the thoughts, knowledge and influence of other issues must be ignored. This separation of actors and things from each other does not, however, reflect the full reality of the world and limits our potential understanding about it. *'There are networks of facts, power and discourse, which cross borders of categories'* because entities are *'neither objective nor social, nor are they effects of discourse'* (ibid.: 6). Latour (1993) gives the example of the ozone hole, stating that it is too humanly constructed to be truly natural. He argues that the intellectual culture does not know how to categorize and that academics believe that ideas are verified and disembodied (BBC 2011). Latour realized that not everything can be understood scientifically and that there is also the unpredictability of the social. These

observations and criticisms of Latour (1993) are similar to the ideas about interconnectivity outlined by Giddens (1999) and Beck (2006) in relation to modern problems such as climate change. Consequently, it is important for this thesis to step away from any theories or points of view that classify businesses, other economic actors or climate change in pre-defined segments, categories or definitions. A perspective that tries to overcome the criticised separation between non-human and human entities from each other by looking at the processes that produce the social with *'an anti-essentialist, open-ended and resolutely relational way of understanding the world'* (Saldanha 2003) is ANT.

ANT, developed by Latour (1993, 2005) and Law (1999) amongst others, acknowledges that the world is created through human and non-human '*actors*' in relationship to each other, in what is called actor-networks (Rutland & Aylett 2008). Any entity, human and non-human, becomes an actor by associating or disassociating with other entities (Crawford 2005, Dolwick 2009). This means that entities are named, defined and find substance through entering networks. Without entering a network, entities would not have any form, characteristic or power (Crawford 2005, Law & Hassard 2007). In this context, an entity, for example, a person, group, idea or material object that acts by itself or through others, is seen as an actor (Dolwick 2009). A network is an entity defined as an assembly of actors where the actors perform activities. Therefore, the terms 'network' and 'actor' are interchangeable as the actor is the network itself (Law & Hassard 2007, Dolwick 2009). Consequently, networks are explained by looking at the actors and the ways they interact (Crawford 2005). Crawford (ibid.) concludes that ANT proposes: (1) agnosticism - the abandonment of assumptions about the networks and the actors; (2) a generalized symmetry - the employment of a single explanatory frame when investigating, interpreting and analysing the actor-networks; and (3) free association - the abandonment of a distinction between human and non-human actors and networks. These three principles demonstrate how ANT presents a view on how things find meaning rather than a theory.

ANT as a theoretical point of view has been used in a number of studies: Neisser (2014), for example, applied ANT to the exploration of risk management of disasters

and aimed to determine how risk could be managed through the lens of ANT. He (ibid.: 88) shows that ANT could be used *'as a tool for planning, design and decision-making of disaster risk management'*. Fox (1999), on the other hand, explores communities of practice with the help of ANT to investigate the power relations in these networks.

Overall, ANT advises the abandonment of the *'organizing binaries of modernity'* that I outlined above (Gregory et al. 2009: 7) because actors in relation to each other generate the social (Davies 1998). The social in this sense is *'a process of assembling'* instead of *'a specific type of ingredient'* (Latour 2005: 1). Following this, knowledge, agents, institutions and society as a whole are seen as effects of relationships of networks involving both human and non-human agents (Bosco 2006: 137). Consequently, a separation between power and knowledge is not logical. ANT views society as heterogeneous and shows that society, nature and technology are interrelated and co-evolve with each other (Neisser 2014).

3.5. A Theoretical Framework for the Thesis

Through providing a viewpoint on how things find their meanings, ANT provides an ideal framework for this thesis. Indeed, I approach the challenge of business and climate change from the perspective of ANT and view the nature of the challenge, engaging with the unthought-of problem of climate change, through the way in which actors give this challenge its meaning. Business leaders and representatives of ISOs clearly form the human actors in my study, whereas the collective of business activity, the businesses themselves, climate change and the networks those participants form might be considered the non-human actors. Wynne (2002) points out that to study modern risks one needs to investigate risks in relation to their social characteristics, functions and effects. ANT allows me to follow Wynne's approach by enabling an exploration of how climate change is socially constructed and the ways in which businesses approach it . Looking at business engagement and climate change from the perspective of ANT enables me to move away from the separation of *'nature and society, materiality and sociality'* which ignores the *'heterogeneity, non-linearity or hybridity'* of risk (Neisser 2014). This should then enable me to reflect on the full reality of business engagement with climate change. Climate change, having been

created through human and non-human processes and impacting on both human and non-human actors, requires people to reflect on the world they want to live in, an aspect that is often only considered in studies on social movements (Giddens 1999). Through its unrestricted view of what constitutes meaning, ANT allows me to observe the world and society in their very own reflexivity and to take into account a variety of different disciplines and topics. Such a view of society supports Beck's (2006) claim that society is starting to realize that scientists and governments who are assigned to manage risks for people cannot provide the desired security. My study will provide some rare insights into how this *'reflexive modernity'* might look.

The ANT approach also allows me to investigate diverse actors without the rigid binaries of modernity because it facilitates the abandonment of prior assumptions about each actor-network. The view that actors find meaning through each other also allows me to move away from seeing the management of risk as something that should be yielded to government only. Following the assumption that human and non-human entities find meaning through each other, which is the essence of the terms social and society, means that the focus of my study must not be on the individual alone but also on interactions within the wider actor-network. This means that choices are put into a historical context and other actors are accounted for. Even if humans think they make their own choices, those choices are always restricted by what someone else chose before. Using this approach means I am thus able to learn from the past and present alike, something that economic theories alone would not allow for (cf. Lindegaard 2013).

I hope to show throughout my thesis that climate change is really a multi-faceted construct based on social and state order of power. This is only possible if the characteristics of ANT are employed, where the society and its governance are viewed without segmentation into discrete disciplines but as an interconnectivity. Such a view is rarely acknowledged in climate change communication, although it is increasingly criticised for this (Lindegaard 2013, Hulme 2007). Following this, the ANT approach allows the research to be open to diverse ideas by letting the actor-networks (my study participants) show me where to look for answers to my research questions. Murdoch (1994: 23) states that in this way the actors *'do as much work as*

possible for us'. Consequently, ANT provides a framework where I can make connections between different aspects and findings but also between actor-networks (Davies 1998). The main problem with other qualitative ethnographic research approaches is that the researcher needs prior knowledge about the (actor-) networks in order to gain access to the network in the first place (ibid.). Businesses have limited time in terms of cost-benefit considerations and thus a researcher must have detailed knowledge before conducting the research and accessing networks (ibid.). The success of working with pre-defined actor-networks is thus always limited by most other research approaches. ANT, in contrast, allows for the investigation of a wide number of actors simultaneously and randomly, dictated only by the actor-networks themselves (ibid.). Other approaches similarly might be restricted by considering only human, technological and natural actors in their analysis (ibid.). Through tracing actors and the relations in each network, ANT allows me to gain a deeper understanding of 'realities' than a conventional research framework would produce (Bosco 2006: 141). I therefore do not just use one theory, idea and/or concept but a variety of different ideas, concepts and theories. In this way, I hope to find a stance which acknowledges human and non-humans in their relationships with each other so that I can benefit not only from pre-defined institutional groupings but consider other perhaps more distant actors outside what the terms 'business' or 'ISO' might suggest.

3.6. Conclusion: ANT as a Point of View from which to Approach this Thesis

In this chapter, I have shown that ANT presents a perspective on agency which is distinct to the *'organizing binaries of modernity'* (Gregory et al. 2009: 7). Due to the fact that climate change is complex, requiring an eclectic, interdisciplinary and open approach to how it is understood, communicated and managed, an approach to studying the risk of climate change requires a theoretical viewpoint which does not emphasise a rational, linear and segmented view of the world by highlighting one concept, theory and/or idea only. The ANT view on agency - and consequently the construction of risk and innovation as well as people's engagement with, for example, climate change - reveals that things, human and non-human, find their meaning through their interaction with each other. ANT thus provides an ideal research framework for studying the complex construct of climate change and business, which is not only created through the interaction of human and non-human actors but also

impacts on this interaction in the future. This holistic view of how the world and society come together is crucial for my thesis.

The need identified by Gidden (1999) and Beck (2006) for a more reflexive society shows that management of uncertainties such as climate change cannot be seen as occurring only in the sphere of the human or the non-human. Using the agency-based approach, ANT avoids losing this understanding of the true nature of climate change. Within the thesis, I am thus able to acknowledge the heterogeneity and hybridity of the business and climate change challenge. ANT delivers *'a systematic way of dealing with'* climate change risk *'induced and introduced by modernisation itself'* (Beck 1992: 21). ANT also allows me to broaden the earlier definition of communities of practice (cf. Chapter 2) and consider non-human actors such as values, rules and artefacts within the analysis of a network. My discussion of ANT also shows that theories to understand innovation such as through separating actor-networks into different levels of regime, niche and landscape do not present a complete picture of how actor-networks come to find meaning through and with each other. These organizing binaries can only serve as a description. Nevertheless, in order to guide the reader through some of the actor-networks, I will use the three levels of niche, regime and landscape, and the term socio-economic system, throughout the thesis to serve as an orientation. This will help to clarify the interaction of larger actor-networks as opposed to individual actor-networks in separation from each other.

The ANT approach more particularly gives me the freedom to move away from pre-defined ideas of what businesses are, what climate change engagement is, how business innovations in the area of climate change might occur and the idea that government alone is responsible for managing climate change risks. With this approach, I hope to show that business engagement with climate change is *'a wake-up call in the face of the failure of government'* and to show how *'alternative'* governance *'in a globalized world'* can be achieved (Beck 2006: 338).

Using ANT as a theoretical framework will thus be crucial in understanding the networks that shape, are shaped by, and also form and de-form our current management of climate change. ANT teaches me that everything and everyone is an

actor in an actor-network society, and that managing climate change needs to be approached through a collective effort (ibid.). Viewing the research context and its participants through the lens of ANT allows me to explore the interconnection of human and non-human actors with each other and with equal emphasis. This perspective also allows me to view climate change as a social construct, which is different to the rational choice based assumptions with which climate change is predominantly approached.

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4. Methodology

To answer the research question that I developed at the beginning of the thesis, I will now explain the methodological approach that I have chosen for my study. This approach aims to enable an open perspective on agency, detached from the *'organizing binaries of modernity'* (Gregory et al. 2009: 7) explained in the previous chapter. The methodology also aims to address the relational nature of climate change explained in the Literature Review. This chapter will therefore review the qualitative research methods that I used to achieve this aim and discuss the ANT-based identification of data sources. I will also reflect on my own reflexivity and positionality in the field and explain which different data collection tools I used, how I used them and why. I will then explain the content analysis method I used to analyse the data. Finally, I will discuss some of the ethical and moral considerations of this study and reflect on the challenge of researching an Objective One region before briefly introducing the main study participants.

4.1. Methodological Approach

Qualitative research methods lie at the heart of this research project and were used to collect the majority of the data. Qualitative research studies aim to reflect the living environments from the standpoint of the participants and can display the reality of society by disclosing its structures, processes and patterns of thought (Flick et al. 2013). This approach facilitated access to the relatively unexplored area of business and climate change, something a more regimented quantitative approach would find challenging (cf. von Kardorff 2013). This qualitative research was structured around two perspectives: collecting data directly from the participants; and researching the processes that shape and are shaped by these participants (cf. Flick et al. 2013). The former was carried out via interview, which *'functions as a narrative device which allows persons who are so inclined to tell stories about themselves'* (Denzin 2001: 25). The latter was undertaken through participant observations, '*a field strategy that simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation and introspection'* (Denzin 2009: 186). I used participant observations including document analysis, participant workshops and questionnaires to provide an insight into the participants' understanding of everyday practices. I chose open and semi-structured interviews, , to allow for understanding of reality as perceived by the participants. I additionally chose to use the quantitative research method of an 'online survey' to support the research findings towards the end of the study.

This qualitative approach with quantitative support enabled me to: (1) explore climate change knowledges from both the communication and business perspectives; and (2) uncover the complex construct of climate change formed by individual experiences and social processes (Winchester & Rofe 2010, Hulme 2011, Hoffman 2012, cf. Eisenhardt 1989). This approach ties in with current studies of climate change communication which mainly use qualitative research methods such as focus groups and personal interviews (cf. Wolf & Moser 2011).

4.2. Identification of Data Sources

The study critically examines 31 SMEs across sectors in Cornwall, the UK, which engage with climate change knowledges, 5 ISOs which communicate climate change knowledges and two communities of practice which discuss climate change related business concerns. The study was carried out over a 3-year time period using qualitative and quantitative research methods.

To identify SMEs, ISOs and communities of practice in Cornwall which engage with climate change, an Actor-Network approach was taken [Figure 6]. ANT (cf. Chapter 3) allows viewing the participating actors in the study in relation to each other, acknowledging that they operate in existing social relations that influence their behaviour (Ritzer 2004, Law & Hassard 2007, Rutland & Aylett 2008, Dolwick 2009) and that actors perform more than one role in these social relations (Rose 1999). Actor-networks in business communities, especially ones that are predominantly characterised by SMEs, as is the case in Cornwall, interact mainly through personal relationships that are found in formal and informal business networks (cf. Chapter 2). Gaining access to the business community was therefore through actors that were already 'insiders' to, and part of this community of personal relationships. ANT provided the opportunity to acknowledge those relationships beforehand without actually knowing their specific design. I was also able to take a bespoke and very personal approach to entering this business community and identify business leaders, intermediaries, business networks and events as my study participants.

Originally I had hoped that the University's Knowledge Transfer Team could help me to gain access to the wider business community through their list of existing contacts. However, early on in the research, I found that this would not be possible when I was confronted with 'gatekeeping' behaviour. Some staff members protected their 'insider

status' in the business community by not sharing information and contact details. Such 'gatekeeping' is often experienced by researchers conducting qualitative research (Crang & Cook 2009, Rose 1997, Kawulich 2005). This gatekeeping from within my own 'insider group' required me to take matters into my own hands and rely on the few personal contacts I had at that time in Cornwall. Lucy, a business leader, who was introduced to me by a friend, turned out to be highly involved within the local business community. Thanks to this key individual, I quickly had access to other key informants (cf. Section 4.4.1.), business leaders and business networks. These few contacts then allowed me to access the wider business community myself. By gaining access particularly to the community of practice BL4LC, I was able to assign this business network as the main community of practice I would investigate during my study. The key informant, Lucy, did not resort to the gatekeeping behaviour displayed by the University. Finding supporting business leaders and non-supportive ISOs, I would later see, was the first glimpse into the competitive and funding-dominated business community in Cornwall. These aspects I discuss in detail in Chapter 5.

I took part in a variety of formal and informal business network and climate change-related business events. I also conducted open interviews with key informants in the Cornish business infrastructure. This Actor-Network approach served as a tool to enter the local climate change and business community, identifying key issues and knowledges and letting the research focus emerge through the data collection. This '*controlled opportunism*' allowed an evolving methodology in which research is non-linear and data collection and theory are not separate (Eisenhardt 1989: 539) and revealed '*how social life is constituted by engaging in real or constructed dialogues in order to understand the people studied in their own terms*' (England 1994: 243). This approach also created a '*preliminary research net*' (Crang & Cook 2005: 17) that gave me access to research participants based on personal recommendations. This guaranteed that the participants actively intended to engage with climate change, and/or are knowledgeable about the business community in Cornwall (cf. Crang & Cook 2009: 11). It was not possible to predict with whom I would make contact and scheduling the data collection in advance was therefore very difficult. Using this actor network approach, however, improved my understanding of how and whom to contact to advance the research. The participating SMEs were from across sectors and varied

in size from one-person micro businesses to businesses with up to 250 employees (cf. Eisenhardt 1989: 537). A few selected SMEs were also directly contacted due to them having a reputation for engaging with climate change issues. In total, I was able to include two communities of practice, five ISOs, 31 business leaders and 20 representatives from ISOs and business networks in my study [Figure 6].
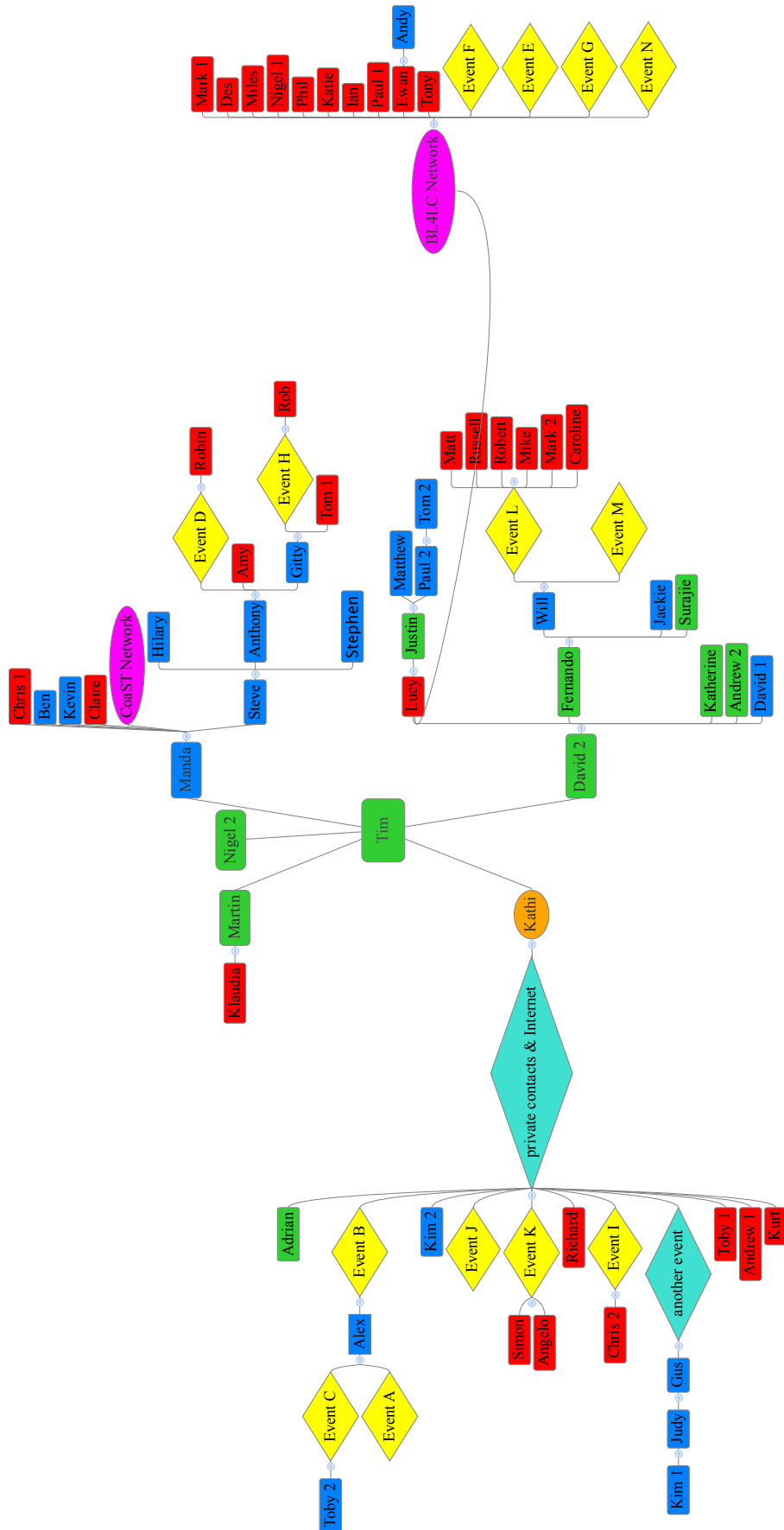
Figure 6: Actor-Network Approach[8]

Figure 6 displays the ANT approach that I took to identify the main human and non-human actors of this study: the business leaders, ISOs and their intermediaries, business networks and climate change-related bsuiness events. The lines show how my contact with one of the actors led to making contact with the other study participants, which indicates how the participants led me to find what and who might be important for the study. The graph also shows that I as the researcher was at the heart of this research approach.

4.3. Reflexivity and Positionality

To allow this Actor-Network approach to work, I had to establish preliminary research findings while still collecting data. The data collection and data analysis was therefore non-linear (cf. Crang & Cook 2009). Even though, especially through my academic background in Management and Economics, I had certain predefined opinions of '*how things should be*', I tried not to allow these to guide me in advance (Eisenhardt 1989: 536). This approach also required me to become part of the business community without being a '*persona non grata*' (Crang & Cook 2009: 62) by asking inappropriate questions or behaving inappropriately. I participated in the observed meetings and events as an active researcher: I chose a very personal, one-to-one communication style with which to contact the participating business leaders, who then welcomed me into their business community (cf. Appendix 8 for feedback of the participants). I was asked to join their business meetings and was given many opportunities to conduct interviews. I was also expected to state my opinion and to inform the participants and their colleagues about my ongoing research. I therefore took part in the *'lives'* of business leaders and responded face-to-face to the opinions of people (Flick et al. 2013). Becoming part of this community, while at the same time not feeling part of it (Leyshon 2002), created a lack of separation between the research, myself and the research participants (cf. Dowling 2010). Crang & Cook (2009: 8) explain that qualitative data is always gathered through an attached researcher within an intersubjective research process '*saturated with relations of power/knowledge*' while '*researcher and researched are equally positioned, interconnected and involved in the changing social and cultural relations under study*'. More specifically this meant that my research could never be fully objective because I would stand in an interactive relationship with my research participants (cf. Rose 1997). As the researcher, McLafferty (1995: 437) explains, I therefore held *'a "privileged" position - by deciding what questions to ask, directing the flow of discourse, interpreting interview and observational material, and deciding where and in what form it should be presented*'. In the same way, the researched, my research

participants, were able to choose what they wanted to answer, how they wanted to answer and what direction they wanted the interviews to flow in.

This meant that my research participants were also able to influence the direction and outcome of my research. My research participants, for example, impacted the research by being able to choose the specifics they wanted to address in the open and semi-structured interviews. They also had the chance to influence the direction and development of my research because I allowed them to guide me to the other research participants. In that sense, the participants were able to influence the knowledge I would gain, the ways in which and times when I would gain it. The question regarding the objectivity of my research and how far this largely qualitative research might be able to reflect the truth must thus be asked (cf. England 1994, Nast 1994). I approached and tried to minimise the subjective influence of myself and the participants on the research by: (1) being aware of its influence on the research development and the research findings; and (2) being reflexive about this influence by discussing how my positionality, for example, my preconceptions and academic background, might influence my observations. Specific steps I took to acknowledge the possible influence of the participants on the research findings include: (1) revealing the positionality of all my participants through detailed profiles about each participant including their interests in the research; (2) in the participant observations described throughout the thesis, showing the confusions of the participants, the different roles that they played and the ways in which they tried to benefit from the specific situations that I observed; (3) addressing the lack of divide between the researched and myself and the social power relations inherent in the process by acknowledging my own position and personal reflections within the participant observations and research findings throughout the thesis, and thereby revealing how I was situated in the research, and by pointing to the different roles participants played during my research; (4) by referring to myself as *'I'*, thereby *'dismiss[ing] the observational distance of neopositivism and subvert[ing] the idea of the observer as an impersonal machine'* (England 1994: 244) and allowing me to acknowledge my own positionality; and finally, (5) actively dealing with my own and the participants' subjectivity with the use of multiple research tools which enabled triangulation of the data. The use of multiple methods minimizes the inadequacies of each method (Denzin 2009). I chose to exploit both *'methodological triangulation'* (using different

methods, including semi-structured interviews, workshops and a survey, to examine the same participants) and *'data triangulation'* (using different data sources, including e.g. business leaders, representatives from ISOs, climate change events and business networks for the same investigation) (cf. Denzin 2009). The actor network approach also allowed for the data triangulation to work by providing flexibility as to what and whom to study next, this allowing me to stay open to what and who might participate in my research. Overall, this reflexivity enabled my observations to be *'a self-conscious, effective, and ethically sound practice'* (Kearns 2005: 192).

It could be argued that the relatively small research sample of 31 business leaders, 20 intermediaries, 2 communities of practice and 13 climate change events limits the wider relevance of these research findings. However, in the light of the limited literature on business decision-making and climate, the study does deliver interesting and important insights into this unexplored field. In research into unexplored topic areas, it is more *'theory building'* - the forming of possible hypothesese to be tested in future studies - that the research should focus on (Eisenhardt 1989: 547). Using a small research sample therefore allowed the research to be *'intimately tied'* to the data and to establish findings for further, future investigation (Eisenhardt 1989: 547). I was only able to have such a close interaction with data and the research participants because the research sample was small. The sample size also allowed the degree of depth of research necessary to properly utilise the methodology within the time available. This organic, small-scale style of research study is one other researchers such as Williams & Schaefer (2010, 2013) have conducted. Williams & Schaefer (2010, 2013) chose to explore why managers engage with environmental issues and climate change through a small study involving the managers of nine environmentally engaged SMEs in the East of England.

The lack of prior studies in this research field, especially at the onset of the research, meant that direct comparison to other findings was difficult and hence there is a possibility that the specific conditions that apply to Cornwall will limit wider applicability of the findings. Comparing my research findings to the few existing studies, such as those of Williams & Schaefer (2010, 2013), and also to literature from wider fields of business decision-making, climate change engagement and climate change communication was therefore crucial and enabled me to generalize the

research findings (cf. Chapter 5, 6, 7). However, there appear to be no obvious reasons why similar businesses elsewhere in the UK or indeed Europe should have radically different characteristics. By concentrating on engaged businesses it was possible to establish just what it is that motivates these businesses to take an active interest in climate change; by doing so, I have shown that attempts to involve a wider range of businesses are very unlikely to be successful if they concentrate on communicate the science per se, or on improving the *'quality'* of the science that is available.

4.4. Tools for the Data Collection

For the mixed method approach, I used six different research tools [Table 1]. Each tool will be explained in detail in the following section. First I would like to show how the tools were implemented over the four-year study period.

| Workshop with Business Leaders and Communicators |
| Survey with Business Leaders |
| Semi-Structured Interviews with Communicators and Business Leaders |
| Personal Observations of Business Networks with Questionnaires |
| Personal Observations of Climate Change Related Business Events |
| Open Interviews with Key Informants |

Table 1: Research Tools[9]

This table shows the six research tools that I used in my study to collect data. It can be seen that I used a variety of different tools.

The research was carried out from 2011 to 2014 with the six research tools. Each research tool provided information relevant to one or more of the three research questions and consequently provided data for the three empirical chapters of the thesis: Chapter 5, Chapter 6 and Chapter 7 [Figure 7].

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[9] Own creation.
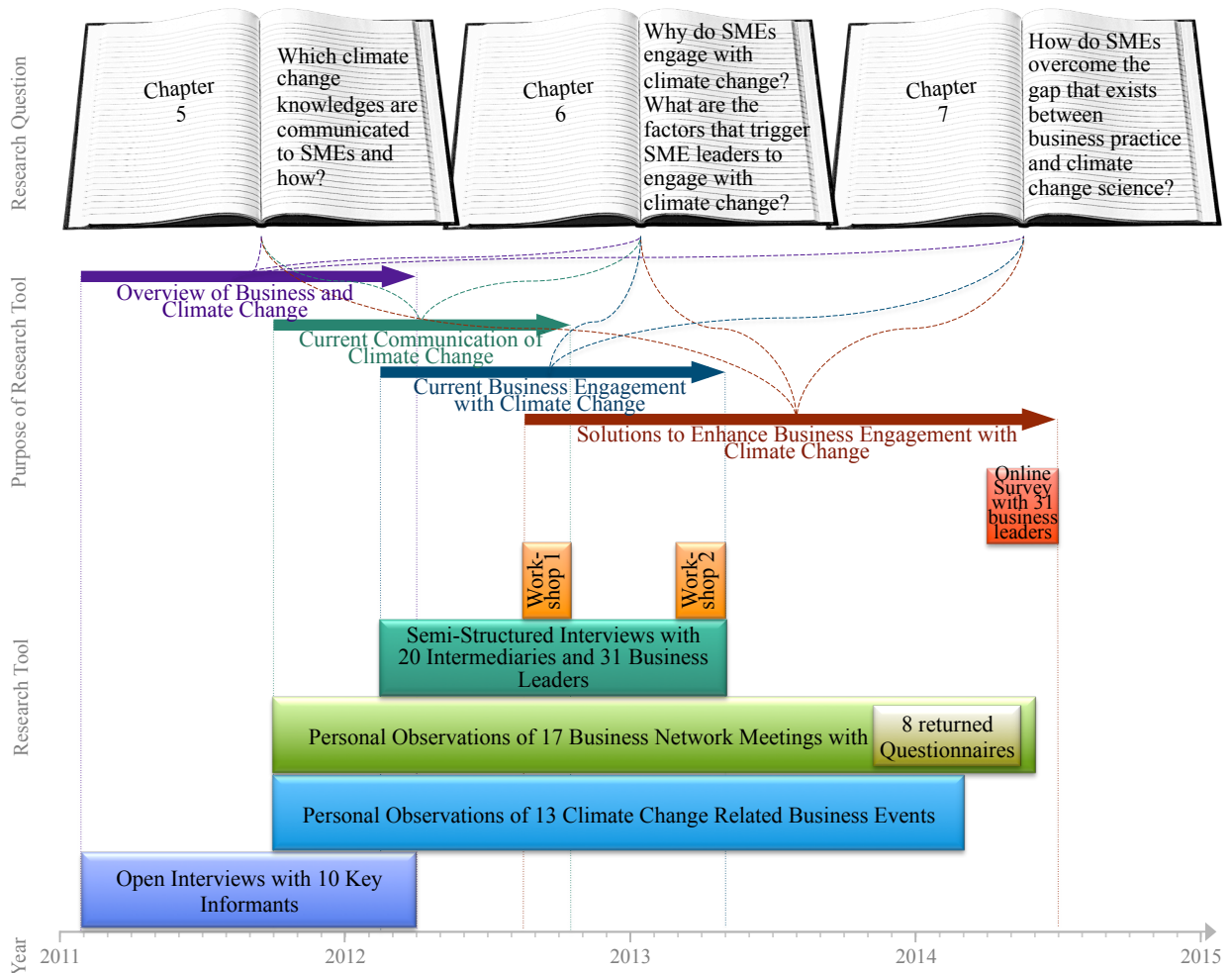
Figure 7: Overview of Research Approach[10]

Figure 7 shows the relationship of the research tools, the study period and the research questions to each other. It can be seen that I started the data collection through open interviews with key informants. They provided me with information on, and contacts with, business networks and climate change-related business events. While still interviewing some key informants, I was able to start observing the business networks and climate change-related business events. Through these observations I then met business leaders and representatives from ISOs and was able to conduct semi-structured interviews with them. These four tools produced a vast amount of data over the first 1½ years so that I decided to let the study participants work with this data. The first practitioners' workshop took place in September 2012. Meanwhile, I continued my participant observations. Due to the iterative nature of the ANT-based research approach, events, business leaders and intermediaries kept coming up as relevant. I stopped conducting semi-structured interviews only after I had conducted a second workshop. I decided to stop the interviews when the data was saturated. I stopped the observation of events in early 2014 because any additional observations were reflecting similar findings to earlier ones. In 2015 I am still participating in the two business networks because I am seen as a full member of the network. The figure also shows how the different tools produced research data was sorted into four main themes. The four categories are not mutually exclusive. I used the content of these four categories to answer the three research questions.

[10] Own creation.

4.4.1. Open Interviews with Key Informants

To identify SMEs which engage with climate change and ISOs which communicate climate change to SMEs, I interviewed 10 key informants from the wider business community and local government about the general business infrastructure in Cornwall [Table 2]. Some of these key informants were crucial in enabling me to gain access to the business community (cf. Section 4.3.). They were selected through the personal recommendation of colleagues I had asked to connect me with people that were well informed and integrated within the Cornish business community who might also know about climate change-related business activities. I interviewed the key informants in open interviews. Open interviews, also called unstructured interviews, consist of a few basic questions, allowing the participant to speak about everything *'that is to be said about the topic'* (Lapan et al. 2012). The open interview therefore allowed the key informants to emphasize what they thought was important for my research (Lapan et al. 2012). They could therefore address issues that I might not have raised in a more structured interview (Flick et al. 2013). This provided an important opportunity to understand climate change and business in Cornwall as I knew little about the local climate change and business situation. I presented the key informants with my research aims and asked them to tell me everything that they thought would be important (a list of the questions can be found in Appendix 3).

Name	Age	Role	Sector
Adrian	50+	General Manager	third
Andrew 2	30+	Business Development Manager	private
David 2	20+	Officer	public
Fernando	40+	Researcher	public
Justin	40+	Director	public
Katherine	30+	Researcher & Consultant	public
Martin	40+	Consultant	private
Nigel 2	50+	Manager	public
Surajie	40+	Researcher	public
Tim	50+	Researcher	public

Table 2: Details of Participating Key Informants

To keep these interviews as open as possible, and with minimal pressure on the participants, I only occasionally tape-recorded them, instead taking detailed field notes. By avoiding conveying a sense that I was interrogating their personal knowledge, I was able to have an open conversation.. Through this, relevant ISOs and

SMEs with their representatives and business leaders were identified. Seven (70%) of the key informants work in public sector organizations, two (20%) are active in the private sector, and one (10%) works in the third sector. On average, an open interview took one hour.

4.4.2. Participant Observations of Innovation-Support-Organizations (ISOs)

I used participant observations of climate change-related business events to focus on the research question *'which climate change knowledges are communicated to SMEs and how?'* Participant observations are useful to learn about the ways in which people behave and think (Lapan et al. 2012). The participant observations of climate change-related business events served as a useful comparison between the actual communication as perceived by the businesses and the communication intended by the intermediaries, both later detailed in the semi-structured interviews (cf. Section 3.4.4 & 3.4.5.).

Through the open interviews with key informants and semi-structured interviews with participating business leaders, I identified five ISOs in Cornwall that the participating business leaders use to receive climate change-related knowledge from. [Table 3].

ISO	Registered as	Sector	Main Topics	Main Financier of Outreach Activity with Business
A	Charity	third sector	low carbon	Millennium Commission, EU ESF
B	Governmnetal Agency	public sector	sustainability, waste	DEFRA, EU ESF
C	Independent Partnership	public sector	climate change	Environment Agency, EU ESF
D	Unitary Authority	public sector	local economy	National government, EU ESF
E	Independent Corporation (Royal Charter)	public sector	sustainability	EU ESF

Table 3: Details of the ISOs[11]

ISO 'C' is a sub-organization of ISO 'D'; the interview participants did not, however, indicate this and therefore ISO 'C' is listed and treated independently of ISO 'D' in this research.

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[11] Own creation.

Observing these business events was important because they are the main way by which the participating ISOs communicate climate change to the participating SMEs. Personal invitations for these events were important as the majority of climate change-related business events were only communicated to select business leaders via business networks, newsletters and/or personal invitations. I attended the events and undertook participant observations based on Whyte's (1955) approach to ethnographic research, as suggested by Flick et al. (2013), an approach which uses participant observations as a tool to gather material as a representation of reality. Carrying out these observations involved the challenge of having to follow research standards while behaving adequately in terms of social and cultural constructs (Flick et al. 2013). I therefore participated in the events as an active researcher. I was welcomed and expected to be an active participant, stating opinions and informing people about my ongoing research. I actively took part in the *'lives'* of participating business leaders and responded to the opinions of people in face-to-face interactions (Flick et al. 2013). The observations served as an interesting contrast to the interviews as they showed the diverse roles people play in different social locales and helped me to understand prevailing social relations (Crang & Cook 2009).

I gathered the data on these participant observations through detailed note taking before, during and after the events, which allowed me to consider the context in which the data evolved (Crang & Cook 2009: 10). The notes included points about the overall content, the participating delegates, the atmosphere and the location of the event. I also noted points based on material obtained during the events and information that I gained through interviews with the representatives of each ISO hosting the events. Importantly, I informed my observations through my interaction with the event's participating business leader: either 1) immediately before, during and/or after an event; and/or 2) through semi-structured interviews with the participants after we had attended an event together. Immediate interaction with the participants meant that business leaders would tell me about their feeling during the event, ask me questions regarding the nature of the event or/and would share their emotional responses throughout the event. During the later semi-structured interviews, I would usually ask each participating business leader how they had experienced the different events, what they had hoped to experience and if/how these expectations had been met. This means that my participant observations (and the

corresponding notes) reflect the opinions and experiences of the participating business leaders who attended the events. All these data points and field notes were then written up as essays (cf. Appendix 4) (cf. Flick et al. 2013), which reflected the feelings and perceptions of the researcher and the researched during each event [Table 4].

Event	Date of Event	Place	The event communicated business climate change related business practices.	The event communicated the science of climate change.	The event convinced of the need to engage with climate change.	The event served the research purpose of the organizers.	Was the event targeted to a particular industry/sector?	The event named climate change in its title and/or invitation.	The term climate change was used interchangeably with other terms.	Did the event use group-work and/or case studies?	How long was the event?	Who presented the key aspect of the event?	How many delegates attended the event?	Nr. of known delegates
A	07.02.2012	Met Office	Agree	Strongly agree	Strongly agree	Agree	✗	✗	✓	✓	day event	Another business leader.	0-25	0-5
B	24.03.2011	Plymouth University	Agree	Strongly agree	Strongly agree	Agree	✗	✓	✓	✓	day event	the ISO & other businesses	0-25	0-5
C	07.12.2011	Met Office	Agree	Agree	Strongly agree	Agree	✓	✓	✓	✓	day event	Another business leader.	51-75	0-5
D	26.04.2012	County Council Hall	Strongly disagree	Strongly disagree	Agree	Strongly agree	✗	✗	✓	✓	1-2 hours	Another business leader.	0-25	0-5
E	24.05.2012	Ward Williams	Strongly disagree	Agree	Agree	Agree	✗	✓	✓	✗	presentation as part of another event	The ISO itself	0-25	15-20
F	26.02.2013	Heartlands	Disagree	Strongly disagree	Strongly agree	Strongly agree	✗	✓	✓	✗	day event	Another business leader.	26-50	0-5
G	01.03.2012	Eden Project	Disagree	Agree	Strongly agree	Strongly agree	✗	✗	✓	✗	presentation as part of another event	The ISO itself	0-25	15-20
H	19.06.2012	St. Austell Brewery	Agree	Strongly disagree	Agree	Strongly disagree	✗	✗	✓	✗	Evening event (2-4 hours).	Another business leader.	0-25	10-15
I	07.03.2013	Innovation Center	Strongly disagree	Disagree	Strongly agree	Strongly agree	✗	✗	✓	✗	1-2 hours	Another business leader.	26-50	10-15
J	19.04.2013	ESI	Disagree	Disagree	Strongly agree	Strongly agree	✗	✓	✓	✓	day event	the ISO & other businesses	26-50	10-15
K	25.06.2012	Bedruthan Steps	Disagree	Neither agree nor disagree	Strongly agree	Strongly agree	✗	✓	✓	✓	day event	Another business leader.	51-75	10-15
L	21.07.2011	ECEHH	Disagree	Strongly disagree	Strongly agree	Strongly agree	✗	✓	✓	✗	Evening event (2-4 hours).	Another business leader.	26-50	0
M	24.01.2012	ECEHH	Disagree	Strongly disagree	Strongly agree	Strongly agree	✗	✓	✓	✓	Evening event (2-4 hours).	Another business leader.	26-50	5-10

Table 4: Overview of the Observed Climate Change-Related Business Events[12]

I then analysed each event based on my participant observations (see above). I used an inductive content analysis and sorted the data that was captured in the participant observations into the different categories (cf. Data Analysis, cf. Elo & Kyngaes 2007). I documented the main findings of each event using a Likert scale rating. This rating measured an event's content in terms of: (1) climate change science; (2) business practice; (3) persuasion to engage; and (4) research purpose of the event. I

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[12] Own creation.

did this in order to (1) show what was being communicated to businesses at these climate change-related business events, and (2) compare the distinct events with each other. To do this, I therefore designed a Likert Scale on which I scored each event [Table 5].

Question	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
The event communicated business practices with which businesses can mitigate, and/or adapt to, climate change.	□	□	□	□	□
The event communicated the science of climate change.	□	□	□	□	□
The event convinced of the need to engage with climate change.	□	□	□	□	□
The event served the research purpose of the organizers.	□	□	□	□	□

Table 5: Likert Scale Rating[13]

I assigned a weighting on the scale from 1, *'Strongly Disagree'* to 5, *'Strongly Agree'* (cf. Appendix 7 for the individual ratings of each event). The average rating demonstrated my perceptions regarding the foci of the four statements of the events. The rating average is calculated as follows [Table 6].

(number of votes of 'strongly disagree'*1) + (number of votes of 'disagree'*2) + (number of votes of 'neither agree nor disagree'*3) + (number of votes of 'agree'*4) + (number of votes of 'strongly agree'*5)
number of events

Table 6: Calculation of Average Rating[14]

I then display the Likert evaluation in a figure similar to Figure 8. The figure shows the evaluation of the observed climate change-related business events for Events A to M (cf. Table 4 for a detailed description of events A to M).

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[13] Own creation.
[14] Own creation.
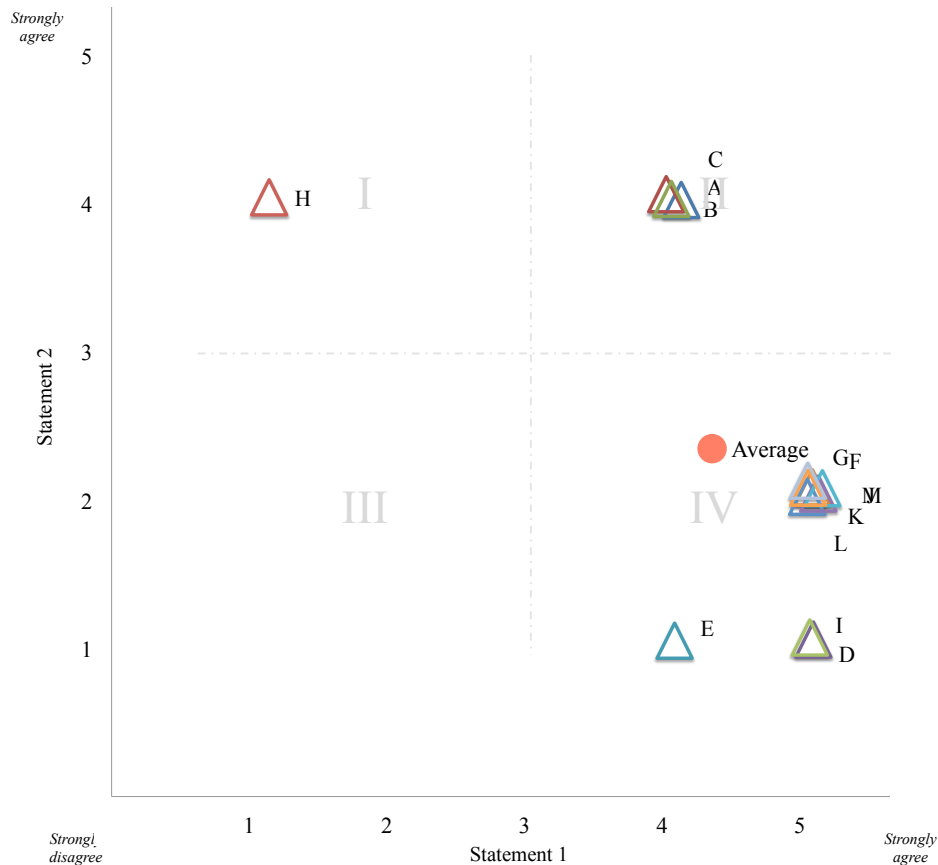
Figure 8: Example of the Evaluation of the Climate Change-Related Business Events[15]

Each event in Figure 8 was rated with the help of the Likert Scale from 'Strongly Disagree' to 'Strongly Agree' on (1) climate change science; (2) business practice; (3) persuasion to engage; and (4) research purpose of the event. Summarising the Likert Scale evaluations in this visual way allowed me to view each event in four different 'fields' and to understand which climate change message the events focused on.

I observed a total of 13 ISO events. I also identified a few ISOs which engage with SMEs, but do not communicate climate change knowledges.

4.4.3. Participant Observations of Climate Change-Related Communities of Practice

My interviews with the participating business leaders and the participant observations of climate change-related business events identified two climate change-related communities of practice that business leaders in Cornwall participate in:

(1) Business Leaders for Low Carbon (BL4LC)

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[15] Own creation.

(2) Cornwall Sustainable Tourism Project (CoaST)

I then joined these communities of practice and undertook participant observations during the networks' meetings [Table 7].

Network	Nr. of Members	Main Theme	Nr. of Observed Meetings
BL4LC	41	low carbon economy	13
CoaST	2,800	sustainable business	4

Table 7: Overview of BL4LC & CoaST[16]

This context also challenged me to be objective and follow research standards while becoming part of the networks. I participated in the meetings as an active researcher; I was welcomed and expected to be an active participant, stating opinions and informing people about my ongoing research. I actively took part in the *'lives'* of the participating business leaders and responded to the opinions of people in face-to-face interactions.

The meetings took an average of four hours and participant observations were documented through note-taking and/or tape-recording if allowed. Field notes included information on the overall content, the attending members, the role of climate change in the discussions, the atmosphere and location of the meetings. The data were complemented with document analysis of material obtained before, during and after the meetings circulated primarily via email; this supported my perceptions and corroborated the research findings with facts and figures. I also reviewed email conversations between the networks' participants to gain information. At some of the meetings I took photographs in order that I could *'replay'* the atmosphere of such meetings to myself while analysing the data and use them also for illustration in the thesis. The field notes and documents were then used to write an essay about each meeting (cf. Flick et al. 2013), mirroring the feelings and perceptions of the researcher.

The participant observations of meetings in these communities of practice focused on answering the research question: *'how do SMEs overcome the gap that exists between*

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[16] Own creation.

business practice and climate change science?' More specifically these observations allowed me to: (1) ascertain businesses' learning and innovation with respect to climate change by SMEs; (2) understand the problems and barriers SMEs face when trying to enable climate change engagement for themselves and others; (3) understand how SMEs view themselves in the climate change context; and (4) uncover the language used and associated addresses to give meaning to climate change (cf. Wittgenstein 1958).

BL4LC

I joined BL4LC as an observer in 2011. Since then I have attended 10 quarterly meetings and one executive meeting. BL4LC viewed me not only as an observer but also as an equal member of the network. I was often asked for my opinion and asked to present my research findings during meetings. My unique standing within the community of practice is also reflected through the fact that I was invited to the executive meetings and given access to its strictly private LinkedIn group. I conducted semi-structured interviews with the network's chairman and BL4LC members. Additionally, many members of this community of practice were interviewed using a semi-structured interview format. At the beginning of the research study, I distributed a questionnaire to the BL4LC members. Nine members of the network replied to my request and completed the questionnaire. The questionnaires serve to determine the reasons business leaders join the network. I also handed out a questionnaire after the second workshop to the 12 delegates, from which eight completed the questionnaire.

CoaST

CoaST is a social enterprise which runs an online business network. Due to the fact that this network's interactions mainly happen online, I started with an open interview with the network's leader. I then joined the virtual network and followed online/email discussions. I attended one meeting on sustainable tourism in 2012 and the network's 10th anniversary meeting in 2013. I also observed two presentations given by CoaST during two separate climate change-related business events. I then conducted a semi-structured follow-up interview with the network's leader. The data on CoaST were complemented with data gained via semi-structured interviews with communicators and business leaders that are members of and/or work with CoaST.

4.4.4. Semi-Structured Interviews with Business Leaders

Semi-structured interviews were conducted with the participating business leaders to determine (1) how SMEs understand climate change knowledges, and 2) the ways in which these knowledges are communicated to SMEs [Table 8]. These interviews focused on the research questions: *'Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?'* The semi-structured interviews covered a list of topics which were common to all participants and used open questions to allow participants to speak about issues not necessarily addressed by the interview questions (Lapan et al. 2012). This technique allowed participants to emphasize issues that they perceived as important and enabled the discovery of commonalities and differences in people's perceptions. The questions were therefore constructed using information from the open interviews with the key informants and what they had identified as important for understanding the challenge of business and climate change. The semi-structured interviews allowed me to understand the climate change and business challenge as perceived by the participants cf. Appendix 1 for the interview questions). I developed trustful relationships with the business leaders over the study period, as I saw most of them regularly at business events and meetings. This enabled me to ask additional questions via email or arrange follow-up meetings (.

Business Leader	Industry/ Business	Service / Product Offered	Nr. of Staff	Founded in	Role of Participant	In Position Since	Age of Participant	Lives in Cornwall Since	Mitigation Activities	Adaptation Activities	Family Run	Member of…
Amy	Hospitality & Tourism	Hotel & Restuarants	120	1940	Sustainability Manager	2010	32	More than 10 years	Carbon accounting, Carbon reduction, Waste management, Renewable Energies	Communicate climate change to other businesses employees, Implement / develop new products/services	yes	BL4LC CoaST
Andrew 1	Property, Land & Renewables	Consultancy	3	1934	Director	1997	46	More than 10 years	Renewable Energies	Communicate climate change to local community, other businesses, employees	yes	none
Angelo	Business Services	Marketing & Management	1	2006	Managing Director	2006	40	5 to 10 years	Waste management, Renewable Energies, business model adaptation e.g. collaborative consumption	Implement / develop new products/services	no	CoaST
Caroline	Cartography & Design	Cartography & Design	1	2011	Founding Director	2011	37	More than 10 years	Carbon accounting, Waste management	Communicate climate change to local community, other businesses, community engagement	no	CoaST
Chris 1	Farming, education & tourism	Carbon sequestration, beef, education & accommodation	4	1960	Owner / Manager	1990	54	Born and/or raised in Cornwall	Carbon accounting, Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, employees, Implement/develop new products/services	yes	CoaST
Chris 2	Communications, consultation, sustainability	Consultation & Inspiration for change	1	2009	Director / Owner	2009	52	More than 10 years	Carbon reduction, Waste management, Renewable Energies, thinking about consumption and travel	Communicate climate change to local community, other businesses	no	CoaST
Claire	Hospitality & Tourism	Hotel & Restuarants	200	in the 1960th	Sustainability Manager	2011	30	up to 5 years	Carbon reduction, Waste management, Renewable Energies, thinking about consumption and travel	Communicate climate change to community, other businesses, employees, Implement/dev. new products/service, use physical protection	yes	BL4LC CoaST
Des	Telecommunications	Consultancy	0	2007	Consultant	2007	65	More than 10 years	Carbon accounting, Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses	no	BL4LC CoaST
Ewan	Finance	Accountancy & Business Advice	n/a	1915	Director	2011	50	More than 10 years	Carbon accounting	Communicate climate change to employees	no	BL4LC
Ian	Wholesale food distribution	Food for the catering industry	30	1947	Managing Director	1985	66	Born and/or raised in Cornwall	Carbon reduction, Waste management	Communicate climate change to other businesses	yes	BL4LC

Table 8: Details of Participating Business Leaders[17]

(continues over the following three pages)

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[17] Own creation.

Business Leader	Industry/Business	Service / product offered	Nr. of Staff	Founded in	Role of participant	In position since	Age of participant	Lives in Cornwall since	Mitigation activities	Adaptation activities	Family run	Member of BL4LC or CoaST
Katie	Hospitality & Tourism	Hotel	90	1920	Director / Owner	2011	44	More than 10 years	Carbon reduction, Waste management, Renewable Energies	Communicate climate change to employees, Implement / develop new products/services, We aspire to being an exemplar to other businesses	yes	BL4LC
Klaudia	Consultancy & Training	Auditing, consulting, training, permaculture design	1	2009	Sole Trader	2009	49	More than 10 years	Carbon reduction, Waste management, raising awareness	Communicate climate change to local community, other businesses, Implement / develop new products/services	no	CoaST
Kurt	Retail	Clothes	50	2004	Director	2004	43	Born and/or raised in Cornwall	none	Communicate climate change to local community, other businesses, employees, Implement / develop new products/services, Install/use physical protection	yes	none
Lucy	Marine	Business Support, Projects & Training	24	2002	Strategic Development & New Projects Manager	2011	37	5 to 10 years	Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, employees	no	BL4LC
Mark 1	Marketing	Branding, strategy, design, PR, marketing, digital	6	1999	Creative Director	1999	39	Born and/or raised in Cornwall	Waste management, Measuring and monitoring activities. Reducing car usage for work. Sustainable travel to work plan.	Communicate climate change to local community, other businesses, my employees	yes	BL4LC
Mark 2	Waste & Recycling	Community recycling locations	1	2008	Managing Director	2008	52	More than 10 years	Waste management	Communicate climate change to local community	no	CoaST
Matt	Creative	Graphic & Web Design	6	2004	Director	2004	42	Born and/or raised in Cornwall	Carbon accounting, Carbon reduction, Waste management, Renewable Energies, team thoughtfulness and action	Communicate climate change to local community, other businesses, my employees, Implement / develop new products/services	no	BL4LC CoaST
Mike	Landscape Architecture	Designing open spaces outside	1	n/a	Director	n/a	50+	More than 10 years	Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, my employees, Implement / develop new products/services, Install/use physical	no	CoaST
Miles	Sustainability, cleantech, town planning & smart cities	Recruitment, business development & market intelligence	2	2013	Director	2013	34	up to 5 years	none yet! but all in time	Communicate climate change to other businesses, my employees, implement / develop new products/services	no	BL4LC
Nigel 1	Communications & Public Relations	Branding, PR, Digital, Social, Graphic	6	1999	Senior PR Account Manager	2012	44	More than 10 years	Waste management, Measuring and monitoring activities. Reducing car usage for work. Sustainable travel to work plan.	Communicate climate change to local community, other businesses, my employees	no	BL4LC

Continuation of Table 8: Details of Participating Business Leaders[18]

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[18] Own creation.

Business Leader	Industry/Business	Service / product offered	Nr. of Staff	Founded in	Role of participant	In position since	Age of participant	Lives in Cornwall since	Mitigation activities	Adaptation activities	Family run	Member of BL4LC or CoaST
Paul 1	Sustainable construction	Monitoring, training, consultancy & project management	5	2002	Cief Executive Officer (CEO)	2003	63	More than 10 years	Carbon reduction, Waste management, Renewable Energies, educating others by example to mitigate	Communicate climate change to local community, other businesses, my employees, Implement / develop new products/services	no	BL4LC CoaST
Phil	Food production	Handmade Cornish Pasties & other savory pastries	205	1988	Founder / Chairman	2010	68	Born and/or raised in Cornwall	Carbon reduction, Waste management, Renewable Energies, We are planning to introduce renewable enery in March 2015	Communicate climate change to local community, other businesses, my employees	yes	BL4LC
Richard	Higher Education	Business incubation & acceleration	4	2011	Centre Manager	2011	43	up to 5 years	Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, my employees, Implement / develop new products/services	no	none
Rob	Communication Solutions	Promotional & marketing communications	70	1919	Sustainable Business Development Manager	2013	45	More than 10 years	Carbon accounting & reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, my employees, Implement / develop new products/services	no	none
Robert	Creative	Service design	9	2003	Director	2003	39	5 to 10 years	Carbon accounting, Carbon reduction, Waste management, Renewable Energies	Communicate climate change to other businesses, my employees, Implement / develop new products/services	yes	none
Robin	Regional Brewer	Beer Production & Distribution	ca. 250	1851	Compliance Officer	2008	44	Born and/or raised in Cornwall	Carbon accounting, Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, and my employees, Implement / develop new products/services, Install/use physical protection	yes	CoaST
Russell	Management Consulting	Project Management	2	2013	Co-Founder / Manager	2013	37	Born and/or raised in Cornwall	Carbon accounting, Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, my employees, Implement / develop new products/services	no	BL4LC CoaST
Simon	Holiday Home Rental	Holiday Homes	40	1977	Chairman	2011	50	More than 10 years	Waste management	Implement / develop new products/services	yes	none
Toby 1	Superyachting	Refit, rebuild & construction of superyachts	ca. 250	1988	Sales & Marketing Director	n/a	40+	5 to 10 years	Carbon reduction, Waste management, Renewable Energies	Communicate climate change to employees, implement / develop new products/services	no	none
Tom 1	Retailing	Clothes	20	2003	Managing Director	2003	39	More than 10 years	Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, my employees	no	none
Tony	Renewable Energies	Renewable Energies	7	2011	Managing Director	2011	41	5 to 10 years	Carbon reduction, Waste management, Renewable Energies	Communicate climate change to local community, other businesses, my employees, implement / develop new products, use physical protection	no	BL4LC CoaST

Continuation of Table 8: Details of Participating Business Leader[19]

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[19] Own creation.

4.4.5. Semi-Structured Interviews with Representatives of ISOs and of Communities of Practice

Semi-structured interviews were also conducted with representatives of the participating ISOs and leaders of the participating climate change-related communities of practice [Table 9]. The purpose of the interviews was to answer the research question: *'Which climate change knowledges are communicated to SMEs and how?'* The interview questions were derived from the open interviews with the key informants and what they identified as important for understanding the challenge of business and climate change. The interviews were tape recorded and fully transcribed (cf. Appendix 2 for the interview questions).

Name	Age	Role	ISO	Sector
Alex	30+	Senior Advisor	C	public sector
Anthony	60+	Sustainability Development Officer	D	public sector
Ben	30+	Carbon Policy Officer	D	public sector
David 1	50+	Rural Delivery manager	D	public sector
Gitty	50+	Senior Environment Officer	B	public sector
Gus	40+	Manager	A	third sector
Hilary	50+	Economic Officer	D	public sector
Yackie	40+	Environment Officer	other ISO	public sector
Judy	30+	Research Manager	B	public sector
Kevin	50+	CEO	D	public sector
Kim 1	30+	CEO	other ISO	private sector
Kim 2	60+	Environmental Officer	B	public sector
Manda	40+	Consultant	CoaST	third sector
Matthew	30+	Manager	other ISO	public sector
Paul 2	50+	Carbon Consultant	A	third sector
Stephen	40+	Strategy Officer	D	public sector
Steve	40+	Manager	D	public sector
Toby 2	40+	Manager	other ISO	public sector
Tom 2	30+	Manager	A	third sector
Will	30+	Researcher	E	public sector

Table 9: Details of the Participating Intermediaries[20]

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[20] Own creation.

4.4.6. Practitioner's Workshops

I conducted one practitioners' workshop to bring together the research participants from business, government, ISOs and science and to reflect on, and develop, the research findings of the study as it progressed. The workshop focused on the research question: *'How do SMEs overcome the gap that exists between business practice and climate change science?'* More specifically, the workshop allowed me to: (1) clarify my research findings; and (2) give my participants the opportunity to develop solutions for the climate change and business challenge (cf. Ostrom 2012). The participants were asked to interpret my research findings, discuss problems that were identified and develop policy recommendations. I also conducted another workshop during a climate change-related business event organized by the University of Exeter. This allowed me to: (1) disseminate my research findings; and (2) investigate the businesses' sense-making processes regarding climate change [Table 10].

Workshop	Nr. of Delegates	Main Theme	Date
Workshop 1	22	enabling engagament through networks and niches	September 2012
Workshop 2	10	communicating and making sense of climate change	April 2013

Table 10: Details of the Workshops

The workshops were documented through tape recordings, note taking, photos and material filled in by the participants (Appendix 5).

4.4.7. Online Survey of the Participating Business Leaders

The survey (Appendix 6) was created out of a need to verify findings and to gain additional data about the individual businesses that participated in the study in order to carry out a cross analysis of the data. The survey targeted all of the three research questions: *'Which climate change knowledges are communicated to SMEs and how?'*; '*Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?'*; and *'How do SMEs overcome the gap that exists between business practice and climate change science?'* More specifically, the online survey asked for the opinions of the participating business leaders on the main findings. These were quite comprehensive. The online survey served to collect data while not have to request the business leaders to participate in another interview. The survey ensured triangulation of data and tested the key findings. All participating business leaders returned the online survey.

4.5. Data Analysis

To organise, make sense of and interpret the data, I conducted a content analysis. Content analysis is a method that is used to analyse written messages through '*distil[ling] words into fewer content-related categories*' (Elo & Kyngaes 2007: 108). Conclusions are then drawn from these data categories in respect to their contexts. This method was chosen because it offers the opportunity to work with large amounts of data about which few previous assumptions exist (ibid.). Researchers can analyze what appears to become important throughout the progress of the research and the process allows consideration of the contexts in which the data has been collected (ibid.).

4.5.1. Data Documentation & Preliminary Work

Precise documentation of my data collection was important, not only because qualitative data collection is complex and difficult to evaluate due to the subjectivity that I discussed above (Crang & Cook 2009), but also because I came into this well-established Cornish business community as an outsider and did not know what would be of importance for my research. Crang & Cook (2009) believe that field notes taken during fieldwork, together with core data, correspondences and emails form important informal data. I therefore documented the participant observations, the semi-structured interviews and the workshops through accurate note taking and tape recording if allowed. I occasionally had difficulty understanding recordings of the participants due to unclear speech and background noise. I learned that tape recordings were very important; transcribing the recordings later allowed me to better understand comments and the overall contexts. I fully transcribed the tape recordings and digitized the field notes, other relevant documents and pictures. For the transcription, I used *iTunes player* and *Microsoft Office Word* as the transcribing software and foot paddle were not available at the University at the time. I usually transcribed the semi-structured interviews within a few days of conducting the interview. One interview usually took about six to eight hours to transcribe.

4.5.2. Creating Research Categories and Coding the Data

After documenting the data, I chose an inductive, iterative, data-led approach to the content analysis. This allowed me to categorise my qualitative, largely textual data into themes. I was then able to decode the meaning of the data within the themes. Elo & Kyngaes (2007) explain that if there is insufficient knowledge about the research

problem to be able to hypothesize categories, data analysis must be inductive. This also means that specific data points can be seen in reflection to other data points and once can then construct general research findings. To establish the categories, I therefore read closely through all my textual data and developed codes that arose from the data. I then coded the data according to the categories I established. After this, I conducted a second round of analysis for which I used new, additional codes arising from the research questions. I then grouped all codes into four categories: '*Overview of business and climate change*'; '*Current climate change communication*'; '*Current business engagement with climate change*'; and '*Sense-making of climate change*'. During this stage of categorization I used data reduction methods (cf. Miles & Huberman 1994) using, for example, mind-mapping to help me identify the themes. Once I had sorted the data into the different categories, I proceeded with open coding (Elo & Kyngaes 2007), describing the content of the data in each category. Based on this open coding, I organized the data more specifically, developing sub-categories of each category within which the majority of data easily found a place [Figure 9]. I then linked the data to the literature and interpreted what the data signified. The categories I developed are described below.

The category '*Overview of business and climate change*' captures all general data on climate change and business. Here the data provides a general overview of the nature of business engagement and climate change. This category contains information on why climate change is relevant to businesses and businesses' understandings of climate change more generally. This category was relevant to understand the other three categories and provided data that was pertinent to all three research questions.

The '*Current climate change communication*' category contains data on the current communication of climate change to businesses. More specifically, the category includes information on how climate change is communicated to SMEs and what this message includes. This category also includes data on the reasons for the content and structure of this communication. This data was mainly used to answer the research question: '*Which climate change knowledges are communicated to SMEs and how?*' (cf. Chapter 5).

The category '*Current business engagement with climate change*' captures data on the

nature of the intended engagement with climate change. This category covers information on the reasons why business leaders intend to engage with climate change and the challenges that they experience when they put this intention into action. This category provided the majority of data relevant to the research question: *'Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?'* (cf. Chapter 6).

The category, *'Sense-making of climate change',* contains data that is concerned with the solutions that the participating business leaders use to enable climate change engagement and to make their engagement more meaningful, profitable and sustainable. This category also looks into the different responsibilities the study participants would like to allocate to private and/or public sector actors. It also covers the ways different economic actors interact with each other, for example, by sharing knowledge to enable climate change engagement. I used this data mainly to answer the research question: *'How do SMEs overcome the gap that exists between business practice and climate change science?'* (cf. Chapter 7).
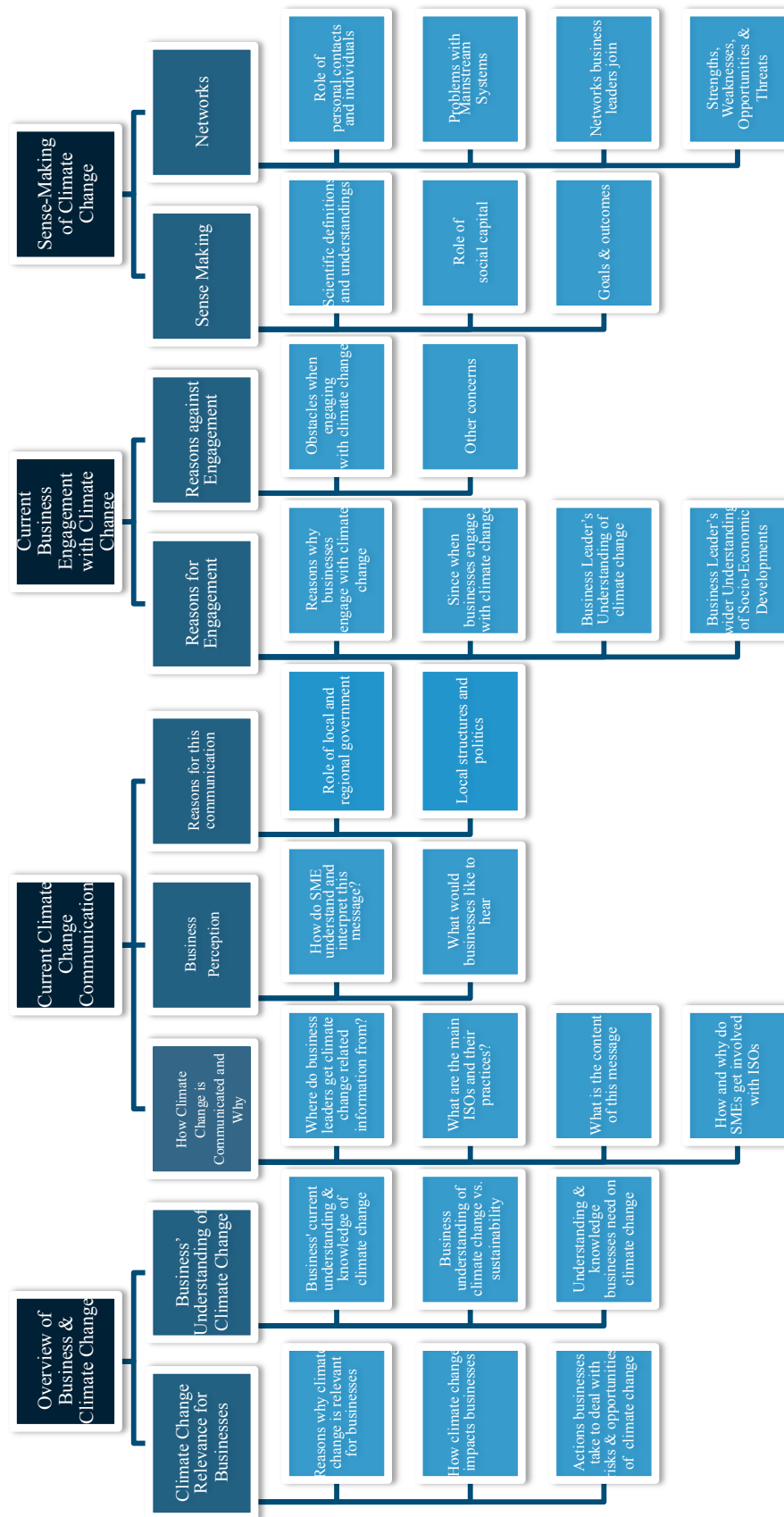
Figure 9: Coding Framework with Categories and Sub-Categories[21]

Figure 9 presents the coding frame for the data analysis. The different data collection tools captured a vast amount of data in text form. I therefore organized the data into four data

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> *categories: Overview of Business and Climate Change; Current Communication of Climate Change; Current Business Engagement with Climate Change; and Solutions to Enhance Business Engagement with Climate Change. Once the data was placed into the four categories I then developed two sub-categories for each category, based on what the data contained. Again this still meant the data points were quite broad. I therefore developed sub-categories for each sub-category until I had enough sub-sub-categories to be able to place all the data into categories in an understandable and easy to comprehend system.*

After sorting my data into the different themes and categories, I was able to compare sub-categories of the same category with each other and each category displayed a *'story-line'.* This entailed a process of going back and forth several times – going back to the data, looking for a category, open coding again and establishing sub-categories. I conducted the early steps of this process using post-it notes and the later steps using computer documents and *Microsoft Excel*. I then used the data gathered through the survey to cross-examine the research findings from the participant observations and interviews and add additional data points.

The data in each category were diverse in respect to phrasing and wording. Crang & Cook (2009: 131) criticize the fact that data coding is largely ignored within ethnographic research papers. I therefore had to experiment to find out how data processing worked best - a process of creative and structured steps of piecing things together (Crang & Cook 2009: 132). I sorted original interview sentences and essay paragraphs into the relevant category and while sorting sentences into *Excel* fields, new themes and sub-topics emerged. After having placed all the interview material in a corresponding field, I went through the entire Excel sheet to establish a more precise distribution, bearing in mind the new categories/themes. Once the data were sorted in Excel, I was able to leave the primary data and code each category. I summarized individual sentences with their corresponding message to a few words/codes.

4.6. Ethical Considerations and Researching an Objective One Region

My largely ethnographic research approach required me to be ethically sensitive to the participants and the research data. To ensure ethical sensitivity towards the participants, all participants were fully briefed on the purpose of this research, all were asked for their consent to be tape recorded and/or have notes taken on what they said, and all were over 18 years of age. With regard to the participant observations, I was given consent from the networks' representatives to attend business network meetings as a researcher, take field notes, photos and gather other associated documents. The participant observations of business related climate events needed to

be handled differently. Some of the events were small and I was therefore able to gather consent to come as a researcher beforehand. Other climate change-related business events were large gatherings where individuals participated rather anonymously. It was therefore difficult to obtain consent from event organisers. I therefore only collected field notes that were rather broad and did not include detailed names or any personal information on individuals. Researching the field of climate change and business practice did not therefore create any ethical dilemmas. I did however have to decide on data inclusion and omission as participants shared personal opinions, motivations and beliefs during the interviews and the participant observations, some of which could have negative effects on other people and ISOs. Participants and organizations are thus kept anonymous. To still enable this thesis to reflect the complex social constructs around climate change and business practise, I decided to identify which participants and organizations belong to a private business and/or ISOs and to also provide some characteristics about them, especially the business leaders.

The fact that Cornwall is an Objective One region, where there is a lot of public sector funding (Cornwall Council 2011, Smale 2006), meant that I stepped into a territory where participants and ISOs had great interest in, and need for, funding. Some participants, communities of practice and ISOs hoped to use my research for their own interests, while others hoped I could provide funding for their business activities with climate change. This made it difficult to meet my research interests and the interests of the participants at times. I expected that finding willing participants would be equally challenging. Many participating ISOs and some participating business leaders, it seemed, were already overwhelmed by their interactions with local research institutions. The participating business leaders were particularly happy to discuss the research interest with me once they heard that the focus was about climate change and business engagement, however. The prevailing funding opportunities meant that many participants were involved in more than one of the observed business networks and also co-operated with many of the participating ISOs. My participants therefore had many more roles than just one (the role of a business leader, for instance). Crang & Cook (2009: 39) explain that people play different roles in different networks. This made the data collection complex as I had to (1) clearly communicate my research independence to potential participants, and (2) view most participants from multiple

perspectives - as business leader, communicator, representative from government and research partner. Some participants had to swap between their different roles during the interviews and observations. Dowling (2010) argues that situations like these interfere with the actual research since the researcher and the participants play different roles and are therefore pursuing diverse intentions which influence and change the data being gathered. To reduce this research entanglement and the associated complexity I decided to only investigate two communities of practice and five ISOs and also to keep the number of participating business leaders relatively low.

4.7. Profiles of the Study Participants: Business Leaders and Intermediaries

In the following section, I will introduce the study participants, who, with their diverse characters, have influenced the content of the thesis. I will provide short profiles on each participant to help the reader understand and contextualize the research findings. The profiles will briefly introduce the participating business leaders and the participating representatives of ISOs. This section will not include profiles on the participating key informants because the key informants will not be referred to individually throughout the thesis (for an overview of their main characteristics cf. Table 2). My interpretation of the participants' characters is largely based on the trustful relationships that developed during the research approach described in the last two chapters. These profiles should therefore be seen as a reference point for the reader and not be treated as an analysis of the research data, although I do provide a brief summary on the common characteristics of the participants towards the end of this chapter.

Amy

Amy is 32 years old and is one of the youngest business leaders that participated in my study. She is naturally attractive and radiates immediate warmth and ease. She smiles a lot and her casual surfer-like appearance makes her blend in with the hotel's atmosphere, which is a Nordic style, high-end family hotel overlooking the beach. Amy is the hotel's Sustainability Manager and even though she has only been in this role since 2010 she seems to be a long-time member of this family run business. Amy speaks passionately about climate change and the responsibilities of businesses. She feels strongly about the need for a consistent consultancy service that should be offered by the government to the private sector. She used to work for a public sector organization that did offer such a service and is well informed about the different political and economic actors in Cornwall. Since my first encounter with Amy, I have met her frequently at many of the climate change-related business events and network meetings, especially BL4LC. Over the period of this study, Amy changed jobs and is now working on sustainable buildings.

Andrew 1

I met Andrew first in a coffee shop in Truro. He was running late because he had to drop his children off for school. I got in touch with him through searching for climate change-related businesses on the Internet. Andrew owns a family-run business that has owned and managed many acres of land since 1934. He utilises these for renewable energy production and he also works as a private consultant. Andrew is 46 years old and I can tell from his expression, his clothing and his family ring that he comes from a family of tradition. He seems to know a lot about the local politics and refers to everyone by their first name. He is well connected. Andrew also has a strong opinion about what the local council should do. He refers a lot to the needs of the private sector and it is clear that he has struggled with the FIT in the past. Andrew is not part of BL4LC but I have seen him at many climate change-related business events. When he sees me, he is welcoming. He treats me like a friend and perhaps like his daughter. He wants to change things here locally. He reminds me to keep him up to date. He is also on the board of directors of the LEP.

Angelo

Angelo seems younger than his 40 years of age. He has worked as an independent consultant for business services since 2006. The first time I met Angelo was at a climate change-related business event run by the University of Exeter in Claire's Hotel. I approached him because he was very outspoken about the happenings in Cornwall. He criticised the fact that we always see the same businesses, and that there is much money being invested in climate change-related events but that we see very little engagement on behalf of businesses. Angelo is not regularly involved in any of the climate change-related business networks that I observe but values personal relationships with Manda and some other participants. Angelo is a person who at times can make you feel unsettled because he is very dynamic and answers questions with counter questions. He has strong opinions about climate change and makes sure people know them. In a way he would be a good politician.

Caroline

Caroline is 37 and has run her own cartography and design business since 2011. Caroline works from home in a small room connected to the kitchen. Caroline is truly dedicated to reducing carbon emissions and making a difference to climate change. She does not own a car, cycles to every business meeting and monitors the carbon footprint of her entire family. She also turns down potential customers if their business activities stand in too strong contrast to the fight against climate change. I often see Caroline at climate change-related business events, to which she also cycles, even if it means taking a shower at the venue. Caroline joined BL4LC for a while, until the group took her off the list. She stays true to herself, is passionate about climate change and is generally a very bubbly, open and friendly character. Caroline is also actively engaged with the Transition Movement.

BUSINESS LEADER

Chris 1

Everybody knows Chris. He is well known in the business community of Cornwall. Chris is a successful farmer, is passionate about community energy projects in his local village and participates in many climate change-related business events inside and outside of Cornwall. Many study participants refer to Chris during their interviews, explaining that people look up to him and that other farms follow his example. He leads by example, through introducing ideas that he feels are important; besides producing beef, he uses his farm as an educational centre and holiday accommodation. The media has already interviewed Chris many times for his innovative ideas. I saw Chris regularly over the study period during climate change-related business events and CoaST meetings. Chris is a funny person. He loses the plot during conversations because his many ideas take him over. He greets everyone like an old friend and is very supportive of others' work. When he sees me he gives me hugs and provides recommendations for books that I should read.

Chris 2

Chris is known for being the founder of Surfers Against Sewage. He is 52 years old and runs a consultancy business on inspiring change locally and nationally, something that comes naturally to him. I met Chris while he was giving a talk about leading change and the importance of mitigating and adapting to climate change. He is very inspiring and makes you feel that anything is possible. Chris is also very approachable with his sunny disposition and washed-out jeans. Chris is not the type of person that you will find at many business meetings or climate change-related events. He lives in Porthtowan and I have met him a number of times in the surf. He inspires change truly from the bottom up. Instead of joining committees, he takes action and inspires other to go on some of the unbeaten paths with him. He does not seek support, support seeks him.

Claire

Claire is another of the very young participants in my study. She is the Sustainability Manager of two hotels overlooking the beaches in a small village on the north coast of Cornwall. The hotels are family-run and were founded about 40 years ago. Clare is very involved with the climate change-related happenings in Cornwall. She works with the local council, is a consistent member of BL4LC and is also in close conversation with Manda and Coast. Claire has a similar role to Amy and they actually co-operate often with each other. She is a conscientious person who knows numbers concerning the hotel like the back of her hand and never forgets to follow up her promises with actions.

Des

Des is 65 years old and retired. He counts as a business leader within this study because he is the chairman of BL4LC and leads the group as if he was still employed. He used to work for a major telecommunication company. He is very passionate about the company's legacy and wants to make sure some of the old company sites are maintained. He spends a lot of time speaking to other business leaders, representatives from ISOs and local politicians. He is an emotional but not very focused character, which impacts on his role as a chairman, meaning that he leads the group in a rather loose manner. The other BL4LC members like him because he is easy going and spends time engaging in personal conversations before and after meetings. He is a person that makes you feel very welcomed and appreciated. He has a very approachable manner. At times Des gets carried away in discussions that he feels emotional about.

Ewan

Ewan is one of the few participants who I have known only very briefly. I have never met him outside formal occasions and in this sense Ewan is quite an illusive person. Ewan is, for example, a member of BL4LC but over the past four years when I have attended almost every network meeting he has never been around. In the interview, Ewan was very interested and knowledgeable about climate change and he also informs BL4LC members about his absence. Ewan, I suppose, is interested in climate change but climate change for him is something that he figured out a few years ago.

Ian

I feel a lot of respect for Ian. Ian has a very warm and calming charisma. He is 66 years old and is just a well-balanced, fatherly person. His business, wholesale food production, has been passed down to him from his father and now his son works in the company as well. The business is located on a cliff top and the winds regularly batter it. Ian definitely belongs to the older generation of the leading business owners in Cornwall. He knows the area well and understands its people and culture. He is comfortable with his business and he comes across as content with himself. The other business leaders respect him and Ian tends to only speak if he feels that he has an important contribution to make to the discussion. Ian is one of the most regular attendees of BL4LC and he also joins many other climate change-related business events.

Katie

BUSINESS LEADER

Katie is powerful, dynamic and enthusiastic. Together with her husband, she owns a high-end hotel that has been passed down over generations since the 1920s. At heart Katie is a lawyer and that comes across when you see her in conversations. She does not fuss around but wants to see action and facts. Katie can also become emotional if she feels things are going wrong. She will express her discontent openly and not shy away from personal confrontation. Katie is 44 years old and has been the manager of the hotel since 2011. You will hear Katie speak about the next generation and how she finds it important to pay attention to climate change for the sake of her children.

Klaudia

Klaudia is a true environmentalist. I met her after she had just come back from a camping trip and freshly skinned rabbit furs were hung over the radiators in the living room. Klaudia has worked as an independent consultant since 2009. Some of the other study participants know her due to her consultancy services. She is well versed in environmental regulation and is knowledgeable about the politics of climate change. Klaudia might not seem like a consultant with her alternative, environmentalist appearance but she is better informed than most ISO representatives.

Kurt

Kurt is 43 years of age and runs one of the most successful, fast-growing clothes producing companies in Cornwall. He founded the company in 2004 together with his wife out of necessity; both wanted clothing that fitted well and would still be beautiful. For Kurt, things have to make sense. He is open-minded but conscientious. For him, climate change engagement makes sense for the business, the products, the customers and the staff. But Kurt is not like most of the business leaders in this study. He is not involved with any climate change-related business groups and I have never accidently met him at any climate change-related business events. He has a university degree that was broadly related to climate change and knows facts and figures about the science. Climate change for him is something that he was personally interested in and used his knowledge of to found a good business; climate change is consequently something that does not have to be communicated to other businesses because it simply makes sense for everyone.

Lucy

Lucy was one of the first people I met in Cornwall for the purpose of my study. Her bubbly and excited character immediately made me feel welcome and she reassured me that my research would be highly valuable for local businesses. Lucy works in a marine related business and is responsible for attaining funding and training opportunities for local marine businesses. Her secret passion is climate change, specifically carbon emissions reduction. She is always on the lookout for potential projects and changes that fall into this category and spends the majority of her time supporting the BL4LC. She attends every meeting, sends out invites and takes detailed minutes. Lucy is unofficially the leader of BL4LC. She is also well connected, realises the struggles of the private sector and knows whom to get in contact with to get things moving in Cornwall, be it in connection with climate change, new projects or helping people to find jobs. Lucy is a fun person and very approachable. She is 37 years old.

BUSINESS LEADER

Mark 1

I met Mark at the very beginning of this study through joining BL4LC. He was one of the first business leaders with whom I conducted an interview. Mark is 39 years old but comes across as younger. He is a family man and a very successful business leader with his marketing company. He has won several prizes for and around his engagement with climate change with his company. Even though the business is very small, with six employees, he is committed to reducing the company's carbon footprint and to adapting his business strategy to the challenges of climate change. Mark is dynamic and enthusiastic. He is also very open and supportive. Throughout the study period, he has regularly connected me with other potential study participants. He spares no effort. He is also the vice-chairman of BL4LC and you can meet him as an invited speaker at many climate change-related business events. Business leaders in Cornwall know him because of his dedication to climate change and his successful business leadership.

Mark 2

I met Mark at a climate change-related business event in Truro. He presented some of his business ideas on recycling and therefore we agreed to meet. Mark resembles how one would imagine an author to be and it did not surprise me when he handed me a novel that he had published in the past. Mark's business provides several solutions to alternative ways of recycling e.g. light bulbs. Mark is 52 years old and lives in an idyllic house surrounded by flowers. We had tea on a large old wooden table when we met for the interview. Mark and I have stayed in contact via emails. That is the type of person Mark is. He stays in touch with people and if he sees something that might be relevant to someone, he will get in touch.

Matt

Interviewing Matt was a most enjoyable experience. Matt is inspiring and after you speak with him for an hour you think that together you could change the world. Matt views everyone and everything as a change maker with the opportunity to do things better. Matt is 42 years old, comes across as a lot younger and founded a web-design business in 2004. His business is thriving and most of it can be attributed to Matt's inspirational leadership. He speaks to people on a very personal level. Matt is very engaged with CoaST and is in close conversation with Manda. He does not join groups such as BL4LC because he believes it is important to change people's opinion personally and to be committed to a few select community activities. Matt is also very direct about his climate change engagement when speaking to his staff. Everyone seems on board and members of staff always note their daily carbon footprint on a big flip chart in the centre of the main business room.

Mike

Mike is a cheerful person. He is over 50 years old and runs a landscape architecture business. I met him at a climate change-related business meeting. Mike is a very outspoken character and has set opinions about societies' culture of consumption. He admires countries like Denmark and Germany. Mike can talk continuously and a conversation can easily turn into a two-hour encounter. He knows many facts about climate change and at times refers to the IPCC or other academic literature. He converses regularly with academics and appears proud of it.

Miles

I met Miles through BL4LC. He is 34 years old and has been a regular attendee at BL4LC meetings. Miles is a quiet, young and careful business leader. He often wears bright coloured socks with his grey business suits and can be seen in personal conversations with some of the other BL4LC members. Miles is generally interested in the networks and the relationships that shape climate change and has reminded me occasionally to keep him up-to-date on my latest research findings. When we conducted the interview in 2012, he was working for a company that specialized in recruiting people for climate change-related jobs. Now Miles has opened up his own business with a friend, focusing on smart cities.

Nigel 1

Nigel is 44 years old and he works for Mark. When I first interviewed and met him, he was the manager of a large telecommunications company. Nigel is a very powerful and dynamic character. With his cheerful but aware attitude he can inform you fully on which things are going well in the UK and which are not. Nigel could be a politician as with his extreme but informed opinions he is a difficult person to argue with.

Paul 1

Paul belongs to the business leaders of the older generation and has been around in Cornwall for a while. He knows Cornwall's people, the culture and the region's difficulties. Paul is a tall 63 year-old. He has a calm and fatherly charisma. He is also very steady and seems at ease with himself. He attends all the BL4LC meetings and normally you can be sure to see him at any other climate change-related business event. With his business on sustainable construction, he relies on his personal contacts with other business leaders and representatives from ISOs to do business. Paul, it seems, is an idealist. He has been interested in climate change for many years and believes that climate change engagement is the only correct route for businesses and individuals. At times it seems he is frustrated with the little change he has seen over his lifetime. He also seems to be stuck in the mainstream system and very dependent on the system's funding possibilities for his company.

Phil

Phil is 68 years old and he looks a lot younger than his age. Phil belongs to the older business leaders that have participated in this study, like Ian. He is gentle, understanding and a good listener. He runs a large food producing company in Cornwall that he founded himself. Phil is passionate about climate change. He is engaged within his local community on issues such as community energy projects and is equally as engaged within the wider climate change-related business community. He hardly misses any BL4LC meetings. But Phil is also selective about his engagement. He does not attend every climate change-related business event but focuses on the areas where he can make a difference. That is why many study participants refer to Phil regularly. They value his opinion and often wait for him to set a sense of direction/vision. Phil always greets me with a hug and supports my research. He does not spare sharing encouraging words. He simply has a very fatherly charisma.

Richard

Richard is a business leader that came into my study after I met him on the university campus. He manages one of the main business innovation centres in Cornwall and has a good understanding of climate change-related business activities. I occasionally saw Richard again after the interviews but not at any climate change-related business networks or events. He works closely with the council and some other ISOs. Richard is a very calm person. For Richard, climate change is a matter for any company that wants to be successful. He is 43 years old and has four members of staff.

BUSINESS LEADER

Rob

Rob is an enthusiastic person who can convince you to do anything with his cheerful manner. He believes in the necessity for climate change engagement and strictly follows this with his own business. Rob is 45 years old and when you speak to him he is not shy to share some stories of his children or the last local football match. I met Rob during a climate change-related business event where he gave a talk on his company's engagement with climate change. For him, climate change is something that he feels passionately about and he enjoys meeting people one-on-one to get things moving. He is not afraid to get his hands dirty. He smiles a lot and has managed to convince his colleagues and supervisors to continue on the road of addressing climate change.

Robert

BUSINESS LEADER

Robert is 39 years old and, together with his wife, owns a creative service design company in south Cornwall. The company has a total of nine members of staff. Robert is very knowledgeable about economic theories, creative ideas and the interconnectivity of business, society and environmental problems. When you meet him, you can immediately sense that he is the perfect kind of person to run a business in the creative sector. He connects ideas and problems and comes up with creative solutions. He seems to feel passionately about any kind of societal problem humanity is faced with and provides creative ideas on how to solve those. Robert captures people's imaginations and at times it is difficult to keep up with his speed of thought. When you are around him you want to get on with some of these ideas and make society more sustainable.

Robin

Robin is the sustainability manager of a beverage producing and distribution company in Cornwall. He is 44 years old and has been a very consistent character to observe throughout this study. You can often find Robin speaking about his business's climate change engagement during climate change-related business events. You can tell that the company has benefited in terms of its reputation. However, Robin is very down to earth about climate change engagement and he makes sure people know it is not difficult but just a very individualistic process for each company to engage with climate change. Robin usually stays quiet during events unless he is prompted directly and he always shares personal words with other business leaders and ISO representatives. Robin is always happy to share news about his family or his latest surfing experience.

Russell

Russell is 37 years old and was working for a large manufacturing company when I met him in 2012. He was responsible for the renewable energy related segment. Russell is good friends with some of the intermediaries that have taken part in this study and I think that this kind of role would suit him better than being in the private sector. Russell knows the power relations within the local council and used to work on some projects on climate change that were commissioned by the council in the past. Russell still wears this structural hat of understanding the world and has a very analytical way of thinking. I struggle to follow his fast thinking.

BUSINESS LEADER

Simon

Simon is 55 years old and runs a holiday home rental business together with other family members. The company was passed down to him by his parents who themselves inherited the company. Simon is a very friendly and open person. He makes time to chat and has actively supported my work over the past years. You can see him occasionally at climate change-related business events. Simon reflects family traditions and values. His office has antique furniture and he wears a family ring. He works with the representatives from ISOs and businesses on a personal one-to-one level. He knows people by name and seems to inspire change on the ground though his contacts instead of through joining committees. Simon is also an active member of the local LEP.

Toby 1

Toby is one of the few business leaders that is not engaged actively within the climate change-related business community. I contacted Toby because a friend of mine suggested that Toby would be a good person to speak to about climate change. Toby is interested in climate change and with his business activities he truly follows the carbon reduction and the adaptation route. But with over 390 employees, Toby's business is a larger business (not even officially defined as an SME). Climate change is less of a passion but more of a requirement and a responsibility. Toby explained some of his climate change-related concerns and I understand that he is a true business leader of a larger business. Climate change engagement is good for the image. Toby is over 40 years of age.

Tom 1

Tom runs a very successful clothing company in Cornwall. He is 39 years old and founded the company in 2003. The entire business model is based on Tom's belief in climate change and his conviction that more sustainable production and consumption can enable economic actors and individuals to make a difference to climate change. Tom is well known amongst the other study participants and has previously participated in some of the climate change-related business events. His business has been growing fast over the last few years and you do not tend to see him at the climate change-related business events anymore. Tom values personal relationships and alternative ways of doing business. He understands the climate change model well, knows how to reduce carbon and how to engage customers.

Tony

I have established quite a personal relationship with Tony throughout my study period, simply because this is the way Tony communicates with people. He is a very personal and friendly person who takes little notice of the social status and the business success that someone has achieved. Tony can always be seen smiling and if people approach him, he remembers their previous conversations and always spots the opportunity to make a positive impact on Cornwall and the economy. Tony is committed to climate change. He tells stories from his personal life on how he mitigates climate change. He also makes sure to send out emails to delegates before attending a meeting to arrange car-sharing and to minimize his carbon footprint. Tony regularly asks me about the sea view from my garden and the latest surf. He too can be found in the sea. Tony is around 40 years old and owns his own renewable energies company.

Alex

Alex is a young, dynamic and powerful woman. She works for one of the main ISOs that I researched for the purpose of this study and is the perfect type of person to link business leaders to the public sector. She is fast thinking and knows the main interests of businesses. She is seasoned in her job. I have seen many of her presentations and she always presents the climate change challenge to businesses in a very engaging and exciting manner. From the start of the thesis Alex would engage me in her events, not shy away from sharing her information and make time to respond to emails.

Anthony

Anthony works for the local council and is responsible for making links to the private sector. He does his job well, and sometimes you could mistake him for a business leader. Anthony always looks very smart in his modern suits and his sporty appearance does not make you believe that he has recently retired. Anthony takes time to speak to people, shares the concerns of the private sector and would like to improve Cornwall's economy to make it more climate change aware.

Ben

Ben is in his mid-30s and he works for the local council on projects that reach out to local businesses on climate change-related matters, particularly carbon reduction. Ben is a fun character and he reminds me of a successful professor. His knowledge is bottomless. He is always busy, always on the run and nevertheless always takes on additional responsibilities. He could do just about any kind of project if only bureaucracy would let him.

INTERMEDIARY

David 1

David works for the local council and is responsible for the agricultural sector in Cornwall. David is over 40 years old and from his slightly tanned skin you can tell that he spends a lot of time outside. His role within the council has recently changed and now David works on issues concerned with the local economy more generally. David is very engaged with the local happenings. He sits on several strategic boards that are broadly related to climate change and sustainability and he is a big advocate of some of my study's participants such as Manda and Chris. He believes in the power of the individual.

Gitty

Gitty is a lady that works for a major ISO in the country. She is well connected to the business community and was majorly responsible for creating the Cornwall Sustainability Awards. As a result of her many years of experience, she has a wealth of knowledge and has the ability to summarize past, future and current happenings in the economy with a few words. She is a fun, friendly and happy person who always makes sure she greets people personally and exchanges a few private words. She truly believes that this thesis could make a difference to the UK's economy.

Gus

Gus is 46 years old and with her powerful and dynamic approach to life she immediately grasped my full attention. She also has a caring aura to her and makes sure people around her are comfortable. Gus is very knowledgeable about climate change and seems to be one of the few intermediaries who regularly refers to the IPCC and is aware of the latest discussions on climate change.

Hilary

Hilary is over 50 years old. She suits her position on the local council perfectly. She is responsible for the economic department and always bears in mind the numbers, trends and goals that have been set for Cornwall. She is friendly and open and makes sure not to waste time on issues that are not related to achieving those goals. People know her and advised me to speak to her about economic issues.

Jackie

I interviewed Jackie because she is known to have successfully supported businesses outside Cornwall with their engagement with climate change. Jackie is over 40 years old and even though she works for a council she has a good understanding of the needs of private sector businesses.

Judy

I have only spoken to Judy once on the phone. She represents the same ISO as Gitty and was referred to me because she engages with businesses on behalf of her ISO. Judy was friendly in response to my request to do an interview. She also was very interested in being sent some of the findings from my study.

INTERMEDIARY

Kevin

Kevin is the CEO of a major ISO that I observed in this study. Kevin is a true CEO. He is knowledgeable, speaks only if needed and is at first sight intimidating. If approached with respect he becomes approachable and supportive. He has been in touch since the semi-structured interviews and is genuinely interested in my personal career developments. He is over 50 years old.

Kim 1

Kim runs the most prestigious, traditional and well-established business network in Cornwall. He is over 50 years old and comes across as having lived a full life. He is confident, cheerful and warm-hearted. He leads the network because in his business career he has been very successful and does not want to settle with simple retirement. He is content but always inquisitive. He knows how to speak to people from all social backgrounds and could easily be mistaken for a politician.

Kim 2

I have only spoken to Kim once on the phone. She represents the same ISO as Gitty and Judy and was referred to me because she engages with businesses on behalf of her ISO. Kim was friendly in response to my request to do an interview. She was very interested in some of my research findings. I have not come across her during any of my other observations and she does not play a major role in the study.

INTERMEDIARY

INTERMEDIARY

Manda

Manda is a natural leader with her inspiring words, her creative mind and quick thoughts that she always tops up with a smile. Manda is over 40 years old and she was born and raised in Cornwall. Everybody in Cornwall knows Manda. She leaves a trace and hearing her speak makes you think you can change the world.

Mathew

Mathew is in his early 30s. He is a young, smart man who has an informed but open-minded view on how things should be. He is a natural people person and always has a smile on his face. Mathew changed jobs during the study period from a public sector ISO to a Private Sector Company. I have not seen Mathew at many network meetings.

Paul 2

Paul is the perfect intermediary. He is very well connected, has seen the developments of the Cornish economy over several years and has a straightforward way of speaking with people. Paul can sometimes be facts and outcome driven and is caught in the Cornish funding mentality. You can see that pursuing this goal has worn him out. He is over 50 years old.

Stephen

I have met Stephen a number of times during climate change-related business events. Even though he works for the local council, he was referred to me after I requested to speak to the head of the local LEP. Even though Stephen represents the local authority, he always tries to meet the needs of the private sector. Stephen is a down-to-earth person who fits in very well with the relaxed Cornish culture.

Steve

Steve is a young man who strives to impact and change the public sector. With his background as an academic and a completed PhD he is somewhat of an idealist and always has strategic ideas. Steve also reflects the typical characteristics of a politician. He speaks openly and does not mind sharing his views even if they do not receive everyone's support.

Toby 2

Toby comes across as a business leader but works as an intermediary for a major ISO. Toby is very outspoken about the facts of climate change and is not shy about criticising the work of other local ISOs. He does seem to have a good understating of the real needs of businesses and many, especially those from bigger companies which regularly request his consultancy services. Toby is about 40 years old.

INTERMEDIARY

Tom 2

INTERMEDIARY

Tom is 36 years old and manages some of the major climate change outreach activities with businesses on behalf of a local ISO. Tom is a people person. He is engaging, friendly and smiles a lot. Tom is very interested in the different projects on climate change and business and has a good understanding of the business community in Cornwall.

Will

Will has just finished his PhD and works for the University. His project also involves working with local businesses on climate change and therefore he organizes events on climate change and business. Will is a fast speaker and an equally fast thinker. He thinks graphically and with his red glasses and his fast speech could be mistaken for a software developer.

The profiles show that the study involves a variety of individuals across different age groups, job positions and backgrounds. Amongst these differences one can, however, also detect general trends in their characters. Both differences and commonalities I would like to briefly discuss here.

Overall, the 51 main study participants include 31 business leaders and 20 intermediaries. Of these 51 participants, 37 (73%) are male and 14 (27%) are female. Their ages range from the early 30s to early 60s. Generally the actor-network approach reveals that the relevant business community is very male dominated. Of the participating business leaders, 29 (94%) are owners, directors and/or chairmen or are in a managing position of their business, and two (6%) are independent consultants. Of the participating business leaders, 8 (26%) were born and raised in Cornwall, 15 (48%) have lived in Cornwall for more than 10 years, 5 (16%) have lived in Cornwall

for 5 to 10 years and only 3 (10%) have lived in Cornwall for less than 5 years. The participants all live in close proximity to each other: 92% of the business leaders live and work in the far south west of Cornwall ranging from Helston in the West to Lostwithiel in the East.

The profiles of the participants reveal that they all tend to be very sociable characters who are well connected and integrated within the local business community. Most of the participants know, cite and refer to other study participants in the interviews and during the participant observations. The participants value personal relationship and emphasize direct interaction with other actors. The participating business leaders also appear to be very open-minded and are outgoing as well as cheerful characters. The participating intermediaries are similarly very approachable and supportive, especially in terms of assisting this study. In particular the participating business leaders tend to be either young and express the attributes of a Cornish beach-surf culture or are older senior business owners and managers that have rather paternal characters. Both of these groups seem to be very grounded in their family and/or the local culture. It can also be observed that all of the participants that are found in the above profiles are outspoken and thoughtful about the world around them. They reflect on society, are critical of contemporary politics and at times even seem to see themselves as separate from the society and culture within which they live and work.

These profiles also display my personal interpretations of, and relationships with, the main participants in the research. The profiles provide a good picture of the type of economic actors that intend to engage with climate change in Cornwall. Although this is not a complete picture of these actors, it is obvious that for these people climate change is a very personal issue that finds form through the interaction with other similarly minded characters and which is understood through a sense of place and belonging.

4.8. Conclusion

In this chapter I have shown how I became part of the Cornish business community to allow for a non-predefined investigation of climate change and business. Viewing the research context, its participants, the business networks and climate change knowledges through the lens of ANT afforded me the opportunity to explore the interconnection of human and non-human, natural and social actors with each other

and with equal emphasis. Importantly, this perspective also enabled an understanding of climate change as a social construct separate to way in which modern society tends to view climate change. For such a broad investigation of human and non-human actors outside the *'organizing binaries'* (Gregory et al. 2009: 7) to work, it was crucial to use a multitude of research tools. These research tools, especially the participant observations, allowed me to consider issues that I would not have been able to consider if I had used a more quantitative research approach.

Both this research method and the post-structuralistic perspective of ANT, were only possible through me becoming part of the Cornish business community (cf. Appendix 8 for feedback of the participants). I took part in the *'lives'* of the participants through joining formal and informal business meetings and events. Key to this active participation was my regular attendance at business events and meetings, demonstrating genuine interest. I was able to be flexible with regard to what and whom to study next: I had access to human actors such as the individuals and networks, as well as non-human actors such as emails, documents and knowledges. To allow a similar study to be feasible in a different locality I would recommend researchers to focus on building personal relationships with the diverse social and economic actors. Emphasis must be put on the participants' own perceptions of what and who might be important for the study. I would also recommend communicating the potential benefits of the study to the participants and staying in continuous touch with them from the beginning to completion of the study.

5. Climate Change Communication:
From Aspiration to Reality

This chapter focuses on the climate change knowledges that are communicated by the participating ISOs to the participating SMEs. Current research cannot explain how climate change is currently communicated to SMEs by ISOs, the major knowledge providers for SMEs (cf. Chapter 2) (Kaufmann & Tödtling 2002, Howells 2006, Klerkx et al. 2009). Equally unknown are the knowledges SMEs need in order to effectively mitigate, and/or adapt to, the impact of climate change climate change. Consequently, it is unclear how climate change should be communicated to businesses so that they can take advantage of opportunities to mitigate, and/or adapt to, the impact of climate change climate change in a meaningful, profitable and sustainable way. This chapter investigates the knowledges provided by ISOs to SMEs in Cornwall. More specifically, it addresses the research question: *'Which climate change knowledges are communicated to SMEs and how?'* I explore (1) which climate change knowledges are communicated to SMEs; (2) how these knowledges are communicated; and (3) how they are understood by businesses. This chapter draws predominantly on the participant observations I completed during climate change-related business events (cf. Chapter 4). The research demonstrates that the participating ISOs communicate climate change in an overly simplistic way and struggle to communicate climate change-related business practices. Communicators focus on persuading businesses to engage with climate change. They are unable to develop more meaningful climate change messages due to short-termed funding structures and UK Government that is perceived to be uncommitted to economy-wide mitigation and adaptation behaviours. The participating SMEs that hear this persuasive message are often already willing to engage with climate change but want practical advice on how to mitigate, and/or adapt to, the impact of climate change it. The chapter concludes that climate change needs to be treated differently to other innovations which have more simplistic and linear development structures. To achieve this, ISOs need to be enabled to communicate over longer time periods and to stimulate co-operation between intermediaries, SMEs, scientists and politicians.

5.1. The Need for Knowledge

In the Literature Review (Chapter 2) I showed that climate change is a complex physical phenomenon with severe consequences for natural and human systems, something that is difficult to communicate and to act upon. The communication of

climate change is therefore crucial but also seen as *'a very complex undertaking. This complexity is a double one, based on the complexity of climate change itself and on the complexity of the communication that is involved'* (Nerlich et al. 2010: 98). Increasingly, research investigates which are the most effective ways to motivate people towards mitigation and adaptation activities (cf. Norgaard 2003, Stern 2006, Hulme 2009, Nerlich et al. 2010, Geoghegan & Brace 2011, Hulme 2011, Wolf & Moser 2011, IPCC 2013, Corner et al. 2014).

In the business literature, businesses are seen to benefit from an interaction with ISOs (Kaufmann & Tödtling 2001, Howells 2006, Klerkx et al. 2009). ISOs were first recognized in the *'agricultural, wool and textile industries'* in the 16th century in Britain as so-called *'middlemen'* (Howells 2006: 716). These intermediaries plied trade and informally disseminated knowledge about technical improvements (ibid. 2006). Nowadays, due to the heterogeneity of SMEs and the complex, non-linear, evolutionary and interactive character of innovation, intermediaries increasingly have to provide tailor-made messages and offer skills which are close to those of consultancy companies (Ashby 1957, Rip & Kemp 1998, Edquist & Hommen 1999, Kaufmann & Tödtling 2002, Geels 2004, Kemp & Rotmans 2005, Klerkx et al. 2009) (cf. Chapter 2 and 3), a service that can only be achieved through close collaboration with government, the business community and society as a whole (Klerkx et al. 2009). Howells (2006: 720) views ISOs as agents that deal with *'any aspect of the innovation process between two or more parties'* and which can be *'either specialized institutions'* design to be ISOs or *'organizations which perform this function in addition to other activities'* (Kaufmann & Tödtling 2002: 801). If businesses are linked to ISOs, it is believed that innovation might be triggered and/or accelerated (Kaufmann & Tödtling 2001). For the particular field of public innovation with regard to climate change 'climate services' exist. They are similar to what ISOs do – give advice and develop knowledge - but their focus is on climate change rather than the interests of the businesses. Climate services '*bridge the generation and application of climate knowledge'* between science and the public by creating and providing user-friendly information, providing training and guiding decision-making (Jones et al. 2014: 18). The role and effectiveness of ISOs with regard to climate change and business has yet to be determined.

5.2. Findings

The findings are divided into three sub-sections [Table 11]. Firstly, I will demonstrate that the participating ISOs communicate climate change in an overly simplistic manner and struggle to communicate climate change-related business practices. Secondly, I will show that the participating ISOs focus on persuading businesses to engage with climate change. Thirdly, I will show that some of the underlying reasons for the current communication failures are rigid, short-termed funding structures and current climate change policies. I conclude that climate change needs to be treated differently from other innovations which have more straightforward and linear development structures. To do so, ISOs need to be enabled to communicate long-term goals and stimulate co-operation between intermediaries, SMEs, scientists and politicians.

Research Findings	Selection of Personal Observations by the Researcher	Events during which similar observations were made	Selection of Interview Quotes from Business Leaders	Business Leaders who gave similar statements	Selection of Interview Quotes by Communicators	Communicators who made similar statements	Selection of Survey Evidence from Business Leaders
Lack of a clear communication of business practices	'[...] the intermediaries are presenting some facts and figures on climate change science. [...] One of the intermediaries says she does not know and continues with her presentation. The man looks disappointed. [...] Some of the SME leaders seem lost and state that they have done nothing but that they want to be prepared. They want to know what they can do. [...]. We heard about climate change science, and we heard about management tools. Both stand separate from each other – the link between them is unclear.' 'The event focuses on emissions reduction. After an overview of policy and climate change-related projects across Europe we are asked to come to the front and discuss how we view the emissions reductions infrastructure in Cornwall. They want to know the actions we take to reduce emissions, what we plan to do and what we would like to do. [...]. We are given pens and post-it-notes and have to stick them into different fields on posters. [...] People chat [...] and only do a little bit of the assignment. At the end there is a short thank you from the intermediaries. I chat with some of the delegates afterwards and they say that they are unsure what they were supposed to learn from today's event.'	D, E, F, G, I, J, K, L, M	'They didn't have message. To have people come to your table, not have a message. [...] People come to them and then ask them for a message. That's a bit too much.' (BL20, Interviewed in 2012) 'I came away extremely deflated, thinking "what a waste of time that was". [...] It was about which projects we could create to talk about climate change rather than saying what is the best thing to do. [...] I thought it was a missed opportunity.' BL25, interviewed in 2012)	BL1, BL2, BL3, BL4, BL6, BL7, BL8, BL9, BL10, BL11, BL13, BL15, BL16, BL17, BL18, BL19, BL20, BL21, BL22, BL25, BL26, BL28, BL29, BL31	'The original issues that we had [...] was there was a lack of willingness and a lack of understanding. [...] The problem we then had was that this work was always done without the actual capacity to follow it up. [...] what we now have is that there are more people than we can actually help. We can't even keep up with what is going on.' (C3, interviewed in 2012) 'We don't look at what comes from other business institutions. We are not very well connected with information that is coming out of them. Or it's not very well communicated to those on the ground doing it. Yes, I guess it is easier to ask them – climate change side of things than the business interpretation of climate change - unless we talk to businesses themselves and we develop a case study. (C1, interviewed in 2012)	C1, C3, C4, C5, C6, C7, C9, C12, C13, C14, C17, C18, C19	77% of the participating business leaders indicated in the online survey that they cannot mitigate and/or adapt to climate change as well as they would like to.
Communicators focus on creating consensus	'The guest speakers give inspiring presentations about the organizations that they have founded. Neither of them mentions climate change but both speak about the interrelation between human actions, the environment and the economy. [...] They motivate participants to care about the environment and to be a change maker. [...].' The event starts with presenting climate change science information. I hear about the Greenhouse Gas effect and wonder if businesses really want to hear it. It irritates me how much emphasis is put on climate science information (...). The communicators present some of the different terms such as weather and climate, mitigation and adaptation (...). They state that the main link between climate change and businesses are costs. Climate change can create costs and when dealt with effectively even contribute to profit creation through abetter reputation for example. They tell us that this is the reason businesses should engage with climate change. Either you act now or you will be out of business.'	A, B, C, D, E, F, G, H, I, J, K, L, M	'There are about 200 SMEs that are at the front and everyone talks to the same 200 SMEs. [...]. There are 18,900 SMEs that aren't engaged. [...]. If you would underline every meeting with what the business will take out of that meeting, then that's a very good measure. [...]. At the moment it's the other way around; self-indulgent. People that are already close to [climate change] talk to each other.' (BL28, interviewed in 2012) 'What I saw was a whole bunch of well-meaning people who were struggling to make a change. [...] [...]. I think I just get a bit frustrated that the same group of left-to-centre, green-thinking people always carry the message. [...] All we hear is the 'warm and smug' of the little people [...] Where significant impact on business needs to be made is in those hard to reach groups [...] not the green industries.' (BL18, interviewed in 2012)	BL1, BL3, BL7, BL8, BL11, BL15, BL19, BL20, BL21, BL22, BL25, BL28, BL31	'Climate change is too big and too scientific to digest. Sustainability is in chunks and gives businesses focus. It's the same with sustainability. If you talked to people ten years ago about sustainability; it was too big to cope with for them. They thought it's all about waste management. It took 10 years to show that it's also about staff and energy.' (C5, interviewed in 2012) 'What we do is that (we start) off with (...) the ground setting and understanding what sustainability means and using the example of coffee (..). (...) And then we do the same with climate change and we throw quite a lot of hard-hitting facts at them to get it out of the way so that we can move on with the rest of the journey. (...) So it's basically if you have a group of twenty people – stand there if you are a climate scientist and there if you have no idea about it. (...). Once we get the facts and figure out of the way we can move on to more of a what had been done about it and some of the innovation and ideas that are coming through from other people.'(C19, interviewed in 2012)	C3, C4, C5, C9, C13, C15, C17, C18, C19	The survey revealed that business leaders indeed understand climate change not as a potential profit-making opportunity as is often assumed. Instead, they view climate change as part of a desire to positively impact (DELETED THE) society, the economy and the environment.
Communicators are locked in short term funding structures	'We speak about the challenge of combating climate change within the current economic system. Manda wants to find new economic indicators. I want to see how we can change the entire economy. The intermediaries have no advice on what we should do with our ideas. We need some practical steps forward. (...) A few days later [...] I am asked to give the intermediaries my observations, at the same time they don't want to give me some of their documents. I am disappointed. I feel used. I have been the research object.' 'I was just invited to give a talk at one of the events. The representatives from the ISO asked me for my business contacts so that they could invite them to the event. I hesitate because most of my business contacts will have heard most of the content before. I wonder if I will see any new SME leaders at the event or if I will just be the same old faces I see at every event.'	A, B, C, D, E, F, G, H, I, J, K, L, M	'This comes from those organizations wanting to be in the prime position and be the number one. [...] A lot of that is commercially motivated. [...] I have no doubt that a lot of what they do earns money and somebody else doesn't earn money as a result. [...] but take those 3-4 organizations in Cornwall that you mentioned earlier. Do those guys talk to each other? So what you've got is a lot of environmental activists who have great intentions and they do really good things but they would work much better in collaboration with each other.' (BL25, interviewed in 2012) 'A lot of these projects are funded and don't have communication experts. A lot of these projects are good but hidden because they don't invest in reaching the unreached. The matrix of performance are based on 'how many SMEs have you seen?' rather than 'how much change did it bring'? [...]. It's about number scoring. It's about who gets the funding.' (BL3, interviewed in 2012)	BL1, BL2, BL3, BL4, BL7, BL9, BL11, BL14, BL15, BL16, BL17, BL18, BL20, BL21, BL22, BL25, BL27, BL28, BL31	'Yes, the work of many different organizations wanting to be in the prime position in Cornwall is all interesting: [...] In the last three years we have had a number of initiatives in Cornwall and they have now disappeared. I embrace the new initiatives and utilize and exploit them as much as possible for the benefit of our firms.' (C15, interviewed in 2012) 'We used to talk to SMEs a lot. At the moment that's not on our work plan. We are not funded to do it. There are only so many things we can do.' (C4, interviewed in 2012)	C1, C2, C3, C4, C6, C7, C13, C15, C17, C19, C20	The survey shows that terminologies such as 'low carbon' are perceived to be more actionable than 'climate change', issues that one can act upon.
What businesses want to hear	The business people look hot and tired. They are wondering (aloud) about/what they could do about extreme weather events when they walk out the door; Something we had hoped to learn here today.' '[The delegates] speak about their business problems, their successes with climate change; they speak about the economy and the world and how things should look in light of climate change. [...] Businesses wait for the climate expert to tell them what to do. The representatives from the local government receive equal appreciation and respect. The business leaders seem excited to have the opportunity to speak to them. Everyone seems feel as if/today they could change all thesepolitics, social systems and businesses.'	not applicable	'How is climate change relevant to my business? That's very individual for every business. So it's about tailoring the message. It needs to be tailored individually, not a big national campaign about climate change. Making it specific for businesses. [...]. Business people are very practical. People want to do the right thing but they don't know how. I wanted to open a drinks business and looked for the greenest bottle and could not find a green solution. [...]. It's about facilitating those green choices. There is a knowledge gap between what can I do and what do I want to do.' (BL3, interviewed in 2012) 'And there is nobody that we could go to when we don't get it. So there is nobody who translates the knowledge that is out there for us in business terms.' BL22 Business Leader, interviewed in 2012)	BL1, BL2, BL3, BL4, BL6, BL8, BL9, BL10, BL11, BL13, BL14, BL15, BL16, BL17, BL18, BL20, BL21, BL22, BL24, BL25, BL28, BL31	'The challenge is more about translating the knowledge that is already available and making that accessible for people. The capacity to process the knowledge that is there. [...]. The more knowledge you create is great but unless you have the people who are translators but also the people who are processing and filtering the knowledge [there is a problem]. So there are gaps in directed and meaningful knowledge that is applicable to SMEs [...].' (C3, interviewed in 2012) '[2007 ...] was about the impacts of climate change. That's when we began to say to SMEs this is not about ice melting and polar bears but the economics of climate change and how it will impact on your business [...]. [...] Once you have gone into a business and demonstrated simple things they want to do more.' (C15, interviewed in 2012)	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C12, C13, C14, C15, C16, C17, C18, C19, C20	90% of businesses understand climate change through definitions such as sustainability; only 60% understand climate change through its scientific definitions.

Table 11: Data Overview for 'Climate Change Communication: From Aspiration to Reality'

5.2.1. The Message

My qualitative research identified that the participating ISOs struggled to connect climate change (science) with business practice. Business practices mean the application and use of ideas, beliefs, and methods to mitigate, and/or adapt to, the impact of climate change climate change in meaningful, profitable and sustainable ways (cf. Chapter 2). The following evaluations of the climate change-related business events show that when the participating ISOs had the opportunity to bring the subject of climate change to businesses, neither business practices nor climate change science were communicated in depth to SMEs. Most of the participating ISOs communicated both business practices and climate change science only briefly.
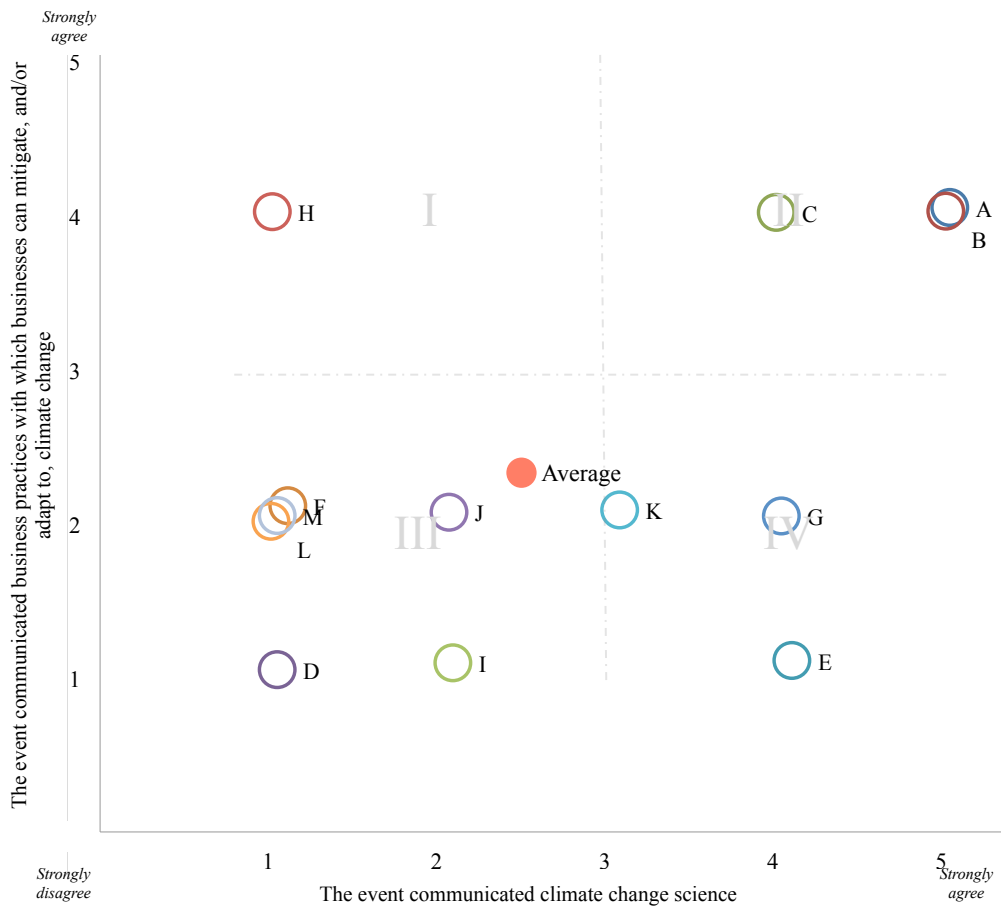
Figure 10: Evaluation of the Climate Change-Related Business Events: Communication of Business Practice and Climate Change Science[22]

Figure 10 shows the evaluation of the climate change-related business events with regard to their communication of business practice and climate change science. The events A to M are the observed climate change-related business events (cf. Table 4). Each event in this graph was rated on a Likert Scale from 'Strongly Disagree' to 'Strongly Agree' according to how much climate change science was communicated, and how much business practice was communicated

[22] Own creation.

during the event. By summarising the Likert Scale evaluations in Figure 10 it is possible to organize the events into four different 'fields' I, II, III and IV. Events in Field I are perceived as communicating no information on climate change science and focused on communicating business practices. Field II displays the events that focused on communicating climate change science and paid equally as much attention to communicating business practice. Events in Field III are perceived as having communicated no climate change science and no business practice. Field IV shows the events that focused largely on climate change science and communicated no business practice.

The majority of the observed eventscan be found in Field III. This means that the participating ISOs are perceived as having communicated little or no climate change science. My participant observations also show that business practice is similarly poorly communicated. The following participant observation gives an example of a climate change-related business event in Field III [Event J] [Participant Observation 1].

> *'This day event is structured into two main blocks: presentations and workshops. The presentations are given by Manda and Chris 2 [...]. I see a few of my participating business leaders. [...] Today, I am a participant and an intermediary but also a researcher. I will lead one of the workshops later [...]. Manda and Chris 2 give inspiring presentations about the organizations that they have founded: CoaST and Surfers Against Savage. Neither of them mentions climate change but both speak about the interrelation between human actions, the environment and the economy. [...] They motivate participants to care about the environment and to be a change maker. [...]. Towards the end the intermediaries ask everyone to propose ideas on how to generate greater business and climate change engagement.*

Participant Observation 1: Event J in 2013 at the University of Exeter

This observation shows that the event did not address climate change science and its relevance to the participating SMEs: After a short introduction, the floor was handed to guest speakers from the wider business community who addressed issues around the environment, waste, and responsibility. The direct link to climate change remained unmentioned and precise steps that SMEs could take were not addressed. The message did not show how the idea of engaging with climate change could be applied in meaningful, profitable and sustainable ways. Events that are clustered in Field IV indicate equally missed opportunities to present businesses with practical information on how to engage with climate change. Even though some climate change science was presented, the link with business was not made.

Only three of the observed events - Events A, B, & C - were found to communicate both business practice and climate change science; these are located in Field II. The following participant observation [Participant Observation 2] gives an example of a climate change event in Field II (Event A).

'[...] the intermediaries are presenting some facts and figures on climate change science. [...]. One of the businessmen asks why there are different temperature developments across the UK. One of the intermediaries says she does not know and continues with her presentation. The man looks disappointed. We then are sorted into small groups of four to discuss what our business is already doing with regard to extreme weather events related to climate change. I feel out of place between two business leaders from companies who have both experienced either an extreme flood or drought. We take notes on the flip chart. Some of the SME leaders seem lost and state that they have done nothing but that they want to be prepared. They want to know what they can do. [...]. We have to answer questions on management practices. Some of the SME leaders do not know some of the terms. It is a bit too general. Neither do the intermediaries when we ask them about some of the terms. So we write ideas on what we think the different categories might mean and what they might mean for climate change and vice versa. Each group presents their thoughts. Our group hopes for a right and wrong feedback. [...]. We heard about climate change science, and we heard about management tools. Both stand separate from each other – the link between them is unclear. The business people look hot and tired. They talk about what they could do in the event of extreme weather events when they walk out the door. Something we had hoped to learn here today.'

Participant Observation 2: Event A in 2012 at the Met Office

The events located in Field II, including the event summarized above, were conducted by one participating ISO; in these events, practical examples were presented on how other businesses have mitigated and adapted to climate change. Participants were given the opportunity to think about their own businesses and how they could then adjust their existing activities to follow the example of businesses already on a pathway to combatting climate change. These events were coupled with basic information on climate change science. It must however be noted that even though I perceived the events as addressing climate change science, the information that was presented was only basic and not detailed. My observation shows that during Event A there was an emphasis on climate change science. The intermediaries gave an overview of current understandings on climate change science. It was explained how climate change is defined, and how the UK's climate will change with extreme weather events and temperature changes. The event continued with open discussions

and group exercises to investigate actions SMEs take to cope with extreme weather events caused by climate change, but it was poorly informed on the science. Indeed it seems that events of this form that do communicate climate change science tend to struggle to provide in-depth knowledge, as shown in the response above. Participant Observation 2 also shows that when an attending business leader asked a question about the projected temperature changes, the facilitator could not answer the question. At the same time, the intermediaries only provided a very general level of information on business practices and management. The intermediaries struggled to provide answers in any depth. Later in the meeting, participants noticed a lack of knowledge of business practice on the part of the intermediaries. This shows that the participating intermediaries had to marry two comprehensive and distinct fields of interest: business practice and climate change, and struggled to have in-depth knowledge of either. Even though both events from Fields II and III were advertised as climate change-related business events, one did not address climate change at all while the other only superficially addressed business practices.

Surprisingly most events were advertised as if the participating ISOs would be able to easily fulfil the purpose off addressing both climate change and related business practice [Document Analysis 1 & 2]. The participating ISOs advertised the climate change-related business challenge as tangible, practical and manageable. Most events that I observed were advertised similarly to Event C and Event F displayed below:

> *'Find out what simple things can be done to prepare and build resilience across the industry. […] showcase best practice and present tools that can help tourism SMEs and professionals respond. […] Increased understanding of the challenges for tourism surrounding changes in our weather and climate and how SMEs can respond to improve resilience. […] Increased awareness of the tools and resources available to the industry and how to use them'.*

Document Analysis 1: Advertisement for Event C in 2011 at the Met Office

> *'With a low-carbon business strategy now firmly accepted as a fundamental goal in terms of climate change mitigation, the project's studies and outputs have never been more pertinent.'*

Document Analysis 2: Advertisement for Event F in 2013 at the Heartlands

The advertisements show that the participating ISOs aim to deliver practical information on climate change to the business community. These ISOs then convey

engagement with climate change as a simple and tangible issue. Of course, events need to be advertised to gather attendees in the first place, but the way in which climate change is communicated in such advertisements leaves the participating SMEs puzzled about why their individual engagement with climate change is much more challenging than advertised. Most of my participating business leaders expressed this bafflement in their interviews with me. It thus appears to me that the participating ISOs aimed to empower SMEs to engage with climate change after having attended the event, and that they see climate change as an issue that, once understood, can be acted upon. Similar to this is the way climate change is portrayed in the mass media.

The findings presented on the content of the message shows that the participating ISOs thus took the nature of climate change at a very general level; the sensitivity and complexity of climate change, which I introduced in Chapter 2, is not discussed, presumably because such detail is not considered necessary or indeed deliverable. Climate change is instead communicated as an opportunity and a risk that is present and tangible. The participating ISOs handled climate change in what could be seen as an overly simplistic manner in order to make a link to business practices the key focus of the message, rather than providing detailed evidence for the basis of climate change itself. When I compare these findings to current thinking in social science, which advises people not to focus solely on the physical, rational assertions of climate change science when communicating about it, because this fails to engage people with the issue (cf. Hulme 2009, Nerlich et al. 2010), then it becomes evident that the participating ISOs were following this advice. The lack of a clear message, however, with regard to either business practices or climate change also indicates that the participating ISOs were confronted with a three-fold complexity: the complexity of climate change itself, the complexity of business practices and the complexity of the communication that is involved (cf. Nerlich et al 2010: 98). I can thus conclude that none of the researched ISO managed to fulfil the purpose of being intermediaries, transforming *'the ideas and knowledge being transferred'* (Howells 2006: 716) by providing solutions to mitigate, and/or adapt to, the impact of climate change climate change and managing to make a link between business practice and climate change - events that would be located in Field II. Looking to the existing literature on

communication it becomes clear, however, that communication is always a difficult task. Weaver (1964) describes the problems of conveying meaning to the receiver of a message as one of the main problems of communication. If a message does not lead to a desired response on behalf of the receiver, this is called the effectiveness problem. Shannon (1964) explains that the content of the message being communicated is purely the choice of the sender. The greater the number of messages there are from which to select, the greater is the *'freedom of choice, uncertainty, and information'* (Shannon 1964: 19). A communicator therefore has the ability to select what and how to report information and s/he can influence individuals regarding *'what to think about'* (du Plooy 1997: 9). This means that the participating ISOs also did not have to report on all the information available but could have been selective and thoughtful on how to use their knowledge. Consequently, if there is a lack of clarity over the nature of the message being delivered, it is not surprising that business leaders find the purpose of the events and the climate change-business practice links uncertain.

Given the uncertain message discussed above, it is worth examining the structure of the events themselves. It is noticeable that during the majority of the events the ISOs methods entailed group-work and/or the discussion of case studies [Figure 11].
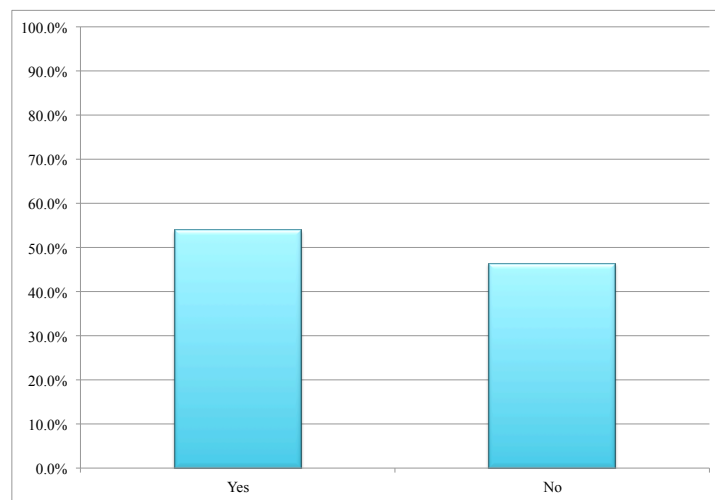
Figure 11: The ISO used Group Work and/or Case Studies[23]

This approach could be a reason why it might be difficult for the participating ISOs to make the link between business practice and climate change science. Attending

[23] Own creation.

business leaders were either given exercises to discuss how to mitigate and/or adapt to climate change in groups or they learned about someone else's engagement with climate change. Although this gave the participating SMEs the opportunity to network and to learn from each other, critically, it also made business leaders responsible for solving their own problems. Thus, rather than the participating ISOs providing answers for the businesses based on how business practice is affected, it was the SMEs themselves that are left to come up with possible solutions. The following participant observation shows the typical setup of the events that I observed [Participant Observation 3]:

> *'We learn about how to best communicate climate change to others, including staff, customers and other SMEs. We then go through different case studies. Every group receives an exercise sheet with a description of a business in the South West. The sheet explains how the business has been affected by physical climate change impacts. The example that my group receives is a hotel located next to a river. We have to think about how the business could prevent flooding in the future.'*

Participant Observation 3: Event B in 2011 at Plymouth University

This example shows how case studies and group work were used to make participating business leaders think about practical steps to engage with climate change. Another of my observations shows that when group work was assigned, the participating business leaders used the allocated time to chat and not to produce specific solutions [Participant Observation 4]:

> *'The event focuses on emissions reduction. After an overview of policy and climate change-related projects across Europe we are asked to come to the front and discuss how we view the emissions reductions infrastructure in Cornwall. They want to know the actions we take to reduce emissions, what we plan to do and what we would like to do. [...]. We are given pens and post it-notes and have to stick them into different fields on posters. [...]. People chat [...] and only do a little bit of the assignment. At the end there is a short thank you from the intermediaries. I chat with some of the delegates afterwards and they say that they are unsure what they were supposed to learn from the event.'*

Participant Observation 4: Event D in 2012 at County Hall

The majority of the participating ISOs also worked with other businesses or external speakers to address the topic of business and climate change [Figure 12], rather than utilising their own expertise. Essentially the participating ISOs see themselves as intermediaries, as they have limited knowledge on how to engage with climate change in business. I would posit that the participating ISOs thus acted as suggested in

recently published literatures which advise that SMEs prefer to interact with clients or peer businesses in the quest for new approaches and innovations (Klerkx et al. 2009). At the events that I observed, however, attending businesses struggled to share and exchange relevant climate change knowledges. Rather, they drifted into regular networking activities. I would suggest that, based on my findings, this interactive learning with regard to climate change in an organized setting does not work.
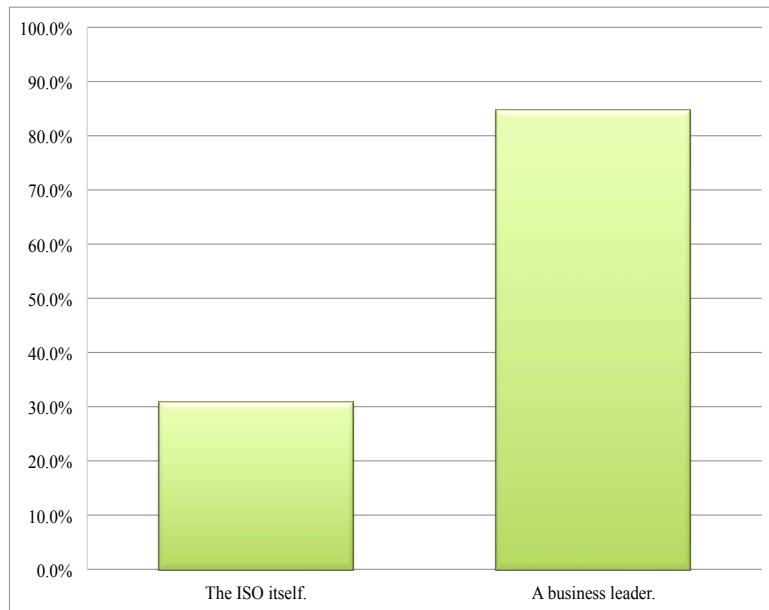
Figure 12: Presenter of the Key Aspects of the Event[24]

A number of my participating business leaders specifically reported on a range of climate change-related business events during which they had been asked what they would like to learn at the specific event they were attending. Robin, a young sustainability manager, explains his experience thus:

> *'I found the meeting okay. But they asked us what they could do for us, but I wonder what they can do for us'.* (Robin, Business Leader, Interviewed in 2012)

Nigel 1 describes a similar experience during another climate change-related business event:

> *'They didn't have a message. To have people come to your table, don't have a message for them and then ask them for a message. That's a bit too much.'* (Nigel 1, Business Leader, Interviewed in 2012)

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[24] Own creation.

Even though my data shows that the participating ISOs used innovative and modern techniques, such as group work and peer-based forms of interaction, to try to enable knowledge exchange between business leaders, the ISOs did not deliver actionable knowledge. The observed behaviour of the participating ISOs thus seemed to follow the recent calls for creating sustainable development with the use of local, individual knowledges (Gallopín 2004). My research also shows, however, that using these techniques did not lead to solutions on how to practically engage with climate change materializing. An explanation for this failure to deliver might be found in the existing literature on sustainability. Gallopín's (2004: 6) explains that issues around sustainability are still challenging: '*We lack, however, a comprehensive framework regarding the multiplicity of local knowledges that could be used as inputs for scientific research and have thus far remained largely unknown to research systems as potential sources of innovation. The key knowledge generated by the lay expert is often contextual, partial and localized, and has not been easy to translate or integrate into a more scientifically manageable conceptual framework*'. Combining my findings above with Gallopín's explanation suggests that it was not possible for the individual and local knowledges that were brought together at my observed events to be disassembled, translated and put into practice. The participating business leaders were not enabled to engage with climate change due to a lack of a comprehensive framework. Innovation support *per se* is difficult to design for SMEs because of their heterogeneity (Kaufmann & Tödtling 2002); unpicking the complex construct of climate change and its importance for SME practices is a task that seem doubly complex and consequently presents a much more challenging role for participating ISOs to perform.

The data also suggest that with respect to climate change, the participating ISOs cannot develop answers by themselves and businesses cannot be treated in isolation. Enabling climate change engagement in SMEs requires a different sort of intermediary where neither ISOs nor SMEs alone unpick and develop knowledge. The participating ISOs need to recognize that innovation is a process '*in which cause and effect are often difficult to distinguish*' (Klerkx et al. 2009: 365) and innovation is a result of interaction between actors across the mainstream system (Kaufmann &

Tödtling 2002). A first step towards this co-operation would be to admit that ISOs do not have the answers on how to mitigate, and/or adapt to, the impact of climate change climate change. Looking at the existing literature, it should perhaps rather be experiences, social learning and cultural interpretation (Hulme 2009, Leyson & Geoghegan 2012, Chapter 7) that enable climate change engagement on the part of SMEs. This conclusion might also mean that the participating ISOs are 'stuck' in out-of-date assumptions about SMEs, assumptions which stem from our ideas about modernity - that people make simple, individual and rational decisions (Beck 1992). The participating ISOs only give room for a modern, rational and individualistic understanding and management of climate change and ultimately approach the participating business leaders as principally rationally motivated, value-free, profit-maximisers (cf. Beck 2006: 333, cf. Chapter 6). It is therefore essential to acknowledge more specifically the needs of SMEs and to involve them together with government, society and the rest of the business community in the creation and delivery of a much more nuanced climate change message, a message that is rooted in local knowledges and practices, and capable of generating more effective innovation. The message communicated by the participating ISOs was different to such an eclectic, interdisciplinary and open approach to understanding climate change (cf. Literature Review). Ultimately, I conclude that the participating ISOs ignored this complexity and did not provide opportunities to explore the interconnection between human and non-human, natural and social actors with each other; I would argue that that their view of climate change is based on the rational choice based assumptions of modernity.

5.2.2. Business Perception

A consequence of the current nature of the message is that the participating SMEs tended to come away from the climate change-related business events feeling dissatisfied.
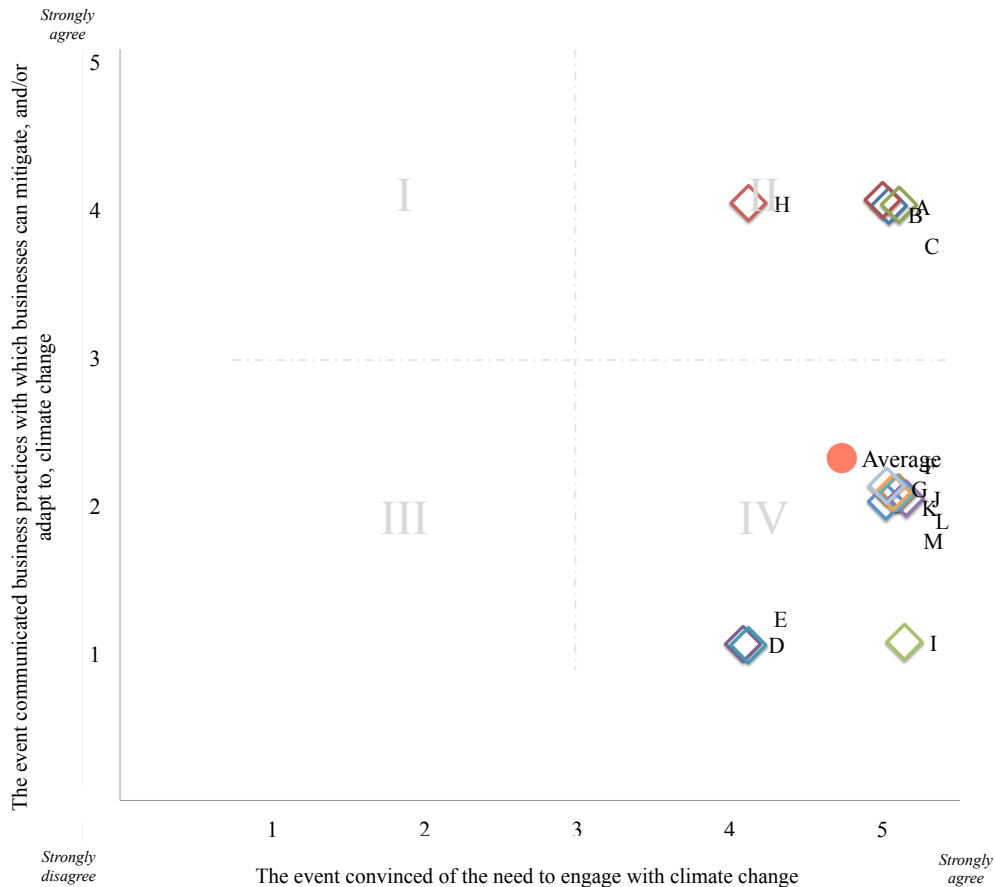
Figure 13: Evaluation of The Climate Change-Related Business Events with Regard to their Communication of Business Practice and Creating Consensus[25]

Figure 13 shows the evaluation of the climate change-related business events with regard to their communication of business practice and creating consensus, meaning an effort was made to convince businesses of the importance of engaging with climate change. The events A to M are the observed climate change-related business events [Table 4]. Each event in this graph was rated on a Likert Scale from 'Strongly Disagree' to 'Strongly Agree' in response to the questions: 'To what extend was the importance of climate change and the need for engagement communicated?' and 'How much business practice was communicated during the event?' By summarising the Likert Scale evaluations in Figure 13 it is possible to organize the events into four different 'fields' I, II, III, IV. Events in Field I are perceived as not communicating the importance of climate change and the need for engagement, but have communicated business practice. Field II displays the events which communicated the importance of climate change and the need for engagement, and that also communicated business practice. Events in Field III are perceived as not having communicated the importance of climate change and the need for engagement, and also not providing business practice. Field IV shows the events that focused on the importance of climate change and the need for engagement and did not communicate business practice.

Figure 13 shows that most of the events that I observed received a high Likert scale rating for '*convincing of the need to engage with climate change*' and can be found in Field IV: events which motivated people to engage with climate change, but which

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failed to convey climate change-related business practices. A description of such an event is given below for Event J [Participant Observation 5]:

> *'We speak about the challenge of combating climate change within the current economic system. Manda wants to find new economic indicators. I want to see how we can change the entire economy. We note our ideas on a drawing board. Manda and I present some of our revolutionary ideas but the intermediaries have no advice on what we should do with our ideas. We need some practical steps forward. Where do we get funding? Which businesses do we work with? We want to do more. A few days later [...] I am asked to give the intermediaries my observations, at the same time they don't want to give me details of the businesses that attended the event. I am disappointed. I feel used. I have been the research object.'*

Participant Observation 5: Event J 2013 at the University of Exeter

The example shows that the participating ISOs did not know how to put the ideas of participating business leaders into practical action. The example also demonstrates that while the participating ISOs focused on convincing business leaders to engage with climate change, there was an absence of any practical way forward. Consequently, my participating business leaders stressed that current climate change communication as described above does not help them to engage with climate change. Robert expresses this disappointment in his semi-structured interview with me.

> *'I came away extremely deflated, thinking 'what a waste of time that was'. [...] It was about which projects could we create to talk about climate change rather than saying what is the best thing to do. [...] I thought it was a missed opportunity.'* (Robert, Business Leader, interviewed in 2012)

The participating business leaders of my study stress that they need more practical solutions. Of my participating business leaders, 77% indicated in the online survey that they were unable to mitigate and/or adapt to climate change as well as they would like to. In responds to the question *'Actions I can take as a business / practical information'* received an average Likert Scale rating of 'strongly agree' by the participating business leaders of my study. The question *'I need to be motivated / encouraged to engage'* and *'science on climate change'* received an average rating of 'neither agree nor disagree' and 'agree' respectively. This is an indication that the participating business leaders need to hear about business practices and should be enabled to implement them. This was also strongly argued by my participants in the semi-structured interviews. The participating business leaders consistently argued that

they need practical steps on how to make a difference with regard to climate change. Angelo, for example, explained how he struggled to put his willingness to engage into action:

> *'How is climate change relevant to my business? That's very individual for every business. So it's about tailoring the message. It needs to be tailored individually, not a big national campaign about climate change. Making it specific for businesses. [...]. Business people are very practical. People want to do the right thing but don't know how. I wanted to open a drinks business and looked for the greenest bottle and could not find a green solution. [...]. It's about facilitating those green choices. There is a knowledge gap between what can I do and what do I want to do.'* (Angelo, Business Leader, interviewed in 2012)

Many of the participating business leaders explained that it is this practical information that they struggle to find:

> *'There is nobody that we could go to when we don't get it. So there is nobody who translated the knowledge that is out there for us in business terms.'* (Phil, Business Leader, interviewed in 2012)

Phil's statement shows that the participating business leaders need someone who explains what some of the communicated messages actually mean to the business activities of the participating business leaders. The need of my participating SMEs for practical information which would enable them to put their willingness and understanding into practice is not met by the participating ISOs. Instead, the participating SMEs are surrounded by ISOs which focus on persuasion. Many participating business leaders, like Phil, therefore experienced the events that I observed as awareness-raising events and felt that they were not gaining opportunities to make a difference to climate change. Business leader Robert also explained that for him the observed events were nothing more than a talking exercise, suggesting that he would need more practical information:

> *'The work they do is really valid and valuable but when you're running a business and you don't have much time you have to be able to get stuff out of events. And very often events are talking shops. I don't always get what I need to get out of it.'* (Robert, Business Leader, interviewed in 2012)

The data also show that most of the participating SME leaders who heard the ISOs' persuasive messages were already convinced of the need to engage with climate change. Nigel 1 explained the situation as he perceives it.

'There is a bit of a cool club in Cornwall's business community. Cool by association. It's always the same old faces. It comes from knowing how to maximise pots of money and then it's the thing everybody wants to join. There are about 50 SMEs in that cool club but there are 21,000 SMEs in Cornwall. Do we make a difference?' (Nigel 1, Business Leader, interviewed in 2012)

My participating business leaders also pointed out that the message regarding climate change was not actually reaching those SMEs that were unwilling to engage with climate change. The following comment made by Mark during an interview with me showed this:

'What I saw was a whole bunch of well-meaning people who were struggling to make a change. [...] [...]. I think I just get a bit frustrated that the same group of left-to-centre, green-thinking people always carry the message. [...]. All we hear is the 'sturm und drang' of the little people [...]. Where significant impact on business need to be made is in those hard to reach groups [...] not the green industries.' (Mike, Business Leader, interviewed in 2012)

This quote shows that the SMEs that are not engaging with climate change are the ones that need to be targeted with the current climate change message. There is then a gap between the intended/expected message that the participating business leaders want to hear and the actual communicated content of the message. This gap leaves the business leaders disappointed after they have attended a climate change-related business event. The participating ISOs seem to function under the belief that if the need to respond to climate change was accepted, SMEs would simply engage with climate change. Ben, who works for one of the participating ISOs, expressed the belief that climate change intermediaries should focus on making knowledge applicable for businesses:

'The challenge is more about translating the knowledge that is already available and making that accessible for people. The capacity to be able to process the knowledge that is there. [...]. The more knowledge you create is great but unless you have the people who are translators but also the people who are processing and filtering the knowledge [there is a problem]. So there

are gaps in directed and meaningful knowledge that is applicable to SMEs
[…].' (Ben, Intermediary, interviewed in 2012)

Representatives from the other participating ISOs also agreed that creating consensus
on climate change was not important anymore. Paul 2 saw that there needed to be a
change in the communicated message. He explained that he had thus tried to alter his
communication style over the past years:

> *'2007 […] was about the impacts of climate change. That's when we began to*
> *say to SMEs this is not about ice melting and polar bears but the economics of*
> *climate change and how it will impact on your business […]. […] Once you*
> *have gone into a business and demonstrated simple things they want to do*
> *more.'* (Paul 2, Intermediary, interviewed in 2012)

Most other intermediaries that I interviewed also agreed that the science was not
important anymore. Ben commented that:

> *'I did need to know the science when we were being tackled on the science.*
> *Now we are not being tackled on the science. […] The original issues that we*
> *had […] was that there was a lack of willingness and a lack of understanding.*
> *[…] The problem we then had was that this work was always done without the*
> *actual capacity to follow it up. […] what we now have is that there are more*
> *people than we can actually help. We can't even keep up with what is going*
> *on.'* (Ben, Intermediary, interviewed in 2012)

These statements suggest that the knowledge deficit (cf. Sturgis & Allum 2004) had
been met successfully over the last few years in Cornwall, without a need for very
detailed explanation of the science. The participating SMEs in Cornwall were targeted
on the understanding of climate change and are perceived to have moved on to more
practical issues. Ben thus advised me that it is important to create willing,
understanding business leaders:

> *'[…] but it's also not about general production of knowledge. It's about 'how*
> *do you engage with the business to build understanding and willingness?'*
> *Those are the key issues: willingness, capacity and understanding. […]. If you*
> *don't have enough willingness you will get inaction or cosmetic action. If you*
> *don't have enough capacity you'll get throated actions and if you don't have*
> *understanding you'll have wrong actions.'* (Ben, Intermediary, interviewed in
> 2012)

The concept described by Ben was developed by Gallopín (2002) and suggests that an absence of sustainable behaviour is linked to three main obstacles: a lack of willingness or the will to do things differently; a lack of understanding of the complex system in which behaviour takes place; and a lack of capacity, a physical obstacle, such as a lack of resources, to implementing behaviour. My findings presented here therefore suggest that for the participating business leaders and the participating intermediaries, climate change-related debates no longer have a need to create consensus (cf. Nerlich et al. 2010). The data also lead me to assume that the reasons the participating ISOs still focus on creating willingness and understanding is that they lack the capacity to communicate how to practically engage. My findings therefore contrast with some of Williams & Schaefer's (2013), which suggest that the key informants for businesses leaders are still convinced of the more rational, profit-related reasons for climate change engagement. My study shows that the participating ISOs are aware that in fact their audience(s) need(s) a different climate change message; they simply do not have the means to deliver this message.

Instead of helping the participating business leaders to engage with climate change, ISOs treat climate change in a way similar to that recently criticized by Lindegaard (2013) in her discussion on climate change and innovation: climate change is oversimplified in a push for quick innovation based on out-of-date assumptions that innovation is a linear process, a direct process from research to markets (Kaufmann & Tödtling 2001, Lindegaard 2013). In this case, innovation is seen to *'begin[s] with a discovery in 'basic science,' proceed[s] with an application or invention derived from [...] applied science [...], and end[s] with the development of a new product or process'* (Freeman 1996: 27). My data leads me to support Lindegaard's suspicion that communicators still tend to treat approaches to engage with climate change in this linear way, when climate change is in fact much more complex because it is linked to complex physical and social constructs (Geoghegan & Brace 2011, Boykoff 2008). My participating ISOs thus are subject to decisions made during political debate within which they are not able to participate (cf. Pielke 2005, Hulme & Blackman 2009) where climate change is viewed as solvable (cf. Literature Review). I assume that the participating ISOs are caught in the much debated, criticised politicization of climate change (Pielke 2005, Hulme 2009, Hulme & Blackman 2009, Hulme 2013),

which focuses on communicating its seriousness and urgency (cf. Moser 2010). I conclude that the participating business leaders cannot be reflexive about climate change (cf. Gregory et al. 2009). Through suggesting that climate change is a practical, manageable and tangible issue, my participating SMEs are being misled and come away disappointed. Lindegaard (2013: 13) remarked that it is often hoped that such *'overly-simplistic approaches'* yield *'rapid, straightforward results'*. She concludes that the literature tends to see innovating for climate change as such an easy, linear progress and believes that framing climate change in such a way is problematic because *'simplistic, linear innovation assumptions are foundationally incompatible with the variability and uncertainty that characterizes changing climates.'* This must be especially true for my participating SMEs because SMEs are generally described in the literature as having heterogeneous and individual innovation processes (Kaufmann & Tödtling 2002). Even though some of my participating ISOs tried to work with more novel understandings of innovation, as can be seen through their use of group work and networking, instead of just transferring the knowledges, they seem to simply aim to *'doing different things'* by using these novel tools, than *'doing things differently'* (PHILA 2005 from Lindegaard 2013: 13). They do not work with the social/cultural understanding that so many scholars describe as necessary to enable profitable, meaningful, and sustainable engagement (Hulme 2009, Hulme & Blackman 2009, Moser 2010, Nerlich et al. 2010, Geoghegan & Brace 2011, Hulme 2013, cf. Chapter 6). The participating ISOs therefore follow recent suggestions made in the literature that climate change communication *'should rather provide the motivation and opportunities for citizens to connect, plan, learn, and voice their preferences on climate change'* (Nisbet 2010), but the participating business leaders cannot see how to put their willingness and understanding into action. The data show that climate change is treated as if simply the idea of doing something differently is sufficient to lead to innovation. This approach seems to be based on the assumptions that actors behave according to *'rational choice assumptions, with its focus on actors' strategic decision-making to maximise their benefits'* (Lindegaard 2013: 11). Lindegaard (2013: 12) points out that traditionally, science and research are seen as the source of innovation and are therefore seen as a *'silver bullet'*. My observed climate change communication seems to be based on these somewhat out-of-date assumptions and I can support Lindegaards suspicion that

climate change '*becomes equated with future growth and success through highly normative suppositions, and becomes a goal in itself*' (cf. Lindegaard 2013: 12). This is an approach that does not meet the needs of the participating SMEs. Howell's (2006) study on innovation support endorses this. He found that SMEs need help on what '*their innovation and business strategy should be*'. The discrepancy I observed between intended goals and actual outcomes at the events suggests that the communication of climate change is currently trapped in creating consensus, something that has long been at the forefront of climate change communication. In the Literature Review, I explained that social consensus on climate change means the '*set of socially accepted beliefs on climate change*' derived from societal norms (Hoffman 2012: 32, Cambridge 2014), which are created through the participation of society's members (Habermas 1984). Creating such a social understanding in society (Habermas 1984: 44), and therefore among SMEs, seems to be the concern of the investigated ISOs.

My overall findings thus echo the observations of Nerlich et al. who (2010: 98) comment that '*communication efforts therefore have changed from persuading people that climate change is happening to persuadingpeople to adopt practical measures to deal with it.*' My data suggest that audiences such as my participating SMEs have moved on to a need for practical measures. The participating business leaders do not need to be persuaded anymore but the participating intermediaries as yet have not met their changed demands. The participating ISO still focus their communication efforts on persuading business leaders that climate change is happening. While studies point to the particular importance of personal values (cf. Corner et al. 2014) and the role of lay knowledges (cf. Nordaard 2006), the role of capacity and the implementation of willingness and understanding is still overlooked according to my findings. I can thus confirm that the climate change message is still focused on creating consensus and is treated as separate to social and political contexts (cf. Agrawal & Narain 1991).

5.2.3. Funding Lock In

In this section, I will present data which provide indications as to why the participating ISO do not meet the needs of their already '*willing*' and '*understanding*' business leader. My data shows that the participating business leaders and the

representatives from the participating ISOs frequently mentioned the Cornwall Climate Change Action Plan (3CAP) in their interviews with me. 3CAP was an interim Action Plan on climate change for Cornwall (CSP 2009). Before 3CAP was completed, further work associated with 3CAP was halted pending the Council's own reorganization. The businesses involved in 3CAP wanted to continue the work initiated by 3CAP and therefore founded the private sector group 'Business Leaders for Low Carbon' (BL4LC). The participating business leader Des explained why he joined and what people wanted of BL4LC:

> *'I got into BL4LC when it was a group which was concerned with 3CAP from the Cornwall Economic Forum. I attended a meeting [...]. They proposed a private sector leadership group because a lot of private people wanted to push a Low Carbon Economy [...].'* (Des, Business Leader, interviewed in 2012)

My interviews further reflected that in the 3CAP processes, many of my participating business leaders were left *'stranded'*. David 1, a representative from one of my participating ISOs, described a similar situation with a different project. He explained that his team used to be tasked to enable farmers to engage with climate change but that changes in funding meant that they could no longer fulfil that role:

> *'We used to talk to SMEs a lot. At the moment that's not on our work plan. We are not funded to do it. There are only so many things we can do.'* (David 1, Intermediary, interviewed in 2012)

David's experience and the 3CAP example show that the climate change communication that I observed is largely dependent on specific funding. Funding then dictates what, how and when the participating ISOs communicate to the participating business leaders. Paul 1, a representative from one of the participating ISOs, stressed that such a reliance is unsustainable for climate change communication and business action:

> *'[...] we have, over the last years, become a little bit reliant on free services and initiatives. There is this grant culture: 'What can I get a grant for? Okay, I will do it.' That is a very amateurish approach to life.'* (Paul 1, Business Leader, interviewed in 2012)

Paul 1 also explained that the participating ISOs have to shape their climate change communication around available funding. Some participating intermediaries also described how this had caused a major setback for Cornwall's low carbon economy. David 1 was particularly outspoken about these developments:

> *'A significant proportion of my time was put to the climate change agenda. Cornwall County Council was leading a Cornwall Climate Change Action Plan (3CAP) [...]. We talked to lots and lots of sector groups about climate change on how to adapt and mitigate. [...]. At that point in time 3CAP was way ahead of the agenda! [...]. DEFRA said that nobody else was close to where we were. But we didn't win the funding.'* (David 1, Intermediary, interviewed in 2012)

The reason for this funding dependence is perhaps that all of the participating ISOs are fully or partly funded through the European Social Fund (ESF). The ESF is part of the EU structural funds aimed to *'decrease regional disparities'* amongst EU member states through *'economic cohesion and development'* (Akçomak & ter Weel 2009: 6). It aims to create physical, social, as well as mental well-being as a precondition for self-responsibility (Sangmeister 2009) by meeting the principles of sustainable development (cf. Chapter 2). Some of my participating business leaders, however, pointed out that the participating ISOs do not seem to aim for such goals, with Robert observing that:

> *'This comes from those organizations wanting to be in the prime position and be the number one. [...]. A lot of that is commercially motivated. [...] I have no doubt that a lot of what they do earns them money and somebody else doesn't earn money as a result. [...] but take those 3-4 organizations in Cornwall that you mentioned earlier. Do those guys talk to each other? So what you've got is a lot of environmental activists who have great intentions and they do really good things but they would work much better in collaboration with each other.'* (Robert, Business Leader, interviewed in 2012)

Robert's statement shows that the 'funding culture' surrounding my participating ISOs had led to rivalry among the participating ISOs. Instead of collaborating in the interest of climate change innovation, the participating ISOs were competing with each other. My Likert scale rating of the climate change-related business events shows a similar trend [Figure 14]: The majority of the observed events are located in

Field IV - they receive a high Likert scale rating for serving the research interest of the ISOs and a low Likert scale rating for communicating business practices.
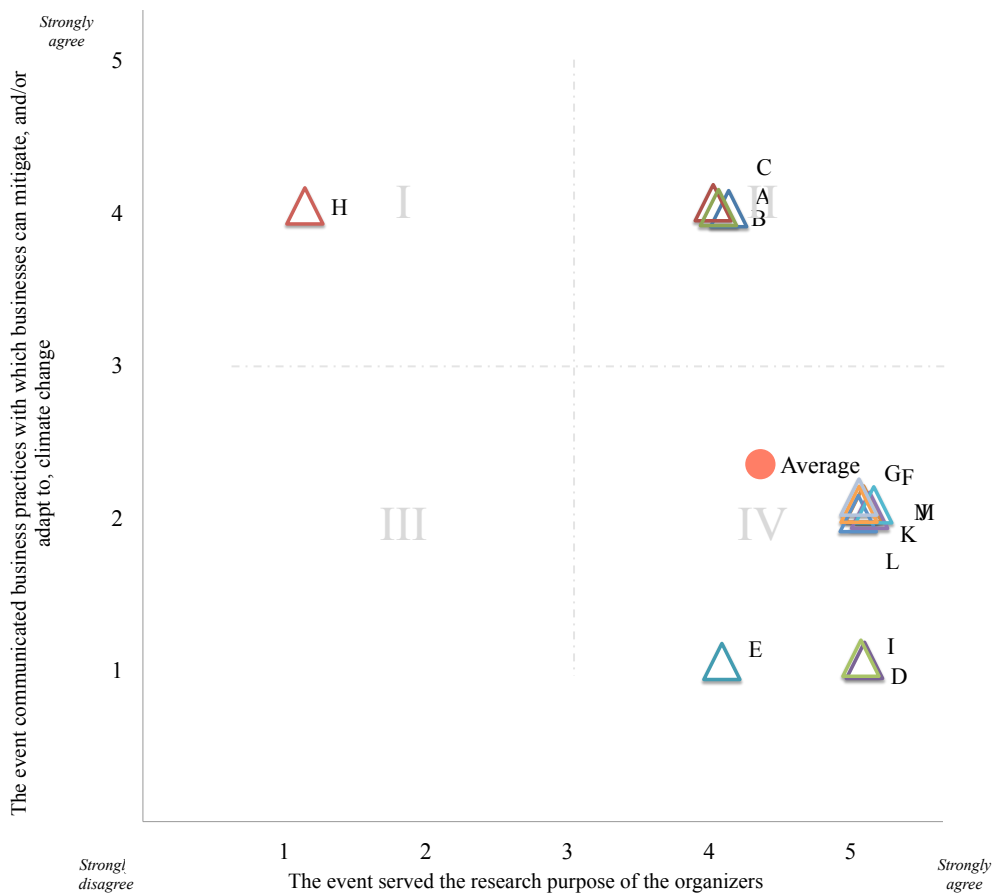
Figure 14: Evaluation of the Climate Change-Related Business Events with Regard to their Communication of Business Practice and Efforts to Fulfill Research Purposes[26]

Figure 14 shows the evaluation of the climate change-related business events with regard to their communication of business practice and efforts to meet the organizer's research purposes. The events A to M are the observed climate change-related business events [Table 4]. Each event in this graph was rated on a Likert Scale from 'Strongly Disagree' to 'Strongly Agree' based on the statements: 'The event was used to meet the organizer's research purposes'; and 'The event communicated business practices'. By summarising the Likert Scale evaluations in Figure 14 it is possible to categorize the events into four different 'fields' - I, II, III and IV. Events in Field I did not focus on internal research purposes but did communicate business practices. Field II displays the events that used the communication time for internal research exercises as well as for communicating business practices. Events in Field III did not focus on either internal research exercises or on communicating business practices. Field IV shows the events that focused on internal research exercises but communicated no business practices.

Based on these findings, I would suggest that the participating ISOs missed the opportunity to convey climate change-related business practice to the participating businesses as they were under pressure to meet funding targets and fulfil research

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goals. Many of my participating business leaders raised this concern in their interviews with me. Simon for example explained that:

'There are about 200 SMEs that are at the front and everyone talks to the same 200 SMEs. [...]. There are 8,900 SMEs that aren't engaged. [...]. If you would underline every meeting with what will the business take out of that meeting, then that's a very good measure. [...]. At the moment it's the other way around; self-indulgent. People that are already close to [climate change] talk to each other. If it would be branded as a meeting of the converted, sharing ideas, then that's fine.' (Simon, Business Leader & Intermediary, interviewed in 2012)

Simon's quote suggests that the funding setup I outlined previously forces the participating ISOs to contact the *'same'* SMEs. This approach enables ISOs to meet their funding requirements. Angelo, a business leader, stated in his interview with me:

'A lot of these projects are funded and don't have communication experts. A lot of these projects are good but hidden because they don't invest in reaching the unreached. The matrix of performance are based on 'how many SMEs have you seen?' rather than 'how much change did it bring?'. [...]. It's about number scoring. It's about who gets the funding. It is also a political game; faces that feed.' (Angelo, Business Leader, interviewed in 2012)

The findings thus suggest that, in order to get financial support, the participating ISOs bases the value of their success on how many SMEs were seen, not how much change was achieved. Some of my participating intermediaries even commented that they had learned to cope with this funding structure and admitted to doing what the participating business leaders criticized them for doing. Paul 2 explained that:

'Yes, the work of many different organizations in Cornwall is all interesting; [...] In the last three years we have had a number of initiatives in Cornwall and they have now disappeared. I embrace the new initiatives and utilize and exploit them as much as possible for the benefit of our firms.' (Paul 2, Intermediary, interviewed in 2012)

I observed first hand, through my involvement in climate change-related business events, that the participating ISOs needed to target a minimum number of businesses and invited the businesses that they had already worked with [Participant Observation 6].

'I was just invited to give a talk at one of the events. The representatives from the ISO asked me for my business contacts so they could invite them to the event. I hesitated because most of my businesses will have heard most of the content before. I wonder if I will see any new SME leaders at the event or if it will just be the same old faces I see at every event.'

Participant Observation 6: Event J in 2013 at the University of Exeter

This observation shows that I already knew many of the attending business leaders from other climate change-related business events. It thus seems that SMEs that were not on the existing contact lists of ISOs were not being targeted. Comparing my findings with the literature, I find that Kaufmann & Tödtling (2002) identified this as a problem with the effectiveness of funding support. They state that SMEs are often unaware of support and thus the *'same SMEs'* monopolize available information and resources. A similar problem amongst water users in Tanzania has also been identified by Cleaver (2012): Powerful individuals monopolised available information and resources while other individuals felt powerless to innovate. If this is true, then this must especially cause problems for my participating SMEs because it has been found that EU regional support approaches require social capital - the features of social life such as trust, norms and networks (cf. Chapter 7) (Putnam 1993), as a '*critical prerequisite*' for its '*effective implementation*' (Akçomak & ter Weel 2007). Consequently, not even those SMEs that monopolize resources can benefit: Once SMEs are in a monopoly of a few interconnected businesses and ISOs, they can then not benefit from externalities, something crucial for innovation (Kaufmann & Tödtling 2002, Grabher 2005). This is termed a 'lock in'. The socio-economic system, and in particular the individual regimes, within which businesses operate (cf. Chapter 2) can *'lock in'* actors, their practices or the entire regime and make future developments *'path dependent'* (Smith et al. 2005, Geels & Schot 2007, Markard et al. 2012). 'Path dependence' means that developments are dependent on previous developments (Cairns 2014). The previous developments have shaped a regime in a way that the occurrence of previous developments matters more than the occurrence of possible later ones (Cairns 2014, cf. Arthur 1989). A 'lock in' is the consequence of path dependence and describes how developments in a socio-economic system are resistant to change because of the existing regimes and landscape (Cairns 2014) that they are locked into. As far as businesses are concerned, this means that they can be 'locked in' to existing business practices, and consequently innovation can only occur

slowly, if at all (cf. Unruh 2000). For the business leaders participating in this research, this might therefore be one of the reasons why the communicated and potentially highly valuable climate change knowledges do not materialize.

A large number of participating business leaders in my study also blamed inconsistent climate change legislation for inadequate climate change communication. Mike, for example, pointed out that the changing nature of legislation is difficult for SMEs to understand:

> *'It's odd to ask a business to react effectively when we see a government flapping about what they believe [...]. It is impacting negatively on the perceptions of businesses as to the necessity or affordability of responding to climate change. [...]. It's not a question of if the government cannot afford it at the moment. The country can't afford not to. The message is still not coming through strongly enough from Central Government.'* (Mike, Business Leader, interviewed in 2012)

Mike's quote reiterates a feeling that the government does not meet the needs of SMEs. Many participating business leaders also stated that climate change-related policies such as the Feed-In Tariff (FIT) are inconsistent and therefore destroy trust in the government's direction with climate change policies:

> *'Suddenly the feed-in tariff gets halved [...]. It's an absolute joke. You look at it and think: 'How did that happen? It happened because its government and most of them have never worked in business [...]. And the result for businesses [...] is that as soon as the government says: 'We like you to do this!', there is a huge amount of suspicion. Frankly, I don't believe a word that they say.'* (Ewan, Business Leader, interviewed in 2012)

Most of the participating business leaders pointed towards the government to provide more consistent rules, with both penalties and incentives for businesses. Angelo, a participating business leader, explained what businesses need:

> *'The role of the public sector is to create a level playing field for the private sector. The private sector's role is to maximize what it can do within that framework, to produce profit and consider the triple bottom line. What are the incentives for doing the right thing for the environment if there is no consequence? The current framework does not provide consequences.'* (Angelo, Business Leader, interviewed in 2012)

The participating business leaders felt that the participating ISOs did not understand climate change legislation either. Amy explained in her interview with me how, when she tried to find specific information on a climate change-related policy, the representatives from the participating ISO did not understand the policy either:

> 'I rang the local council and they had no idea and directed me to the ISO. They had no idea because it was new and directed me back to the other ISO. That happens quite a lot with legislation because it comes down, stops at the local authority and then doesn't go anywhere. They have a shocking lack of knowledge about environmental legislation.' (Amy, Business Leader, interviewed in 2012)

Andrew, a participating business leader, also observed that one of the main challenges facing ISOs was to keep up with the changing nature of climate change-related legislation. He suggested that it was difficult for a local council to work with inconsistent climate change legislation enacted by the Government:

> 'The ISO does desperately try to provide [clarity on the Feed-In Tariff]. [...]. Which way are we going? That's the problem. We don't know [...]. The ISO tries to create this forum for everyone [...] but every time we go a certain way, they say we don't know what we'll be told by government. Local level Cornwall is miles ahead of everybody. They know what and how they want to do it. [...]. But it has to adapt in constantly changing circumstances.' (Andrew, Business Leader, interviewed in 2012)

For the participating business leader, Mark 2, the current government does not provide enough commitment to actually support the participating ISOs' communication on climate change. He explained that:

> 'The UK is worse than Italy. Environmentally it is appalling in this country. We try to patch it up. It's like the underground in London. We try to keep it going by patching up the problems because we don't have money to change the whole system.' (Mark 2, Business Leader, interviewed in 2012)

Overall, these quotes reflect the fact that legislation on climate change was perceived as inconsistent and negatively impacted the framework within which the participating SMEs operate. My findings also show that the participating SMEs were not able to make long-term plans and had developed a certain level of cynicism regarding UK Government's decisions in this area. The short-term polices on climate change also

influence the message that the ISOs can, and have to, communicate to SMEs. Nigel 1, a participating business leader, argued that the UK Government does not have climate change on its political agenda:

> *'The government needs to believe [climate change] itself. The government is pulling back from the climate change issue constantly […]. […]. The current government doesn't have climate change on their agenda. They want to please the left-leaning side of the coalition.'* (Nigel 1, Business Leader, interviewed in 2012)

Mike agreed with this. He argued that the government has the responsibility for prioritising climate change as it is only through governmental leadership that businesses and societies will respond to it. He continued by explaining that the UK Government did not prioritize climate change because of its controversial nature:

> *'The level of profile which the issue has in government is one of 'if we can afford it'. The- country needs to make a decision. […]. […] we need to understand that the scale on which government can affect these issues is really by government alone. […]. I think governments are not trying hard enough to deliver the message […] because it will impact negatively on big business, their re-election, and support. So there is a political nature to climate change, which impacts on small SMEs.'* (Mike, Business Leader, interviewed in 2012)

This statement reveals that the participating business leaders and also the participating ISO suffered from inconsistent and confused climate change legislation. They had difficulties making long-term plans and did not trust the legislation that existed due to their past experience with the FIT. The practitioner's workshop, which I hosted for the participating business leaders and the participating ISO representatives, showed that the participating business leaders as well as representatives from the ISOs valued the opportunity to develop ideas together. Representatives from the local government in particular stated that they found exchanges with the participating business leaders interesting [Participant Observation 7]:

'[The delegates] have forgotten about my questions and the exercises [...]. [...] They speak about their business problems, their successes with climate change; they speak about the economy and the world and how things should look in the light of climate change. They share the view that [...] [climate change] is about resilience. The resilience of society, in the decisions we make, of the ways we live. One of the university experts on climate change joins the workshop for a couple of discussion rounds. It seems as if all eyes are on him. The business leaders wait for him to tell them what to do. The representatives from the local government receive equal admiration. The business leaders seem happy to share the table with them and develop their thoughts together. They seem excited to have the opportunity to speak to them. Everyone seems to think as if today they could change these politics, social systems and businesses.

Participant Observation 7: Practitioner's Workshop 2012

The observation above shows that the participants used the workshop to exchange their experiences with each other. Amy summarized the benefit of the workshop as follows:

'The workshop was really impressive. Getting all those people into one room and everyone discussing these issues was a fantastic achievement. I think the lack of solutions and continuation of challenges that happened [...] prove that Kathi is carrying out some really necessary research.' (Amy, Business Leader, Reflection on my workshop via email)

Overall, the observations show that the ISOs have to communicate climate change in a way that is dictated by the Government and is therefore top-down. One of the main reasons for the current climate change message that my participating SMEs were receiving is that the true ideological battles, visions and ethical values that politics were designed to reflect (cf. Paasi 2004, Ball 2006, Hoppers 2009) are ignored when the focus is solely on scientific evidence (Hulme 2009). This results in climate policies that are unable to trigger the needed behavioural changes in the area of climate change. It might be the case that governments are torn between following scientific reasoning and being faced with societies' questions and insecurities regarding climate change, issues which are rooted in the much broader questions of what climate change means for society (ibid.). Such science-focused climate change-related policy debates *'undermin[e] both politics and science'* (Hulme & Blackman 2009: 222). This then means that often mitigation and adaptation measures adopted by the Government do not reflect the needs of society. Policies have to be adjusted or

even dropped once society hears about them. The participating ISOs then simply report on the political issues without responding to the real revolutionary changes climate change requires (cf. Boykoff & Roberts 2007). I suggest that as long as the Government does not include cultural reflections such as - beliefs, social practices and public discourses - then climate change policies will continue to be perceived as inconsistent and confusing. The participating ISOs were only able to follow a top-down governance of climate change (Pielke 2005, Boykoff et al. 2009, Hulme 2009, Hulme & Blackman 2009, Hulme 2013). This communication leaves limited room for SMEs to: (1) influence the content of the climate change message that will be communicated to them, (businesses cannot, for example, redefine their needs to match the areas that are available for funding) (2) feedback their perceptions about climate change engagement to ISOs and the Government; and (3) make sense of the climate change message communicated to them with the diversity of actors that give SMEs their 'meaning'. Climate change communication is based on a limited understanding of the reality of the decision-making processes of SMEs and SMEs cannot utilise the climate change knowledges for their decision-making. The climate change message communicated by ISOs fails to deliver information on business practices related to climate change and does not help business leaders to make climate change engagement more meaningful, profitable and sustainable [Figure 15].
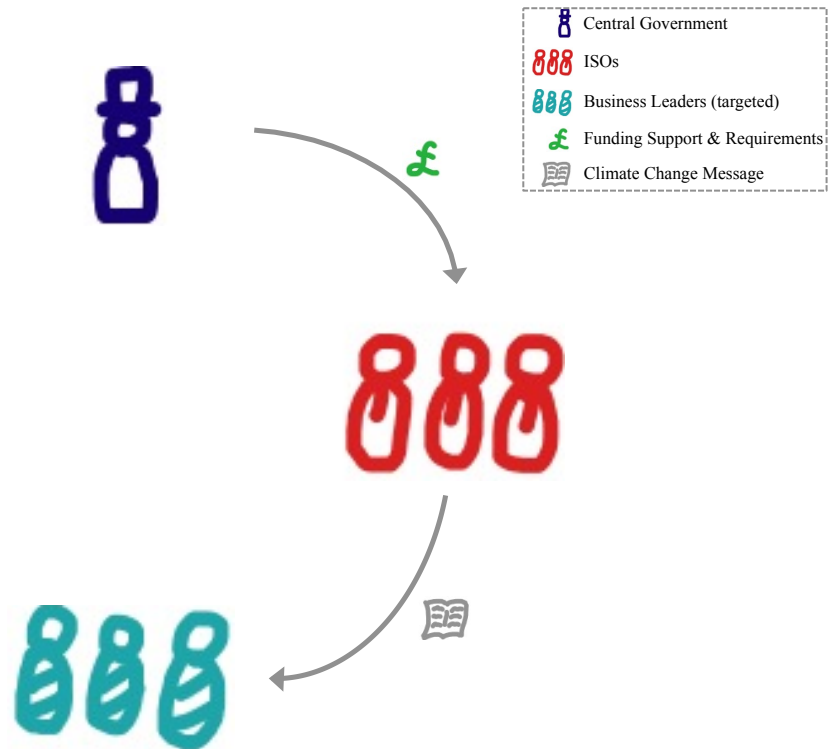
Figure 15: Linear and Top-Down Climate Change Communication[27]

Figure 15 summarizes how ISOs, as the main communicators of climate change knowledges for SMEs, have to communicate climate change in a way dictated by the Government. Their climate change communication functions in a linear and top down fashion: the Government dictates the climate change-related topics that ISOs can communicate through deciding on the topics that are available for funding support because ISOs are dependent on funding support from the Government. Consequently, ISOs communicate the topics that were allocated to them based on the funding support.

The data suggest that businesses are unable to implement new ideas on mitigation and adaptation simply through hearing about them in the way displayed in Figure 15. This top-down approach to encouraging action and innovation is fundamentally at odds with the interactive nature of innovation. To overcome this inconsistent and inadequate political framework, the noise, ISOs should bring businesses together with politicians and policy makers so that innovation is enabled in a necessarily interactive context within and across the socio-economic systems (cf. Kaufmann & Tödtling 2002). My findings show that climate change requires a new model, and new understanding of innovation that appreciates changes in the human and natural systems and how knowledges about them change. In a similar way, Hoffmann & Jennings (2012) criticize current economic measures that treat climate change from rational standpoints ignoring more dynamic influences on decision-making.

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[27] Own creation.

5.3. Conclusion

In this chapter I have shown that the participating ISOs communicated climate change in an overly simplistic way. The participating ISOs also had difficulties communicating climate change-related business practices, practices that make the intention of the participating business leader to engage with climate change possible in meaningful, profitable and sustainable ways. The participating ISOs focused on persuading businesses to engage with climate change but the participating business leader that heard this persuasive message were often already willing to engage with climate change. The participating business leaders needed practical advice on how to mitigate, and/or adapt to, the impact of climate change climate change. I can therefore conclude that current climate change communication fails to deliver a message which the participating business leaders need to hear. This chapter has also revealed that climate change communication is still caught in the politicization of climate change, which focuses on the seriousness and the urgency of climate change. ISOs view the participating business leaders as rationally-minded profit-maximisers who are at the receiving end of information instead of an integral, interactive part of innovation. I therefore suggest that climate change communication needs to move on to the implementation of the consensus that does exist amongst the participating business leader. The participating ISOs seemed to ignore the lay knowledges, culture, practices, values and beliefs that are increasingly regarded as an important means of enabling meaningful and sustainable engagement with climate change (cf. Jackson 2005, Moloney et al. 2009, Seyfang 2009, Nerlich et al. 2010, Hoffmann & Jennings 2012, Corner et al. 2014, Jones el al. 2014). I conclude that the participating ISOs knowledges about climate change on the following premises: firstly, that the SMEs understood climate change in absolute terms instead of through individual and very personal narratives; and secondly, that the SMEs were institutions motivated mainly by profit maximization. It is also important to note that lessons learned from other disciplines regarding behaviour change or climate change communication were not taken into account. The climate change message communicated by the participating ISOs maintained a distance from social and political contexts and manifested itself in rather vague suggestions for possible actions while still focusing on persuading people about the need to act. The result is that the climate change communication

provided no room for individuals to respond to, and reflect on, the consequences climate change has on their lives (cf. Hulme & Blackman 2009, Lindegaard 2013). Consequently, it seems as though there is a distance between the scientific meaning of climate change and *'the goals, ambitions and destinies'* businesses *'foresee for'* themselves (Hulme 2010: 298). This could be one of the reasons why ISOs do not communicate business practices when communicating about climate change with businesses.

My chapter also shows that the climate change intermediaries had to operate in an infrastructure that is shaped by rigid, short-term funding structures and UK's Government that is uncommitted to climate change. A strong dependence of the participating ISOs on funding and regional development policies created time-limited projects that hindered communication in ways and about what is needed. Consequently, there was a mismatch between the support offered on climate change and what was needed. The research therefore indicates that there is a requirement for a new model of climate change and new understandings of innovation, as argued by Hoffmann & Jennings (2012). Climate change communication needs to move away from current economic approaches that treat climate change from rational standpoints and ignore more dynamic influences on decision-making. Successful innovation will require intermediation that is interactive in nature instead of being a top-down, simplistic and linear process. Engagement with climate change can only be enabled if the government commits to addressing the issues raised by climate change and focuses on changing the socio-economic systems within which this can take place. To allow for the implementation of business innovations that respond to climate change, ISOs need to be enabled initiate co-operation and ongoing communication between intermediaries, SMEs, scientists and politicians. Central Government as well as regional and local level government needs to provide long-term, progressive and interlinked policies, infrastructures and messages. This would reduce the 'noise' that interferes with this communication and ultimately enable a more interlinked, continuous interaction with businesses and allow actors from different regimes and across the socio-economic systems to develop innovation. SMEs would then be more able to engage with climate change in a meaningful, profitable and sustainable way.

The research also demonstrates more generally that climate change communicators need to move away from increasingly hackneyed persuasion debates (Hulme 2009, Hulme & Blackman 2009, Moser 2010, Nerlich et al. 2010, Hulme 2013) and work with the realities and complexities of individual audiences. The literature tells me that climate change is perceived as a distant and largely inexperienced phenomenon. Consequently, intermediaries and policy makers need to accept that innovative responses to climate change will be different from innovations in more traditional areas. This is especially true because both human and non-human systems work with and on the *'changes in our understanding of the world related to the modern scientific awareness of the behavior of complex systems, including the realisation that unpredictability and surprise may be built in the fabric of reality'* (Gallopín 2004: 1). The approach to climate change must be equally dynamic, with flexible interactions and a wide range of innovation partners so that ultimately what happens is non-linear, evolutionary and interactive development. For this to happen, communicators, especially those who already support engagement with climate change, need to be far more aware of the established belief systems in groups, communities and audiences *'that emerge, not from individual preferences, but from societal norms'* (Hoffman 2012: 32) (cf. Chapter 2), and utilise them more effectively. This shift needs to be actively supported by UK's Government in terms of the political and economic infrastructure that it provides.

6. Climate Change and Values, Culture and Beliefs. Learning from Businesses

In the following chapter, I will explore why the participating SMEs have mitigated and adapted to climate change. To do so, I focus on what has motivated the participating business leaders to engage with climate change. Contemporary research exploring the responses of SMEs to climate change is very limited and does not adequately explain why and how businesses understand and interpret climate issues (cf. Hoffman 2004, 2006, Hart 2007, Williams & Schaefer 2013). The purpose of this chapter is to redress this imbalance by studying how the business leaders of the participating SMEs have understood climate change and why they have made climate change relevant to their individual decision-making. This chapter draws predominantly on the semi-structured interviews with these leaders (cf. Chapter 4). The purpose of this chapter is to answer the research question: *'Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?'* I explore the understandings that the participating business leaders have of climate change, outline their personal values and examine the relevance that they give to climate change with regard to their businesses and more generally to the economy and society. My results in this chapter demonstrate that businesses' mitigation and adaptation strategies are lay-knowledge-dependent and are derived from personal values, space and place identity. To increase the number of SMEs engaging with climate change, communication needs to target the personal values of business leaders. The message should highlight the local impacts of climate change, the potential 'feel good factors', such as the benefits of engagement with (the local) society and economy, and the possible financial benefits for the business. Current climate change communication, as revealed in Chapter 5, needs to change its focus and challenge values, cultures, and beliefs to stimulate a socio-technical landscape that promotes values-based decision-making. Committed business leaders provide a valuable way of addressing such issues.

6.1. Values and Business Decision-Making

My extant Literature Review has shown that climate change is a complex physical phenomenon with severe consequences for natural and human systems, something that is difficult to communicate and to act upon. Growing doubt has been cast in recent years on approaches that try to make people engage with climate change based on rational-choice assumptions. Instead, lay knowledge, culture, practices, values and beliefs are increasingly regarded as important as a means to enable meaningful and

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sustainable engagement with climate change (Jackson 2005, Moloney et al. 2009, Seyfang 2009, Nerlich et al. 2010, Hoffmann & Jennings 2012, Corner et al. 2014, Jones el al. 2014). I explained in Chapters 2 and 3 that decision-making in the participating SMEs is the responsibility of the individual business leader. This, combined with the limited resources providing information on all the alternatives and possible outcomes of a decision, means that the decision-making processes in SMEs are dependent on the personality traits and/or cognition of the business leader making the decision (Eisenhardt & Zbaracki 1992, Busenitz & Barney 1997, Ürü et al. 2011). Nevertheless, many studies maintain that business leaders mainly make decisions using a rational choice-based approach (Carroll 1991, Russell 2001, Douma & Schreuder 2002, Druker 2002, Göbel 2002, Goleman 2004, Loew et al. 2004, Porter & Kramer 2006, Carter 2007, Hart 2007). These studies paint a quite value-free, rational, choice-based picture of business leaders while other studies argue that there is little evidence to support the effectiveness of such rational choice-based assumptions in the decision-making process (Eisenhardt & Zbaracki 1992, Busenitz & Barney 1997, Goleman 2004, Vives 2006, Ürü et al. 2011, Murmann & Sardana 2012). These studies emphasize the importance of personal experience and values in the decision-making processes of business leaders. Busenitz & Barney (1997), for example, found that the cognition and subjectivity that emerge out of people's values and experiences enable business leaders to make effective and efficient decisions; they guide decision makers and act as a substitute for more rational considerations (Busenitz & Barney 1997). The business leaders of SMEs tend to be overly optimistic in their initial assessment of and are only slow to incorporate available information (Busenitz & Barney 1997). SME leaders thus generalize about an issue based on their reasoning, which is influenced by, for example, their personal experience and values (Busenitz & Barney 1997). The studies also explain that because business leaders tend to let their decisions be influenced by 'irrational' considerations, business leaders are often perceived as intuitive and opportunistic risk takers (Busenitz & Barney 1997, Ürü et al. 2011, Murmann & Sardana 2012). Visser & Courtice (2011) therefore believe that truly responsible, and perhaps better, business leaders are people who initiate action aimed at creating a better world on the basis of their personal values, not just on the basis of rational choice-based considerations.

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6.1. Sustainable Decision Making

Over recent years, the well-being of the natural environment has been increasingly understood to be dependent on the ways in which individuals understand the impact of their present actions with regard to the future. Sustainable development, defined as *'meeting the needs of the present without compromising the ability of future generations to meet their needs'* (Brundtland 1987: 1, cf. Chapter 2) is the most critical concept for addressing this interconnection. The definition shows that in order for development to be sustainable, it needs to address intragenerational needs and intergenerational limits. Intragenerational means in the context of sustainability that the basic needs of a generation need to be met. Consequently, based on the idea of intergenerational limits, meeting the needs of a generation should happen within the limits of human and non-human assets so that the next generation can meet their needs as well. This view of development reflects the belief that social and environmental actor-networks are closely interconnected. Of course, sustainability is ambiguous *'like beauty, is in the eye of the beholder'* (Carter 2007: 212). Nevertheless, the concept allows an understanding of the time dimension that is connected to human (and non-human) action and sheds light on one of the core problems that individuals perceive when faced with climate change: their struggle to understand their contribution to climate change and their reluctance to take mitigating and adaptive action because climate change impacts and projections are too distant for people to perceive them as an issue of individual importance (Lorenzoni & Pidgeon 2006, Houghton 2009, Geoghegan & Brace 2011); Most people can only consider their actions and the potential consequences of these within their own lifetimes (Geoghegan & Brace 2011) (cf. Chapter 2).

Sustainable development points to the importance of humans challenging their own inability to think (and act) beyond their own timeframes and to think (and act) beyond the present and their own generation. This principle of futurity explains that action taken by the present generation should not impair the development opportunities of the coming generations (Curwell et al. 2005). Human and non-human assets should therefore not be allowed to diminish and/or decline (Curwell et al. 2005). Futurity combines the aim of enabling humans to live to their fullest potential in the future with the well-being of the natural environment (Carter 2007) and in this sense, the

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human existence of every individual becomes somewhat eternal. It also indicates that just because one lacks specific knowledge about environmental impacts, does not mean one should postpone working to prevent environmental degradation (Carter 2007). In respect of this discussion, I would like to show in the following section how the majority of the participating SMEs have not yet materially/physically been impacted by climate change; however, their individual business leaders have been able to construct a (current) link between the possible future impacts of climate change and their current economic activities.

6.2. Findings

The findings are divided into three sub-sections [Table 12]. Firstly, I will demonstrate that climate change is a future issue, by which the majority of *'engaged SMEs'* have not yet materially been impacted. Nevertheless, the participating business leaders were able to construct a link between possible future impacts of climate change and their current business activities. Secondly, I will show that the personal values of participating business leaders trigger their engagement with climate change on behalf of their businesses. Thirdly, I will show that climate change is an ethical debate over values and culture, which does not fit easily with the current socio-economic systems. I conclude that to increase the number of SMEs engaging with climate change, to maximize the potential socio-economic value of climate change for society and to establish a low carbon economy, climate change communication needs to target the personal values of business leaders. Climate change communication therefore needs to go beyond thinking about potential financial benefits and scientific evidence; rather, it should challenge values, cultures, and beliefs to initiate economic, political, and social frameworks that promote values-based engagement with climate change.

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Research Findings	Selection of Personal Observations by the Researchers	Business meetings during which similar observations were made	Selection of Interview Quotes from Business Leaders	Business Leaders who made similar statements	Selection of Interview Quotes by Communicators	Communicators who made similar statements	Selection of Survey Evidence from Business Leaders
Climate Change as an Issue that does not yet impact the majority of business leaders	*The communicator asks the business leaders what stops them from taking action. The business leaders say it is the lack of knowledge, the unknown, not knowing what works, the lack necessary cash and the knowledge about potential benefit. [...] Someone also adds that the local market does not supply climate change-related products and customers don't demand climate change-related products. That they cannot demand related products in the UK but instead need to go to Germany or Holland.'* *'I feel out of place between the business leaders of two big corporations, who both have experienced either an extreme flood or drought event. [...]. Some of the businesses seem lost and state that they have done nothing, experienced nothing, but that they want to be prepared. They want to know what they can do.'*	Bl.4LC meeting in 2011 at the Cornwall Marine Network, Bl.4LC meeting in 2012 at Tregony Industrial Park, Bl.4LC meeting in 2013 at the Innovation Center	*'Climate change may affect us where the wheat crops are growing because we need it for our process. If we can't get it, that will affect us. Our head brewer definitely looks at these things. Prices get affected. They have to buy years ahead.'* (Robin, Business Leader, interviewed in 2012) *'There is a massive gap between understanding the world for what it is and what you would like it to be. We don't have a crystal ball. The things that we need really like to know, nobody can ever tell us. When will we have a good summer or from where can we import things in the future?' So it's more about enforcing the things that we know about – reduced availability of resources – and working around that. That should make you more resilient to impacts of climate change.'* (Chris l, Business Leader, 2012)	BL2, BL3, BL4, BL5, BL7, BL9, BL10, BL11, BL12, BL13, BL15, BL17, BL18, BL19, BL20, BL22, BL23, BL24, BL25, BL26, BL27, BL28, BL29, BL30, BL31	*The key things are that 30 percent of businesses related people did not expect to be affected by climate change in the future. [...]. The biggest barrier to adapting to climate change was the perception that there is not immediate flex, which is what 50 percent of the businesses said.'* (Kim, Intermediary, interviewed in 2012) *'You need to tell farmers that they need to be more profitable to be able to exist in the future which is about costs and equally crops. 10 years ago nobody cared about electricity because it was a cheap resource.'* (David, Intermediary, interviewed in 2012)	C2, C3, C4, C5, C8, C9, C11, C12, C14, C15, C18, C19	Six business leaders indicate in my online survey that their business has been impacted by physical impacts that they attribute to climate change.
The participating business leaders are motivated to engage with climate change because of their personal values	*The communicators asks what the drivers for this staff is and says 'it's the money isn't it.' Phil says that he is just very interesting and motivated in these things but is seems no one want to hear this.'* *Bright red and green jumpers shine in between the many smiling faces. I feel comfortable and excited amongst the chatting of all these delegates. They seem to know each other [...]. This is a big social club.'*	all of the observed Bl.4LC & CoaST network meetings	*'I guess it was personal interest and personal conviction which kind of span out to have business benefits as well. [...]. Initially it was my personal interest but the more you get into it the more you see the business benefit.'* (Mark l, Business Leader, interviewed in 2012) *'When I grew up, there were hardly any trees around here. They really would not grow. It was so windy, and so much salt in the air. The climate has certainly changed. The predominant winds are no longer so much from the South West. They are much more variable and it is amazing, for me to see what is growing around here where there wasn't very much at all. I think that is quite noticeable. We all know that we are getting much more weather extremes as well. Some of the rainstorms. You get so much rain.'* (Ian, Business Leader, interviewed in 2012)	BL1, BL2, BL3, BL4, BL5, BL6, BL7, BL8, BL10, BL11, BL12, BL14, BL15, BL16, BL17, BL18, BL20, BL21, BL22, BL24, BL25, BL26, BL27, BL28, BL30, BL31	*There are some businesses who are interested generally in their role positive deviance and their impact to change. They want to understand their activity beyond just on their own business and this is the level of the [...]. collective responsibility – this is not just about my business. [...]. And they would see it as a personal responsibility to inform themselves and remain informed and make sure their understanding is at a reasonable high pitch.'* (Manda, Intermediary, interviewed in 2012) *'Farmers deal with it automatically but some farmers are interested in climate change in and off itself. We have people like Chris Jones. He is into climate change for climate change sake. He is right at the forefront if the thinking and he is designing his business around that. There is another one that is designing is farming system around climate change.'* (David, Intermediary, interviewed in 2012)	C2, C4, C5, C6, C13, C15, C17, C18, C19	99% of the participating business leaders state in the online survey that their engagement with climate change was triggered by personal values and interests.
SME struggle to engage with climate change because climate change contrasts too much with the current socio-economic system(s)	*We speak about the challenge of combating climate change within the current economic system. Manda wants to find new economic indicators. I want to see how we can change the entire economy.'* *'They speak about their business problems, their successes with climate change; they speak about the economy and the world and how things should look like in light of climate change. They share that [...] [climate change] is resilience, general system resilience. Resilience of society, of decisions we make, of the ways we live.'*	all of the observed Bl.4LC & CoaST network meetings	*'The main idea with our company is our passive activism. The way we engage with climate change allows our clients to open their eyes a bit more to the idea that they could make a difference. [...]. We talk about climate change but actually it's about social change as well. Understanding what you are part of.'* (Matt, Business Leader, interviewed in 2012) *'I think, it's culture, [...]. We want more and buy more and actually the way our society functions is fuelled by credit. ...We've got this culture to work really hard for reward and then we spend all of it; play hard. That is not sustainable. It's not the key to happiness. The key to happiness is probably to be more resourceful. [...]. What needs to happen is for communities and businesses driving it forward. [...]. We are talking about the same. [...]. Climate change is exactly the same.'* (Robert, Business Leader, interviewed in 2012)	BL1, BL2, BL3, BL4, BL5, BL6, BL7, BL8, BL10, BL11, BL14, BL15, BL16, BL17, BL18, BL20, BL21, BL22, BL24, BL25, BL26, BL27, BL28, BL30, BL31	*There's a lack of steer and incentives. To incentive or penalize businesses might be a way. But that is quite challenging for SME's. There's so many of them. They already have so many demands that you want to integrate adaptation into their businesses.'* (Alex, Intermediary, interviewed in 2012) *'Businesses have little faith in government. That is the problem. Government is never given industry financial support or financial incentive to be green. They never said that this legislation is produced to look after your shareholders and help the environment. They never gave confidence. Same with Europe...all they do is bringing red tape because they don't explain it. The communication between Europe, Government and us and industry has broken down that actually that we try to look after you by producing this legislation.'* (Gitty, Intermediary, interviewed in 2012)	C1, C2, C3, C4, C5, C6, C8, C9, C13, C15, C16, C17, C18, C19	60% of the business leaders that participated in the online survey agree that the current economic models do not fit the notion to engage with climate change.

Table 12: Data Overview for 'Climate Change & Values, Culture & Beliefs. Learning from Businesses'

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6.2.1. Climate Change as a Future Issue

My research findings show that only a small number of the participating business leaders had experienced physical climate change impacts on their businesses. Only six of the 31 participating business leaders said, in their semi-structured interviews, that they had experienced physical climate change impacts. Amy, one of these six business leaders, explains that the hotel for which she works, which is located at the edge of a beach on the north coast of Cornwall, experienced severe flooding in one of the main buildings during a storm. She gave an overview of what happened and of the uncertain future with regard to insurances:

> *'[…] because of where we are on this beach, we are completely at the mercy of the weather. It impacts us so much that we can't escape climate change. […] Our […] restaurant on the beach got washed away a few years ago in a massive storm. We had just finished refurbishing it and then had a really big storm with a really high tide and it took it out completely. It was devastating. We lost that and a big chunk of our business and then had to rebuild it. Obviously, the insurance for that is now very different to what it was. If that would happen again we couldn't afford to rebuild it.'* (Amy, Business Leader, interviewed in 2012)

Amy clearly used climate change to make sense of what happened, based on her interpretations of what the effects of climate change might be, and not taking into account that the problem could have been caused by climate variability. Many of my participating business leaders attributed extreme storms to climate change. This seems to have enabled the participating business leaders to develop an understanding of what climate change could mean for their future business activities. The literature explains that such changing behaviour towards risk makes a business resilient (Gallopín 2006). Amy's quote also illustrates that a business can experience financial costs such as expenses for rebuilding flooded properties or increased insurance premiums. The statements of participating business leaders who had experienced physical climate change impacts also show that such physical climate change impacts provide a specific way of knowing the '*messy, non-linear and diffuse'* (Boykoff et al. 2009: 1) *field of* climate change. In my online survey, three business leaders indicated that they had experienced the physical impact of climate change. Three business leaders indicated later on in the survey that they had experienced erosion, which had impacted on the operation of their businesses, and six participating business leaders

stated that flooding had impacted on their businesses. Eighteen of the participating businesses leaders indicated later in the survey that they had experienced extreme weather events. These opposing findings indicate that the participating businesses leaders seem to struggle over whether or not they had been physically impacted on by climate change. It seems as if the timing and phrasing of the question was able to elicit different responses to questions that were intended to trigger the same ones. Having said that, it was clear that the majority of the participating business leaders indicated that they had not yet materially experienced climate change. Regarding their perceptions of the relevance to them of climate change in the future, however, they did state that they could see this. An example of this is Robert's observation:

> '*Climate change may affect us where the wheat crops are growing because we need it for our process. If we can't get it, that will affect us. Our head brewer definitely looks at these things. Prices get affected. They have to buy years ahead.*' (Robin, Business Leader, interviewed in 2012)

Robin's statement supports what Giddens (1999) and Beck (2006) describe as a typical notion of risk society (cf. Chapter 3): the participating business leaders were concerned with risks that are distant in time and space. Most participating business leaders also commented on the links they can see between their business and the natural environment. Claire, a young participating business leader, for example, understood climate change through viewing the dependence of her business on the (beautiful) natural environment.

> '*Our business is very aware of climate change and the impact it can have on our local environment and on the things that so many of our customers come to visit us; the beaches, the green grass for walking, enjoying the area around. There was an article on BBC today that people love being by the seaside and that it improves well-being. That's one of the reasons people come to us; because we can give this experience. If we don't take care of our environments then people won't come back for it. It keeps us a business and we are very linked with our environments, our surroundings and the impacts of climate change whether it's drought or rise in sea level.*' (Claire, Business Leader, interviewed in 2012)

My findings further show that even participating business leaders that had not actually experienced climate change could still make the link between the possible impacts of climate change and business continuity. Whether or not a storm event or a change in

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crop growth is actually connected to climate change is irrelevant to them.. The participants referred to how they had adapted their business models to the possible future implications of climate change. Chris 1, who runs a large farm, explains how he envisions the future:

> *'When we made this place, we designed it to be used in a number of ways. We might have refugees and not tourists in the future.'* (Chris 1, Business Leader, interviewed in 2012)

Chris also explains how he deals with these '*distant futures*' (Geoghegan & Brace 2011: 292):

> *'There is a massive gap between understanding the world for what it is and what you would like it to be. We don't have a crystal ball. The things that we would really like to know, nobody can ever tell us. When will we have a good summer, or from where can we import things in the future? So it's more about enforcing the things that we know about – reduced availability of resources - and working around that. That should make you more resilient to impacts of climate change.'* (Chris 1, Business Leader, 2012)

The above statements show that the participating business leaders were addressing climate change issues and making them their 'own', using them to inform their decision-making processes, business strategies and worldviews in order to be able to cope with the complex, ever-changing and uncertain nature of climate change. The participating business leaders of this study also approached climate change in a very personal manner. They imagined very subjective futures and accepted that climate change science is incomplete. Simon explicitly stated that even though his business had not been materially impacted by climate change he still engaged with climate change.

> *'Climate change hasn't impacted us. [...]. Scientists can measure it but as normal human beings we would have to experience climate change. It requires a certain leap of faith and insight to actually be able to say that this is how the world is going to be in 50 years' time. But it's difficult for us. The simple thing for us to understand is that if you keep using stuff, it will run out.'* (Simon, Business Leader & Intermediary, interviewed in 2012)

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Simon went on to express what some other business leaders, including Ian and Phil, had expressed in the interviews: those participating leaders who were not directly dependent on the natural environment felt that customers were not yet demanding that a business mitigate and/or adapt to the impacts of climate change.

> *'Customers do not demand the green agenda in tourism. It doesn't really make a difference to customers. [...]. We think we should and put resources into it. There is no demand now, but we think it is an investment in the future. After customers have been to one of our houses they might be more aware next time. [...]. Then there is a commercial driver in the future.'* (Simon, Business Leader & Intermediary, interviewed in 2012)

The above investigations show that even though climate change had not *'manifested itself physically yet'* (Leyson & Geoghegan 2012: 57) to most of my participating business leaders, it was still afforded considerable current relevance. The participating business leaders were therefore creating their own understanding of what climate change is and could be, in a way in which the exact definition of this largely physical phenomenon did not play much of a role. Somewhat contradictory to the notion of a risk society though is that the participating business leaders here seemed to be behaving in a way that is not found in a risk society: they were using intuition, subjective values and reasoning to understand the relevance of climate change in their decision-making processes. They were not waiting to evaluate all the alternatives for possible action before making a decision on their climate change engagement. In this way, perhaps the business leaders were demonstrating a new and better way of making decisions in the light of modern risks - by considering the nature and tradition - and thereby, they meet Giddens' (1999) and Beck's (2006) need for a reflexive society.

The actual engagement of the participating business leaders with climate change creates a 'form of life' for climate change. This is a description that stems from Wittgenstein (1958), who explains that words find their meanings through use within a societal setting and are not in need of a precise definition. These businesses were reassessing their business operations regardless of the fact specific impacts were unknown. Having such complex responses in times of the unknown is an ability business leaders tend to lack, Hoffman (2004) suggests. My findings here show that

for these participating SMEs, mitigation and adaptation strategies on *'climate change shape and are shaped by'* lay knowledge, which go *'beyond science as a community of practice and scientists as the producers and arbiters of a particular kind of knowledge'* (Geoghegan & Brace 2011: 293). My findings also confirm Geoghegan & Brace's (2011: 297) assumption that climate change is *'a relational phenomenon that needs to be understood on a local level, attending to its distinctive spatialities and temporalities'* (Geoghegan & Brace 2011: 297). My findings suggest that 'knowing' climate change goes beyond knowing scientific facts and is instead *'constructed through memory, observation and conversation'* (ibid. 2012: 64).

The data further suggest that businesses that did not fear the direct material impact of climate change seemed to have more positive associations with climate change and could see opportunities in it. The participating business leaders viewed climate change as a futurity that might impact the business indirectly through growing energy prices and changing supply and demand conditions. Several studies showed that personal cognition of specific concerns substantially influences decisions made in SMEs and allows business leaders in these SMEs to make a decision in the first place (Eisenhardt & Zbaracki 1992, Busenitz & Barney 1997, Ürü et al. 2011, Murmann & Sardana 2012). Busenitz & Barney (1997) explain that bias and heuristics enable business leaders to make entrepreneurial decisions because if a business leader tried to behave more rationally by developing objectives, gathering relevant information, evaluating possible outcomes, developing alternative decisions and finally making the most optimal decision, an opportunity would have passed before a business leader of a small business would have been able to complete these steps. My results therefore contradict Norgaard's (2006) findings, which suggest that people avoid thinking about climate change as it makes them feel helpless, guilty and threatened. Wilson (1997) links information behaviour to social cognitive theory, where self-efficacy determines behaviour. He refers to Bandura (1977: 193), who states that *'the strength of people's convictions in their own effectiveness is likely to affect whether they will even try to cope with given situations.'* He therefore hypothesizes *'that one of the motives for information-seeking is to gain information to improve one's self-efficacy in coping with problems of whatever kind'*. The businesses examined in the study might feel that they have enough self-efficacy to engage with climate change. The participating

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business leaders thus does not feel that their engagement with climate change might negatively relate to their *'standard of living'* (Hoffman 2012: 33). My findings emphasise that having the capability to mitigate and/or adapt to climate change, in this case through the engagement of the businesses, creates a positive, and opportunity-seeking, outlook on climate change. I can thus confirm Rogan et al.'s (2005) findings that people feel satisfied and encouraged and experience positive self-esteem about themselves and climate change when involved in environmental conservation or restoration experiences.

As part of the notion of understanding decision-making in SMEs, the personal values of business leaders have been identified as playing an important role. Especially with regards to the decision-making of SMEs that affects the natural environment (cf. Schaefer et al. 2011, Williams & Schaefer 2013) and society more generally, scholars increasingly argue that personal values play a key role when business leaders make decisions (cf. Nonis & Swift 2001, Aragón-Correa et al. 2004, Hemingway & Maclagan 2004, Kerr 2006, Visser & Crane 2010). Values are considered a *'guiding principle in the life of a person'* or present an *'abstract set of moral principles'* to only show some of the *'multiple conceptions of human values that exist across these multiple literatures'* (Corner et al. 2014: 413). Leyshon (2008: 5), referring to Rorty (1989) and Hekman (1999: 19), explains that values are *'formulate[d] belief systems'* individuals *'believe to be stable, solid and truthful to themselves, which can be affirmed by everyday actions'*. Consequently, what people believe to match their self is not necessarily founded on contingent scientific interpretations of facts but is rather based on personal experiences and lay knowledges (cf. Chapter 2). This kind of cultural cognition strengthens the definitions of one's self and therefore people put more time and effort into supporting existing beliefs than challenging existing beliefs, thus becoming resistant to change (Hoffman 2012). Simová & Odziemczyk (2007), for example, identified that in SMEs, the personal values of SME leaders that most impact their decisions are concerned with health, family, reliability, integrity, trust, responsibility and monetary success. Hughes et al. (1993) discovered that business leaders with strong value systems behave more ethically than people with weak value systems. The influences of personal values on the decision-making processes in SMEs are especially influential with regard to choices that are related to social and

environmental concerns. Kerr (2006) found that the key factor motivating an SME to engage with social, environmental and economic issues is having leaders with strong ethics regarding environmental and social issues. Kakabadse et al (2014) posits that values relevant to social and environmental concerns are derived from the business leader's values when making business decisions. These values reflect a constant desire of the business leader to deliver an excellent business, and the direct, often personal, relationships that the business leader has with the local community. Within these various studies, perhaps the most important for this research is that of Williams & Schaefer (2013). In their research on environmental issues, climate change and SMEs in East England, they showed most recently that the reasons for business leaders being environmentally pro-active were personal values and beliefs. The business leaders want their personal values to match their professional decisions. Personal values and culture can consequently hinder or promote mitigation and adaptation behaviour in respect of climate change if the belief in, and/or the engagement with climate change, discounted or promoted someone's value system.

6.2.2. Engagement due to Personal Values

My research data further reveal that 97% of the participating business leaders' initial trigger for making climate change relevant to their business was due to their personal values. Mark 1 explained why he started engaging with climate change:

> *'I guess it was personal interest and personal conviction which kind of span out to have business benefits as well. [...]. Initially it was my personal interest but the more you get into it the more you see the business benefit.'* (Mark 1, Business Leader, interviewed in 2012)

Mark's statement reflects that his personal interest in climate change triggered his initial engagement and he later realised the business benefits. Most other participating business leaders described very similar links between their initial engagement with climate change and their personal values. My findings therefore show that it was personal values that determined the decisions of my participating business leaders to engage with climate change. These findings contradict the existing business literature and current climate change communication, which assumes that self-interested, profit-maximizing individuals lead businesses (cf. Zahra & Covin 1993, Porter 2004, Hoffmann & Jennings 2012, Corner et al. 2014, Chapter 5), and, on the other hand,

confirm the small number of existing studies which find that personal values are important in the decision-making processes of business leaders (Loe et al. 2000, Vives 2006, Barnett & Karson 2014) particularly with regards to the decision-making of SMEs concerning the natural environment (cf. Schaefer et al. 2011, Williams & Schaefer 2013). These findings thus challenge current business studies and economics curriculums for neglecting to convey that values impact businesses and economics (cf. Cohen & Watson 2014).

The business leaders in my study also believed that decision-making on climate change is strongly linked to individual business leaders. Tony explained the interrelation between personal values and decision-making in SMEs:

> *'There are more and more personal convictions (driving business decisions). Smaller businesses have that flexibility. A director of a small business can take that business with him, whereas a bigger business finds that difficult.'* (Tony, Representative from an ISO, interviewed in 2012)

Tony's statement shows that the participating business leaders had the opportunity to act according to personal values when confronted with climate change because of the small size of their businesses. Importantly, my research also shows that their personal convictions were only the initial trigger to engagement with climate change and that financial benefits were relevant as well. The question is whether personal values are crucial to achieve (potential) financial successes. Amy, one of the participating business leaders, commented on this. She expressed the belief that engaging with climate change requires a business leader to be motivated by personal values in order to benefit from the opportunities climate change could provide to a business:

> *'I think it's one of those issues that, to make it part of your core business, you have to be very passionate about it. Unless people find that passion they won't see the relevance. It is really down to personal passion for such an issue. Making that bolt move to have it part of your business...can be quite difficult. People don't see the relevance and care for it. [...]. I think it's personal interest and financial sense. [...]. We would not have built our hotel in the way it is if sustainability had not been a key passion for the directors and a vision to future proof ourselves.'* (Amy, Business Leader, interviewed in 2012)

The participating business leader Mark expanded on Amy's comment. He stated that, often, engagement with climate change does not immediately create benefits for the participating businesses, but that through gradual engagement, motivated by personal interests, business benefits can be created:

> *'In terms of how that works with our business is that, in some respects, it doesn't. It's something that I was just really interested in – looking at how we can become more sustainable as a company. But from that, it actually created business opportunities for us. [...] It was something that we wanted to do because we felt like we should be doing it. It's given us business benefits at the same time. So to begin with it was my own conviction, [...] I guess it was personal interest and personal conviction which kind of span out to have business benefits as well.'* (Mark, Business Leader, interviewed in 2012)

My research findings show here that personal convictions allowed the participating business leaders to take opportunities arising out of climate change issues and to innovate beyond what they would normally do. Only later did this personal-values based behaviour on climate change yield financial benefits. My findings thus contradict some of the literature on business decision-making which argues that leaders often fail to cope with change because they feel powerless (Kotter 2001). My findings also contradict Norgaard's (2006) research findings that people avoid thinking about climate change as it makes them feel helpless, guilty and threatens their individual and collective sense of identity. In my study, there was no evidence of such a value-action-gap between actual engagement and the values of participating business leaders (cf. Chapter 2). One of the few studies on the motivations of SME leaders to engage with climate change provides similar findings to the ones which I have presented here: Williams & Schaefer (2013) also show that the decision to engage with climate change through business practices is due to personal values. I can further support my findings by presenting evidence that the participating business leaders of my study predominately developed their personal interest in climate change-related issues through personal experiences. Ian, a participating business leader, explains:

> *'When I grew up, there were hardly any trees around here. They really would not grow. It was so windy, and so much salt in the air. The climate has certainly changed. The predominant winds are no longer so much from the South West. They are much more variable and it is amazing for me to see what*

is growing around here where there wasn't very much at all. I think that is quite noticeable. We all know that we are getting much more weather extremes as well… some of the rainstorms. You get so much rain.' (Ian, Business Leader, interviewed in 2012)

Ian's statement shows how the participating business leaders who lead the family-run SMEs of my study, including Chris 1, Claire, Ian and Katie, whose businesses have been passed down over generations, have been able to *'experience'* climate change, which normally is perceived to be *'difficult to grasp'* (Geoghegan & Brace 2011: 291). In my study, this particular group of leaders had the opportunity to access memories and experiences that had been collected over several generations. I would suggest that experiences and knowledges passed down through generations enabled these business leaders to overcome the immediate timescales of human behaviour that prevent individuals from grasping climate change as an issue of individual importance (cf. Hulme et al. 2009, Geoghegan & Brace 2011). Ian, a participating business leader exemplified this suggestion:

'I guess I've been interested in energy, insulation, and climate change since I was a student. My dad started this business, now I run it and even my son works here.' (Ian, Business Leader, interviewed in 2012)

Ian was clearly expressing here what Leyson & Geoghegan (2012: 58) term, a *'familiarity with place'* that results from *'a daily encounter with'* climate change. The connection that Ian has with a place - *'the sum of resources and human relationships in a given location'* (Fullilove 1996: 1518) - have been described in various literatures as the concept of 'belonging'. Belonging is the *'sense of personal involvement in a social system so that persons feel themselves to be an indispensible and integral part of the system'* (Anant 1966: 21). The literature suggests that belonging is crucial to people's mental well-being as it allows individuals to connect their self to their surroundings and allow them to feel that they are an indispensible part of a socio-economic system (Hagerty et al. 1992). Reflecting on these existing ideas on belonging makes me wonder whether Ian's quote shows that in relation to climate change, a sense of belonging to a place allows the participating business leaders to imagine climate change through thinking about memories that they associate to a changing climate. This is perhaps because climate change puts the sense of belonging

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at risk with the threat of familiar places being disturbed. A disruption would then mean a disruption of this (mental) well-being (Hess et al. 2008) (cf. Devine-Wright & Howes 2010). Finding evidence in my study that the participating business leaders constructed climate change through remembering and imagining the past in relation to a particular place is similar to Rogan et al.'s (2005) findings that people use places as reference points to the past to understand the environment. I therefore conclude that certain participating business leaders have had the (fortunate) ability to conceptualize climate change as a potential threat to their business activities, self and space as a result of being able to overcome the disproportions of '*scale between climate change and individual actions*' (Patenaude 2011: 267) and the much discussed feeling of helplessness. I further conclude that for certain participating business leaders, imagining the future posed less of a problem as they were able to overcome the '*inability to conceptualize time beyond the periodic frame of our own lifetimes, or even a generation, and to imagine distant futures in which the climate might be altered*' (Geoghegan & Brace 2011: 292) through imagining an infinite lifetime for the business. Similar statements by other leaders in my study, including Katie, confirmed my conclusion:

> '*I fell into it because I was a corporate finance lawyer and one client was one of these climate change businesses. Suddenly it clicked. I was always fairly aware. [...]. But then I had small children and suddenly I was doing something for which I could use my discipline and expertise and actually believe in it. It made more sense. [...]. I have a more generic interest in sustainability that comes from me living down here for 30 years, amongst a community where I bring up the next generation of two daughters who might want to do the same job.*' (Katie, Business Leader, interviewed in 2012)

Katie's statement here, as well as the data that I presented previously in this section, show that in attempting to enable a meaningful, profitable and sustainable management of climate change, the business leaders of my study did not display some of the characteristics of modern decision-making. They seemed, rather, to consider criteria for decision-making that societies of pre-modern times considered: values, collectivism, lay knowledges and experiences (cf. Chapter 3). They showed how they conceptualize time beyond their own lifespan and generation and revealed how, for them, climate change engagement required the participating business leaders to follow the concepts of futurity and intergenerationality that I introduced earlier in this

chapter. Other participating business leaders also saw a link between business engagement, education and intergenerationality. Andrew 1, for example, described how his peer business leaders were motivated both by personal values and education:

> *'[...] it's the responsibility of the owner of the business. It comes down to if the owner believes climate change is an important part. I think in Cornwall there are many of those because they see it. Somebody like Phil, for example, has a strong belief in being involved in lots of different things. He enters it at the strategic level and then tells his staff. So rather than taking his staff off the core business he'll do it and then he relies on his core business to be run by staff. If Phil is concerned about climate change, then how does he influence change? [...] Personal choice and personal decision play a major part! If you change the structure of a business then education is probably as important. How important is climate change? That's based on education.' (Andrew 1, Business Leader, interviewed in 2012)*

Andrew 1 also explained in the above statement that engagement with climate change is linked to individual business leaders and their values. For Mike, however, it was the changes in the environment that he perceived and the experiencing of those changes that led to his engagement with climate change:

> *'I see the changes and I respond to them on a small level but also through my own experience. Trying plants in certain areas. In a way I'm doing my own primary research. I'm an environmental business.'* (Mike, Business Leader, interviewed in 2012)

Mike's statement supports my previous assumption that the participating business leaders seem to have accumulated lay knowledges on climate change over time. My findings here support Hulme et al.'s (2009: 197) belief that climate change finds its form through experiences, social learning and cultural interpretation, and emphasises that its actual meaning is '*informed by emotion, memory and a sense of place that comes in part from familial ties'* (Leyson & Geoghegan 2012). These lay knowledges provide a very personal and individual understanding of climate change, not just in terms of time but also local space. This enabled my participating business leaders to imagine the social, unexperiencable construct of climate change over '*past, present and future'* (Leyson & Geoghegan 2012: 59). A growing number of literatures support my findings, recognizing that people's own experiences of climate change are of importance (cf. Chapter 2) (cf. Curtis & Schneider 2001, Boykoff et al. 2009, Nerlich et al. 2010, Hulme 2013,). Geoghegan & Brace (2011: 285), for example,

emphasize that lay knowledges allow '*different ways of knowing*' climate change. Leyshon (*forthcoming*) also points out that the social sciences predominantly do not reflect on what those ways of knowing might mean for society. My research delivers evidence that the personal values on which people make decisions can deliver these insights. My data show that the personal values and experiences of participating business leaders are important in understanding climate change while also constructing determinants on whether or not to let climate change play a role in decision-making processes. Interestingly, several studies have previously shown that people struggle to follow up personal values on climate change (cf. Kollmuss & Agyeman 2002, Whitmarsh et al. 2011). Tilley (1999) for example demonstrates that owner-managers of small firms struggle to follow up environmental attitudes with environmental practices. She suggests that it is difficult for businesses to associate business practice with environmental damage, but that, more importantly, a conflicting message on environmental solutions causes this gap. In my research study, however, participants' values led to action. My continuous interaction with the business leaders over a three-year period showed that the majority of them demonstrated a true commitment to these values, which they acted on. These leaders regularly took part in climate change-related business meetings, attended climate change-related events organised by the participating ISOs and actively developed mitigation and adaptation actions within their businesses. Of the 31 participating business leaders, 86% mitigated climate change through, for example, using renewable energies, waste management and/or giving employees incentives to reduce their work related carbon footprint. A large majority, 97%, of the participating business leaders adapted to climate change by adjusting and/or developing new products and services, and 90% also communicate the need for mitigation and adaptation strategies to the local communities, other businesses and their employees.

The importance that my findings place on personal values for engagement with climate change has also been recently emphasized by the IPCC's latest integration of philosophers within its panel, one of which is the philosopher Broome (BBC 2013, cf. Broome 2012). Broome explained recently in a BBC Radio 4 interview that integrating values in the climate change debate challenges the scientific basis on which climate change is currently understood as it raises moral questions. For most of

the leaders in my research, the choice between profit and climate change seemed to start with such a moral question. Why do some SMEs decide to ignore climate change? One could suggest that they simply have the 'wrong' values, because values, according to Broome, guide people into seeing that there might be a disadvantage to someone or something else through, for example, emitting carbon (cf. Broome 2012, BBC 2013). Personal values and experiences with respect to the communication of climate change, for example through policies, especially with regard to businesses, are only rarely and have only recently been considered in studies of business engagement (cf. Corner et al. 2014). Williams & Schaefer (2013) have also shown that the decision to engage with climate change through business practices is due to personal values (Williams & Schaefer 2013). Hoffmann & Jennings (2012) explain that currently, although the main route to engaging businesses in climate change is through pricing carbon, based on the principle of homo economicus (cf. Chapter 3) ignoring the consideration of e.g. values. This type of communication, which I described in the previous chapter, is also present in Cornwall. The findings from my research study oppose this type of climate change communication, which traditionally presents climate change on the premises that: first, participating SMEs understand climate change in absolute terms instead of through individual and very personal narratives; second, participating SMEs are institutions mainly motivated by pure profit maximization; and third, lessons learned from other disciplines on behaviour change or climate change communication seem to be overlooked. My findings further confirm existing criticism that ideas on business engagement with climate change are too scientific (Hoffman 2004, Goodall 2008). The personal background of a business leader can be the factor that explains a personal conviction and many of the interviewed business leaders demonstrated the following characteristics: (1) a strong feeling of identity within a specific location/region; (2) an education in and awareness of the relevance of climate change; and (3) the ability to experience and conceptualize climate change beyond their own lifetime through the lifespan of the business.

6.2.3. Business Engagement with Climate Change within Current Socio-Economic Systems

While the above findings show that the personal values of the participating business leaders triggered engagement with climate change on the part of businesses, the findings which I will present in this section show that the participating business

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leaders connected climate change with greater social and economic concerns. Robert, for example, explained that his company aimed to create a better world:

> *'My business has a very strong social objective and that is to make the world a better place. [...] And the environment is a very important part of that. [...] it's not just about dealing with the issue as a global warming issue, it's about looking at things like the motivations in people's lives.'* (Robert, Business Leader, interviewed in 2012)

Robert went on to explain that he viewed climate change as an issue that is connected to how one sees oneself and one's place within the world:

> *'I've been interested in climate change for years; actually about 10 years. I'm very interested in W. F. Schumacher. So that got me thinking many years ago about choosing more for less and that we are living on an unsustainable path. I'm very interested in environmental issues. I tend to see it as a social issue.'* (Robert, Business Leader, interviewed in 2012)

Most of the other participating business leaders also emphasized their awareness of the link between business activities, society and the environment. Matt, for example, explained that he was aiming to create social change through his climate change engagement. He was attempting to stimulate adaptation and mitigation activities in the wider business community and society (cf. Hoffman 2012).

> *'The main idea with our company is our passive activism. The way we engage with climate change allows our clients to open their eyes a bit more to the idea that they could make a difference. [...]. We talk about climate change but actually it's about social change as well. Understanding what you are part of.'* (Matt, Business Leader, interviewed in 2012)

Social change in this context occurs that the dominant mental models of societal interaction change due to the acceptance of new and/or the change of societal norms (Seyfang 2009, Markard et al. 2012, Seyfang & Longhurst 2013). The participating business leaders thus emphasised an understanding of the embeddedness of businesses within both society and the natural environment. My findings here thus fit with the growing belief in the literature that businesses are responsible for, and dependent on, a healthy society. The quotes also express the desire of the participating business leaders to be responsible citizens. Engagement with climate change allows

them to be so and to endorse their personal identity. The data also show that the business leaders felt empowered to influence social and economic change. Kotter (2001), for example, suggests that if leaders feel empowered to lead, it means that they are capable of coping with change. This is supported by data from the online survey that I conducted with the participating business leaders. The results show that in over 90% of the participating businesses, the business leader initiated the engagement with climate change. Most of the participating business leaders linked their personal values regarding climate change to their desire to achieve a change in the UK's culture on consumption and capitalism. One participant expressed this as follows:

> *'I think we are uneducated. We don't seem to approach things. I had quite a lot to do with Germany – friends, skiing, etc. I did pick up a feel for the way younger people were thinking about climate change. It's sad that our society is not at all interested in this.'* (Ian, Business Leader, interviewed in 2012)

The data also indicated that participating business leaders believed that mitigating and adapting to climate change was not accepted/integrated in the current socio-economic system(s) due to the UK's culture and society. Ian, for example, saw an important responsibility for changing the political and economic system(s) as coming from society and a change in people's values:

> *'I think, it's culture. [...]. We want more and buy more and actually the way our society functions is fuelled by credit. ... We've got this culture to work really hard for reward and then we spend all of it; play hard. That is not sustainable. It's not the key to happiness. The key to happiness is probably to be more resourceful. [...]. But we don't get that in our country. [...]. What needs to happen is for communities and businesses driving it forward. [...]. We are talking about businesses and communities. Everyone. [...]. Climate change is exactly the same.'* (Robert, Business Leader, interviewed in 2012)

I conclude that the participating business leaders described a socio-economic system in which businesses do not feel they can change the systems in which they operate. Mazzucato (2013) questions such a perception. All different actors need to be seen as *'active, entrepreneurial, risk-taking agent[s]'* (Mazzucato 2013: 12) who collectively shape the socio-economic system in which they operate. People need to dare to see the true interconnection of actor-networks against the *'organizing binaries of*

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modernity' (Gregory et al. 2009: 7) and consequently it needs to be highlighted that all actors have equal responsibility for enabling innovation. Some of the participating business leaders pointed to the need for a shift in the way the country's socio-economic systems find form. Caroline also argued that there was an urgent need for a cultural change, which should be motivated by businesses and governments alike:

> *'I think there are a lot of small businesses who want to be more responsible and when those companies grow, that will bring a culture change. We have to change how we are doing business. It will be ripples from bottom to top, top to bottom, until it's all mainstream.'* (Caroline, Business Leader, interviewed in 2012)

Caroline's statement exemplifies how those leaders who are driven through their personal values to engage with climate change have a holistic understanding of what climate change means to the socio-economic systems. Williams & Schaefer (2013) also found that business leaders who are environmentally engaged have this holistic understanding of climate change. Climate change engagement and the associated communication should therefore be connected with a sense of place of individual business leaders and the (business) community more generally. Rogan et al. (2005) support this claim in their study of the relationship between a sense of place and a changing natural environment. They found that there is a growing sense of responsibility towards the local environment especially when people can link the place to family experiences. This sense of belonging brings a sense of responsibility and then leads to an engagement with the environment, which then fulfils people's own goals (Rogan et al. 2005). The findings that climate change engagement is very much related to personal values provides new insights into the notion that climate change is an ethical debate over values and culture. This is something that must be learned, not only for the communication of climate change, but also for the modelling of climate scenarios and scientific debates about geoengineering. I thus conclude that questions over values, beliefs and worldviews emphasize the need for new socio-economic systems that enable meaningful mitigation of and adaptation to climate change away from the *'organizing binaries'* (Gregory et al. 2009: 7) of modern society. Jackson (2009) describes such fundamental changes in our (mainstream) system(s) as *'prosperity without growth'*, criticizing the current model of economic success based on *'relentless consumption growth'* (Jackson 2009: 489) for making the

combating of climate change impossible, while calling for a more '*sophisticated form of capitalism*' (Porter & Kramer 2011: 12).

6.3. Conclusion

This chapter has addressed the lacuna on how the participating business leaders of SMEs conceptualized climate change and how their understanding of climate science has influenced their business practices. This chapter approached the topic from the perspectives of the participating SMEs and in particular focused on how they understood climate change. Methodologically, this enabled me to gather context-dependent insights into why some businesses manage to engage with climate change. In this way, I critically examined Geoghegan & Brace 's (2011: 297) request for a more relational approach towards climate change '*that needs to be understood on a local level, attending to its distinctive spatialities and temporalities*'. The chapter illustrates that the participating business leaders' mitigation and adaptation strategies have been shaped through their personal lay knowledges on climate change and do not appear to be formulated through interpreting specific scientific knowledges and/or business reasoning. This occurs, according to my findings, for two main reasons: first, climate change decision-making is often predicated upon an individual's identity and value systems (these are often elided in the business studies literature), and second, decision-making is focused on wealth creation for the business.

In this chapter, I have demonstrated that climate change is a(n) (un)known futurity for the participating SMEs. The participating business leaders conceptualized climate change through both imaginative and experiential lenses which then allowed them to position their businesses in relation to past and expected (future) existence(s) (Geoghegan & Brace 2011). Those business leaders who believed they have the capability to make a difference to climate change had a positive outlook on adapting to (future) climate change and an eye on opportunities. In this way, responding to climate change was a very individual process for the businesses. This contrasts with the ways in which climate change is currently communicated to SMEs by the participating ISOs, which I identified in the previous chapter. The participating business leaders understood and situated climate change within personal values and belief systems to produce their own personal lay knowledges of climate change. Leyshon (2008) explains that actions in reference to stable value systems enable

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individuals to locate themselves in the world. It is important for individuals to view themselves within their value systems, a collective entity located and shaped over time and through experiences. It is only then that individuals can also *'place themselves in […] context, to cope with the contingencies of existence',* such as climate change (Leyshon 2008: 5). This literature-based evidence leads me to conclude that the participating business leaders wanted to place themselves with their value systems within the field of the challenges of climate change. This understanding of how climate change science is understood by the participating business leaders is therefore fundamentally at odds with the 'deficit model' of knowledge exchange; that is to say that without addressing and changing individuals' value systems, I should not expect climate knowledge to be absorbed and acted upon. Hence, reasons for the engagement of businesses with climate change are lay knowledge dependent and these knowledges are derived from personal values, space and place identity.

I introduced the concept of an *'engaged SME'* to represent those SMEs which intended to voluntarily foster and encourage further engagement with climate change issues. The findings suggest that business engagement with climate change is primarily a function of the business leaders' own personal value systems rather than a response to climate change science *per se*. The participating SMEs do not need to consistently hear about the latest climate change science. To enhance the number of SMEs engaging with climate change, to maximize the potential socio-economic value of climate change for society and establish a low carbon economy, communication therefore needs to target the personal values of individuals. Business leaders in this study suggested that this can be achieved in three interrelated ways: firstly, by focusing attention on climate change impacts at a regional level; secondly, by drawing attention to potential *'feel good factors',* meaning the benefits to (the local) society and economy and thirdly, by raising awareness of the potential financial benefits that might accrue to the business if they mitigate or adapt to climate change.

The research reported here further demonstrates that the participating business leaders' understanding of climate change emerged around transient understandings and knowledge exchanges. Therefore, climate change scientists as well as climate change intermediaries do not need to communicate climate change science or the need

to engage with climate change to SMEs. Climate change scientists as well as climate change intermediaries need to comprehend the value-driven audience of SMEs. SME leaders interviewed here have pursued strategies to safeguard economic, ethical and philanthropic expectations of themselves and their organisations. This is a view which is largely unrecognized and consequently ignored despite reflecting the true cultural characteristics of this business community. Climate change communication therefore needs to go beyond thinking about potential financial benefits for SMEs and pursue Hoffman's (2012: 32) recommendation that *we must acknowledge that the debate over climate change, like almost all environmental issues, is a debate over culture, worldviews, and ideology*. Overall, the participating business leaders show us, by following their personal values, including their experiences and reflecting on the world that they want to live in, that society needs to be more reflexive about the things it values. One way of allowing this is through revisiting some of the pre-modern ways of making decisions and interacting with risks: using lay knowledges, traditions, and thinking beyond one's own lifespan.

I conclude that climate change communication overall needs to be more aware of individual audiences (cf. O'Neill & Hulme 2009) and acknowledge that climate change science is as much a discussion about values, cultures, and beliefs as it is about modelling climate variability. To inculcate considerations of climate change in the decisions that are made within the socio-economic systems requires, as Hoffman (2012: 6) argues, *'a violent debate among cultural communities on one side who perceive their values to be threatened by change, and cultural communities on the other side who perceive their values to be threatened by the status quo'*. Too often is the area of climate change seen purely as a scientific debate, and is climate science being misappropriated as an economic and political instrument (Cook et al. 2013). Instead, a progressive space for discussion and dialogue on climate change, in which socially informed and value-laden knowledge can be exchanged, needs to be opened up because, ultimately, political regulation does not depend on governments alone but rather on consensual agreement (cf. Hulme 2009). My examination of SME leaders carried out here demonstrates that this is possible and that such business leaders could have an important role to play over the next few years.

7. Overcoming Current Socio-Economic Systems: Sense-Making of Climate Change

The following chapter builds on the findings of the previous two chapters, which revealed that current climate change communication and the socio-economic system(s) do not help the personal values-driven SMEs in making their engagement with climate change (more) meaningful, profitable and sustainable. In this chapter, I therefore explore how SMEs approach the knowledge gap between climate change science, business practice and current climate change communication. The extant literature that I explore below suggests that bottom-up, community-led approaches to managing climate change can enable individuals to engage with it (Dietz et al. 2003, Heiskanen et al. 2009, Ostrom 2009, Seyfang & Longhurst 2013). Equally important are peer-to-peer relationships, as are seen in the business communities of practice the SMEs used to work on innovations (cf. Chapter 2). Even though there is recent evidence that businesses are increasingly using voluntary approaches (cf. Chapter 2) to mitigate, and/or adapt to, the impact of climate change climate change (Bailey & Rupp 2004, Tahlmann & Baranzini 2004, Gupta et al. 2007, Visser & Adey 2007), these different approaches, perhaps because they also stem from diverse disciplines, have not yet been brought together. Little is known about the efforts that SMEs make through their informal relationships to overcome the gap that exists between business practice and climate change science. In this chapter, I aim to close this research gap and answer the research question: *'How do SMEs overcome the gap that exists between business practice and climate change science?'* I refer predominantly to the data that I collected through the participant observations during the community of practice meetings of CoaST and BL4LC (cf. Chapter 4). The chapter shows that the participating SMEs tried to overcome the lack of knowing specific business practices that enable the engagement with climate change through forming and joining communities of practice. In so doing, the participating SMEs (1) were able to make sense of climate change and (2) benefitted from the entanglement with social belief systems, *'beliefs that emerge, not from individual preferences, but from societal norms'* (Hoffman 2012: 32) (cf. Chapter 2). My findings show that climate change needs to be treated within niches, *'protected spaces where projects can develop away from the normal selection pressures of mainstream systems'* (Seyfang & Longhurst 2013: 881) to allow economic actors to consider climate change outside of socio-economic systems. Niches provide the space for sense-making with peer businesses to create climate change-related business practices that are meaningful, profitable and sustainable. Ultimately, combating climate change requires alternative socio-

economic systems that enable 'doing business with and alongside climate change' in meaningful, profitable and sustainable ways.

7.1. Business Leaders and Communities of Practice on Climate Change

Rational choice-based assumptions steer the current ways in which climate change-related policy are made and in which climate change is communicated (Jackson 2005, De Kirby et al. 2007, Jamison 2010, Moloney et al 2009, Seyfang 2009, Shove 2010). It is believed that people need to be *'nudged'* (Nerlich et al. 2010: 100) to engage with climate change through governmental leadership, regulation and MBIs (Moloney et al. 2009, Seyfang 2009). Increasingly these rational choice-based approaches are said to *'ignore the 'social embeddedness' of decision-making'* (Moloney et al. 2009: 7616), as they portray people as *'selfish, norm-free and maximizers of short-term results'* (Ostrom et al. 1999: 279, cf. Jackson 2005, Carter 2007, De Kirby et al. 2007, Visser & Adey 2007, Heiskanen et al. 2009, Seyfang 2009, Nerlich et al. 2010, Hoffmann & Jennings 2012, Lindegaard 2013, Corner et al. 2014). Ostrom in particular (2009) explains that such rational views on how people make decisions are too simplistic because they assume that people cannot communicate or interact with each other (cf. Ostrom 2010). Ostrom, together with Williamson, received the Nobel Prize for Economics for providing numerous examples of people achieving close-to-optimal outcomes when managing common pool resources through local agreements through face-to-face-communication (Dietz et al. 2003, Ostrom 2009, Ostrom 2010, IU 2012). In recent years, there have been several studies on the role of such citizen-led approaches to addressing environmental problems (cf. Adger 2003, Heiskanen et al. 2009, Seyfang & Longhurst 2013) but the role of businesses has not been examined. One example is low carbon communities - *'forms of co-operation and collaboration that aim to reduce the carbon intensity of their member's lifestyles by providing amenable contexts and mechanisms that encourage behaviour change'* - which have been shown to change people's approaches to energy consumption (Heiskanen et al. 2009). Another approach is based on grassroots innovations - *'innovative networks of activists and organisations that lead bottom-up solutions for sustainable development'* (Seyfang & Smith, 2007: 585) - which create sustainable systems of provision based on local needs (Seyfang & Longhurst 2013). Transition Towns also aim to enable low-energy lifestyles within their localities (Scott-Cato & Hillier 2010). These studies reflect that the potential of civil society to solve issues related to

sustainability is *'promising'* (Seyfang & Longhurst 2013: 882). Civil approaches manage climate change not just through governmental, scientifically based, power structures but also through the civil society that experiences and lives climate change. Ostrom (2009) summarizes such civil approaches to managing climate change as polycentric, meaning that *'many elements are capable of making mutual adjustments for ordering their relationships with one another within a general system of rules where each element acts with independence of other elements'* (Ostrom 1999: 57 in Ostrom 2009). In the light of the theoretical perspective of this thesis, such civil society approaches show that the organizing binaries of modernity when managing climate change are irrelevant and somewhat of a hindrance in that process.

The understanding of and engagement with climate change on the part of SMEs is, however, largely disregarded in investigations of these bottom-up, civil society-led approaches. This is somewhat surprising as SMEs often work through face-to-face communication to solve problems, as discussed in Chapter 2: SMEs act collectively, learn from each other and access scarce resources (Mitra 2000, Muller & Zenker 2001, Bougrain & Haudeville 2002). Overall, activities to solve problems through formal and informal relationships are explained by the theory of social capital which posit that people perform better by being better connected (Burt 2000). Putnam (1993) describes social capital as features of social life such as trust, norms and networks: social capital refers to the *'features of social life - networks, norms, and trust that enable participants to act together more effectively to pursue shared objectives'* (Putnam 1994: 664f). An example of business networks that aim to overcome climate change-related problems are the voluntary groups working to address carbon emissions. Voluntary approaches are mainly distinguished by the degree of control that the government has and the extent to which the voluntary approach is binding for the business (Tahlmann & Baranzini 2004). While there are several taxonomies for voluntary approaches, the most common ones are voluntary agreements and self-regulation. Voluntary agreements are contracts between the government and one or more private parties such as the Climate Leaders Group (Tahlmann & Baranzini 2004, Gupta et al. 2007). Self-regulations are voluntary actions regarding climate change-related issues arranged without the government but amongst businesses, NGOs and other interest networks such as the Corporate Leaders Network on Climate Change, a business network that lobbies for more and tougher legislation on climate change

(Gupta et al. 2007, Visser & Adey 2007). The growing number of such approaches by businesses suggests that businesses also increasingly manage climate change in a similar manner to citizen-led approaches (cf. Bailey & Rupp 2004, Tahlmann & Baranzini 2004, Gupta et al. 2007, Visser & Adey 2007). While there is a growing interest in these voluntary approaches to climate change (cf. Hoffman 2005, Eberlein & Matten 2009), their role for SMEs and their potential impact on policies, other businesses and the wider economy has been overlooked, for reasons which are not well understood. Engaging with voluntary approaches might have a similar function and yield similar benefits to businesses to those of regular business networks, connections that enable business leaders to act collectively, learn from each other and access resources and human capital (Mitra 2000, Bougrain & Haudeville 2002, Muller & Zenker 2001). Schaefer et al. (2011), for example, identified that if business leaders are part of business networks that consider climate change to be important then, they will also tend to consider climate change within their own business. Businesses tend to be engaged in such business networks if their business is directly exposed to and/or dependent on climate change (Schaefer et al. 2011). The business leaders of SMEs are open to receiving climate change-related information from business networks that they are part of (Williams & Schaefer 2013). Williams & Schaefer (2013) argue that consequently, how SMEs put climate change-related information into business practice, as a result of being members of business networks needs to be explored; little is known about the specific approaches that SMEs take to dealing with climate change within and through their formal and informal relationships.

7.2. Findings

In this chapter, the findings are presented in three sections [Table 13]. Section one presents two climate change-related communities of practice within which the participating business leaders participate - BL4LC and CoaST - and which I investigated in my study. Section two illustrates the ways in which business leaders participated within these communities of practice, the value of these informal structures being the face-to-face interaction and sharing similar values. The main focus of both communities of practice is a 'coming together' with other business leaders, to provide an opportunity to make sense of climate change. I will show that there was a discrepancy between intended goals and achieved goals in these communities of practice. In section three I will show that the business leaders in this

study joined BL4LC and CoaST as citizens rather than business representatives; within these two communities of practice, business leaders found the space to combine their citizenship with their business environment and benefit from social belief systems. I conclude that climate change needs to be treated within niches (Seyfang & Longhurst 2013), to allow economic actors to (1) consider climate change outside of socio-economic systems where dominant practices, rules and assumption empower and (2) permit evolutonary knowledge making.

Research Findings	Selection of Personal Observations by the Researchers	business Meetings during which similar observations were made	Selection of Interview Quotes from Business Leaders	Business Leaders who made similar statements	Selection of Interview Quotes by Communicators	Communicators who made similar statements	Selection of Survey Evidence from Business Leaders
The participating business leaders create and join communities of practice to make sense of climate change in casual, interdisciplinary, personal, face-to-face setting	*'Des goes through the 'Matters & Minutes Arising'. This includes going through the long list of action logs that we have accumulated over the years. There are about 40 open actions on the list today [...]. Most of the actions have not been completed [...]. They are labelled as 'on-going' so nobody knows when they will be completed. Des [...] does not really mind that most of the actions are not completed. We even sign some of the actions off as completed through second-guessing [...]. We also sign off some of the actions that should be done by 'all' as completed if 3-4 people in the room confirm that they have completed the task.'* *'The intermediary speaks to us about sustainable tourism. [...]. Then the delegates start speaking about transition. [...]. [...]. We drift into cooperative farming. [...]. [...]. Someone says that the main benefit from the Objective One funding is the partnership that it created. One lady says that we need bottom-up movements [...]. They refer to wind turbines and renewable energies. Then they speak about the airport and that people want everything to be better. [...]. The intermediary says that he does not want growth. One of the ladies says that growth, growth growth based on a carbon economy is not sustainable. Someone else says that the focus should be on creating a good quality of life for people who live here. [...]. The word 'low carbon' is mentioned several times. [...]. Then we speak about wind farms, insulation, attracting visitors to Cornwall [...] and badgers.'*	all of the observed BL4LC & CoaST network meetings	*'Another thing I do is just to ring other people that do similar jobs [...] in similar hotels. I would definitely call Claire's hotel. We have a very good working relationship actually. [...]. There is no point in re-inventing the wheel. We are all in it for the same reasons. But we wouldn't share other information.'* (Amy, Business Leader, interviewed in 2012) *'With the big side of climate change you might not see the benefits but it's those small steps. The butterfly effects that you start with recycling paper but then three years down the line you get solar panels. [...]. Our first project [meant] 18 months of solid work trying to up the level of recycle use in Cornwall and suddenly you are immersed in recycling, compost, nappies etc.'* (Matt, Business Leader, interviewed in 2012)	BL1, BL3, BL4, BL5, BL6, BL7, BL8, BL10, BL11, BL14, BL15, BL16, BL17, BL18, BL20, BL21, BL22, BL24, BL25, BL26, BL28, BL31	*'Climate change is too big and too scientific to digest. Sustainability is in chunks and gives businesses focus. It's the same with sustainability. If you talked to people ten years ago about sustainability; it was too big to cope for them. They thought it's all about waste management. It took 10 years to show that it's also about staff and energy.'* (Gitty, Intermediary, interviewed in 2012) *'Chris is very good at talking so what happens is that you get 2-3 of them that are as enthusiastic as Chris. People start seeing the sense in it, so that you get 5-6 people, then they see it working and you get 20 people around him and then it spreads out. If you look at research on where do farmers get their advice from the number one source is their neighbour. I know one person with a very good diary farm in Cornwall, whenever he goes out and cuts his salvages everyone does as well, just because people know he is doing it right. Peer to peer is extremely important.* (David, Intermediary, interviewed in 2012)	C2, C3, C4, C5, C6, C8, C13, C15, C17, C19	46% of the participating business leaders indicate in the online survey that they best engage with climate change through using personal contacts.
The participating business leaders try to create safe niches through those communities of practice because they want to change the current socio-economic systems	*'A representative from the council explains that they want to support the ambitions of SMEs to grow. Someone says that this is something most business leaders in this room disagree with. 'Business is not just about growth; after all a growing number of economists recognizes the limits of growth and the need for prosperity to combat climate change', someone adds. The council lady replies: 'No, it's not just about growth but it's an argument to secure funding.' I am disappointed that nobody in the room supports the other two people who just criticised the growth assumption. [...]. They stay quiet because they want to secure the funding too.'* *'Bright red and green jumpers shine in between the many smiling faces. I feel comfortable and excited amongst the chatting of all these delegates. They seem to know each other. [...]. This is a big social club. [...] As I walk out I see Chris I. He greets me with a kiss on the cheek. [...]. There are two old ladies [...] (who) remind me of Amish people. [...]. The day ends with a dance so Manda invites us all to stand up. It consists of shouting, jumping and humming. I am surprised to see the local councillor join in. This is a very exciting atmosphere. It feels very intimate. People here know each other by name. I seem to have joined a little community. [...]. We all want to change the world. Today that seems possible.'*	BL4LC in 2011 in the Marine Network, BL4LC in 2012 at Tregony, BL4LC in 2013 at Pool Innovation Center, BL4LC in 2013 at the Heartlands, BL4LC in 2013 at Community Energy Plus, BL4LC in 2013 at Francis Clark, BL4LC in 2014 at the Innovation Center, BL4LC in 2014 at Watergate & both CoaST meetings	*'What is our selling point and what can we offer? [...]. We are not paid or influenced by someone's agenda. [...] The reason we are passionate is sustaining our own and other businesses in Cornwall. It can't just be one business being sustainable. We are all in this together. The majority of the people are not too worried about climate change – they want to make money and stay in business in as sustainable way. [...]. The average businessman in Cornwall says he has enough problems trying to keep the business afloat. In reality if they don't start the low carbon rout they won't survive anyways.'* (Bes, Business Leader, interviewed in 2012) *'If you get your electricity bill, its already too late. You have already used the electricity. So if you'd understand your energy meter and you would understand when you're using which amount of energy for which purpose then your energy bill could be lower. So energy meters are a good example of improving communication before its too late. And actually that's just the tip of the ice berg....you could do all sorts of things to enable not just individuals but whole communities to reduce their environmental impact and actually live a better quality of life as well. If you have the tools and techniques and the knowledge to do that.'* (Claire, Business Leader, interviewed in 2012)	BL1, BL3, BL4, BL5, BL6, BL7, BL8, BL10, BL11, BL14, BL15, BL16, BL17, BL18, BL20, BL21, BL22, BL24, BL25, BL26, BL28, BL31	*But some members criticize this because they fear that new members want to use us as a promoting platform. LinkedIn increased our exposure [...]. That is a challenge.'* (Des, Business Leader, interviewed in 2012) *There is a traditional view of competitors and who is our competition. We try to see a different take on that. The neighbour doing the similar business in not necessarily my most important competitor.* (Tom, Business Leader, interviewed in 2012)	C2, C3, C4, C6, C13, C15, C17, C19	All of the participating business leaders state in the online survey that they engage with climate change to help create a better/sustainable society and economy. 90% of the participating business leader state that they are part of BL4LC and/or CoaST networks are because concerned with environmental and economoc concerns.

Table 13: Data Overview for Overcoming Current Socio-economic Systems: Sense-Making for Climate Change'

7.2.1. The Participating Communities of Practice

I would like to remind the reader that I outlined in Chapter 3 that the world is made up ouof human and non-human *'actors'* that only find their meaning through each other. To understand the world, human and non-human actors should therefore be seen as an interconnected system. Communities of practice in this sense can be seen as *'anti-essentialist, open-ended and resolutely relational'* (Saldanha 2003) because they enable a constant and somewhat undefined interaction of actors with each other. Communities of practice can consequently interact differently with each other at any given moment. Consequently, a community of practice has the opportunity to change, and be changed by, its actors at any time (Neisser 2014). Viewing communities of practice through the lens of ANT shows that an actor-network can adapt easily to change and interact with uncertainty (Neisser 2014). Neisser (2014) explains; *'[i]n this perspective then, risk is neither a property of the human or non-human world but arises from the interactions between them and is performed by the complex ensembles they constitute'* (Healy 2004: 284 in Neisser 2014). A business community of practice on climate change can thus acknowledge the heterogeneity and hybridity of possible responses to and impacts of climate change and the existence of human and non-human actors alike, including values, rules and artefacts. Communities of practice in this thesis must thus be seen as representing 'more' than just the formal definition of each individual community of practice that I will present below.

My open interviews with key informants and semi-structured interviews with business leaders revealed that many of the participating business leaders joined private sector-led, climate change-related business communities of practice. The main communities of practice joined were:

- BL4LC
- CoaST

Of the 31 business leaders that participated in the survey fifteen indicated that they were active members and affiliates of BL4LC. Similarly, 15 of them indicated that they were active members of CoaST. About 27% of the 31 leaders contacted CoaST to *'help [the business] mitigate, and/or adapt to, the impact of climate change climate change'*; about 31% actively contacted BL4LC to address questions concerned with climate change .

BL4LC

My data analysis shows that BL4LC is a private sector-led community of practice comprising 41 business leaders and affiliates across sectors (the business leaders that participated in this study and who are part of BL4LC are named in Table 8). The community of practice aims to '*support the creation of a low carbon economy in Cornwall*' (Chairman Presentation 2014) through leading by example in carbon-related issues. Specific tasks involve '*communicating the meaning of a low carbon economy*', and '*demonstrating economic benefits*' and '*best practice*' of low carbon activities. They also aim to '*challeng[e] [the] public sector*' (ibid.). This community of practice was formed out of Cornwall's Climate Change Action Plan (3CAP), an initiative by the Council to provide evidence that policies were being made for climate change-related policy making (CDC 2010). Before 3CAP was completed, the council halted the project due to the introduction of the Localism Bill and the restructuring of the council. Members of 3CAP's advisory communities of practice wanted to see 3CAP's work continue and founded BL4LC in 2010. Cornwall Council's Cornwall Development Company (CDC) provided secretariat support for the network. By 2012, the community of practice had managed to set up regular meetings and had established a growing membership. BL4LC then decided to be fully private sector-led and CDC's secretariat function stopped.

The majority of the (over 41) members and affiliates are active in the tourism, information and communications, food and renewable energy sectors. Individuals can gain different membership statuses according to their business position and their participation within the community of practice [Table 14].

Status	Number of People
Total number of members and affiliates	41
Active affiliate	11
Passive affiliate	14
Member	11
Executive team member	5

Table 14: BL4LC Members and Affiliates Statuses[28]

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[28] Own creation.

An individual can only become a BL4LC member if s/he works in a private sector business and holds a senior level position. Members are also required to attend at least 50% of the quarterly meetings and are discouraged from using the community of practice for sales and marketing purposes. All other individuals are affiliates. The affiliate status allows interested individuals to join the community of practice without holding a position within a private sector business. Based on my observations and interviews, there are 14 passive affiliates and 11 active affiliates. Members and affiliates are expected to show a passionate, enthusiastic and proactive attitude regarding the low carbon economy and be respectful of others. Of the 16 BL4LC members, 5 members belong to the executive team. Executive members are required to respond quickly to urgent discussions, converse regularly with the executive team and manage the network. Two BL4LC members are elected as chairman and vice-chairman.

The community of practice does not have any formal contracts, membership fees or any other financial resources. BL4LC functions solely through the voluntary participation of its members and affiliates. Members and affiliates meet every three months at the office of one of the members. Meeting attendances range from 9 to 19 attendees at the quarterly meetings, with an average of 13. According to my observations, a BL4LC meeting takes an average of three hours [Table 15].

Year	Date	Location	Number of Attendees	Main Topic Discussed	Duration
2011	14.09.11	Cornwall Marine Network	11	Purpose of group, mission statement	3 h
	21.11.11	Francis Clark Truro	12	BREEAM (Building Research Establishment Environmental Assessment Method)	4 h
2012	01.03.12	Eden Project	16	Federation of Small Businesses and Low Carbon, Superfast Cornwall, group's structure, Local Enterprise Partnership (LEP), Activity Champions	5 h
	24.05.12	Ward Williams Associates	19	LEP's Economic Growth Strategy, Green Cornwall Programme, Activity Champions, Use of LinkedIn	4 h
	06.09.12	Cornwall Marine Network	11	Clear About Carbon, BREEAM	3 h
	22.11.12	Tregony Industrial Park	16	Cornwall Sustainability Awards, my research	3 h
2013	26.02.13	Heartlands	14	Membership, Green 100, future funding opportunities	2.5 h
	16.05.13	Cornwall Marine Network	9	Finance in Cornwall, BREEAM, Group's priorities, European Structural and Investment Strategy	4h
	11.07.13	Pool Innovation Center	10	Superfast Broadband	4 h
	26.09.13	Community Energy Plus	5 (executive team only)	Membership, purpose of group	4 h
	28.11.13	Francis Clark Truro	14	SMART, community energy	5 h
2014	13.02.14	Tremough Innovation Center	13	Group's priorities, SMART, BREEAM	4 h
	22.05.14	Watergate Bay Hotel	10	Funding opportunities, formalization of group	4 h

Table 15: Overview of BL4LC Meetings[29]

The protocol for the meetings I observed was managed by a team member. These protocols, together with an action log, which assigned actions to members, and other documents, were made accessible via email. Email and the website LinkedIn served as the main form of communication. Members of the core team also produced yearly work programmes and meeting agendas, and invited guest speakers to address topics of interest during each meeting.

CoaST

CoaST is a community of practice which aims to enable sustainable tourism with social, economic and environmental benefits across Cornwall, the UK and worldwide.

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[29] Own creation.

This community of practice aims to provide '*policy (influencing, informing, and helping) [...] practical projects (delivering them) [...] free online One Planet Tourism UK wide network*' (CoaST 2014). Manda registered CoaST as a social enterprise in 2003. The social enterprise started out with only five members and grew rapidly over the next 10 years to over 2,800 members (the business leaders that participated in this study and are part of CoaST are named in Table 8). The social enterprise has four members of staff and works with two volunteers. CoaST also has four directors, all of whom are business leaders from the tourism industry in Cornwall. The founder of CoaST is also the executive director. CoaST's staff team executes various activities ranging from providing case studies on sustainable tourism to providing towel cards for hotels. The team also offers a consultancy service and takes on research projects. Even though CoaST has sustainable tourism at the heart of its activity, the 2,800 members come from across sectors and industries spanning over 22 countries. Organizations, businesses and individuals can sign up as members for free. Members, also called CoaSTies, have access to the online network, which has an online calendar where staff and members can register events that are related to sustainable tourism, use different email bulk lists per topic and access other information. This community of practice tends to communicate mainly online via newsletters and discussion forums. Members only come together for organized events that target the discussion of particular topics or as part of other climate change-related events [Table 16].

Location	Number of Attendees	Topic Discussed	Duration
Woodland Valley Farm	7	sustainability, development, renewable energies, communities and change, local economy	2 h
Heartlands	84	climate change, economic models, new thinking, change	5 h
Met Office	40 - 60	impacts of climate change on tourism businesses, possible adaptation and mitigation actions	5 h
University of Exeter	40 - 60	leading and insiring change	5 h

Table 16: Overview of Observed CoaST Meetings and Presentations[30]

Members can also become CoaST Champions, members who are passionate about the land, history and ocean and want to make others more passionate about sustainability. Currently there are 90 Champions. Additionally, CoaST has 23 ambassadors, who '*are businesses with different objectives, at different stages of development, with different budgets, approaches and locations. What binds them is an understanding of*

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[30] Own creation.

how sustainable practice means higher quality, improved efficiency and happier visitors' (CoaST 2014).

7.2.2. Making Sense of Climate Change

My interviews and observations reflect that both communities of practice are structured informally and that members cannot be held accountable for the responsibilities they take on. In the observation that I made below during a BL4LC meeting it can be seen that there is a somewhat relaxed acceptance about this informality [Participant Observation 8].

> '*Des goes through the 'Matters & Minutes Arising'. This includes going through the long list of action logs that we have accumulated over the years. There are about 40 open actions on the list today [...]. Most of the actions have not been completed [...]. They are labelled as 'on-going' so nobody knows when they will be completed. Des [...] does not really mind that most of the actions are not completed. We even sign some of the actions off as completed through second-guessing [...]. We also sign off some of the actions that should be done by 'all' as completed if 3-4 people in the room confirm that they have completed the task.*'

Participant Observation 8: Quarterly Meeting in 2013 at the Heartlands

This observation shows that the members of BL4LC paid little attention to creating outcomes; there was no formal approach to create actual applicable business practices to follow up the participating business leader' ideas, beliefs and concerns on climate change, something that according to the literature a risk society would do (Giddens 1999, Beck 2006). What did happen, based on my observations, was that members brought a variety of topics to the community of practice meetings, which they discussed and felt emotional about. The following observation I made on a BL4LC meeting shows that the participating business leaders had distinct ideas of what the topics were that were related to climate change and consequently what the purpose of this community of practice should be [Participant Observation 9]:

> *'Paul says that the network needs a new mission statement. He finds 'resourcing' too wordy. Another person asks what 'low carbon' means. [...]. Someone states that 'low carbon' might underestimate what 'low carbon' really means; the enormity of the issues. 'We need to hold businesses to account'. Phil comments that we need a holistic approach on what we talk about and that businesses might not know what 'sustainability' means. [...]. 'It's best practice, knowledge, all these things' Phil adds. [...]. 'What is our thing?' Paul asks. Phil responds that it is about changing hearts and minds through knowledge. Stuart thinks it is about seeing pioneers. [...]. Stuart then says that we do not need to reinvent communication. We only need to facilitate it. We want businesses to engage in Cornwall. [...]. Des says he wants to be an advisory network. Engage with and advise through examples [...]. Suddenly he adds 'to convince non-believers'. [...]. Phil then says: 'We need to communicate that 'low carbon' is a change of life.' [...]. Someone asks: 'Are businesses ready to set pioneers?' He means the attending businesses as well. Paul says: 'It's a journey not a destination'.'*

Participant Observation 9: Quarterly Meeting in 2011 at the Cornwall Marine Network

My observation here shows that the participating business leaders recognised that low carbon meant different things to different people. This confirms that climate change understanding is very subjective and can mean different things to different people, as is increasingly suggested in the literature (Hulme 2009, Hulme & Blackman 2009, Moser 2010, Nerlich et al. 2010, Hulme 2013). I also observed that the participating business leaders raised different topics and used terminologies without defining their specific meaning. It was my sense that the SME leaders did not know what they actually meant by the terms either. The data here show that the business leaders used climate change-related words such as '*low carbon*' as an all-encompassing term that they see as a '*change of life*' and a '*journey*'. This '*journey*' and '*change of life*' leaves out specific implications by using terms such as '*thing*' and '*issue*'. I observed that the participating business leaders seemed to avoid precise definitions in the fear of excluding something from this '*change of life*'. My analysis of BL4LC's mission statement revealed an equally open approach to what the purpose of the community of practice is and consequently what climate change meant to the participating business leaders [Document Analysis 3]:

'**Top Priorities:** *Encourage businesses in achieving prosperity through energy efficiency and improves resilience. Lead a robust challenge to public and private sector commitments and policies to support a real transition to a low carbon economy. Continue to communicate the availability of existing projects and services to the business community*
Functions: *Leadership, Driving forward delivery, Peer-to-Peer Information Exchange, Challenging, Championing, Communicating, Acting in a proactive consultative role, Resourcing.*
Mission Statement: *A private-sector-led advisory network, whose passion is to support the creation of a low carbon economy in Cornwall.*'

Document Analysis 3: BL4LC's Mission Statement

My data on CoaST show a similar unspecific approach to understanding climate change-related issues. During a CoaST meeting, for example, the members raised a variety of different topics [Participant Observation 10]:

'The intermediary speaks to us about sustainable tourism. [...]. Then the delegates start speaking about transition. [...]. We drift into cooperative farming. [...]. [...]. Someone says that the main benefit from the Objective One funding is the partnership that it created. One lady says that we need bottom-up movements [...]. They refer to wind turbines and renewable energies. Then they speak about the airport and that people want everything to be better. [...]. The intermediary says that he does not want growth. One of the ladies says that growth, growth, growth based on a carbon economy is not sustainable. Someone else says that the focus should be on creating a good quality of life for people who live here. [...]. The word 'low carbon' is mentioned several times. [...]. Then we speak about wind farms, insulation, attracting visitors to Cornwall [...] and badgers.'

Participant Observation 10: CoaST Meeting in 2012 at Woodland Valley Farm

My data here reflect that the members used the community of practice meetings to discuss issues that are only in the widest sense related to climate change and that little information on business practice was actually exchanged. The variety of issues that the BL4LC members and CoaSties address in their meetings was indicative of the ways in which the participating business leaders were seeking to understand climate change-related issues; they seemed to create their own understanding of what climate change is and what it could be. To do so, they seemed to go beyond the '*traditional conception of scientific knowledge'* (Jamison 2010: 815) and the market-oriented approach that dominates climate change-related policy debates. My online survey supports this finding; the participating business leaders indicated that terminologies such as *'low carbon'* were perceived to be more actionable than '*climate change'* [Figure 16].
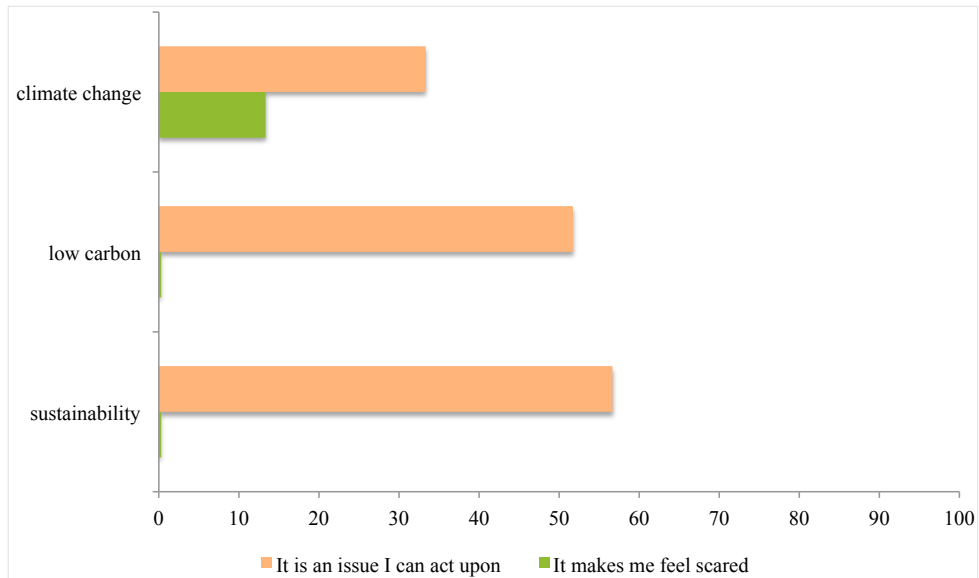
Figure 16: Actionable Climate Change, Low Carbon and Sustainability[31]

The participating intermediaries also confirmed my finding that scientific definitions and terms such as climate change are irrelevant for the participating business leaders. Gitty, an intermediary, summarized her experience thus:

> *'Climate change is too big and too scientific to digest. Sustainability is in chunks and gives businesses focus. It's the same with sustainability. If you talked to people ten years ago about sustainability, it was too big to cope for them. They thought it's all about waste management. It took 10 years to show that it's also about staff and energy.'* (Gitty, Intermediary, interviewed in 2012)

My survey data also points to the positioning of scientific definitions some distance away from the terms people use to convey what climate change means for their lives; more business leaders understood the challenge of engaging with climate change through the terms '*low carbon*' and '*sustainability*' than through the term 'climate change' [Figure 17].

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[31] Own creation.

Figure 17: Understanding of Climate Change through Other Terms[32]

The data above therefore demonstrate that the participating business leader perceive the term 'climate change' as a term that yields itself mainly to science perceives climate change. This confir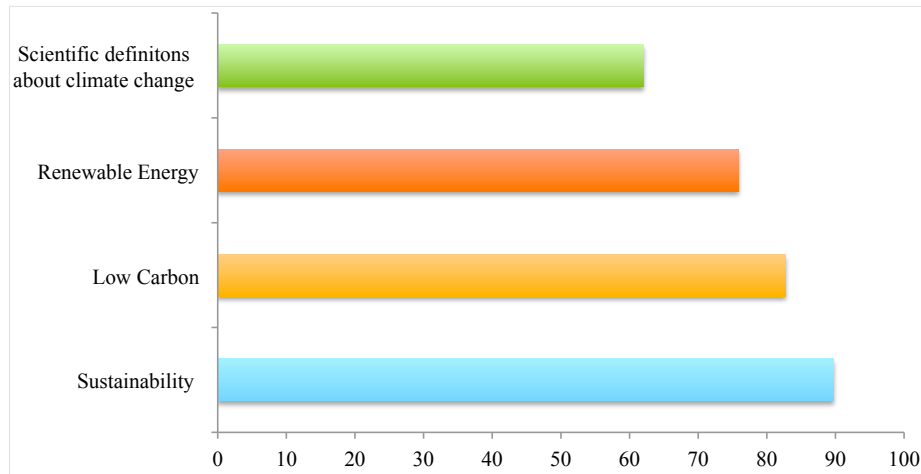ms suggestions made by Hulme (2009), that climate change is mainly seen as a scientific concern (cf. Hulme & Blackman 2009, Hulme 2013). The concept of sustainability received the highest rating in both figures. My data thus show that sustainability portrays best what climate change was about for the participating business leaders: meeting people's current needs in ways that meet the needs of people in the future, which involves having climates similar to current ones. The participating business leader addressed climate change without knowing specifically what they would gain from engaging with climate change. Therefore I assume that the participating business leader brought climate change to *'life'* within their very own societal setting. I conclude that to enable a sustainable management of climate change, the participating business leader had to ignore some of the individualistic characteristics of modern decision-making: they had to think as a collective, share lay knowledges and pass on experiences.

Behaviour that appears to be similar to that of my participating business leader identified above is found in what Giddens (1999) and Beck (2006) describe as a typical behaviour of a reflexive society: my business leaders are reflexive about the risks of climate change in their examination of lay knowledges and experiences. My findings contrast with the *'over-emphasis on scientific evidence'* with which climate change is normally approached (Hulme & Blackman 2009: 220). They show that the

[32] Own creation.

participating business leaders let anything that came up during their community of practice meetings be of relevance in this 'life giving' process, or, as Latour (1993, 2005) and Law (1999) would phrase it, let anything be an actor. This behaviour shows that the climate change understanding of my participating business leaders was evolving organically and was not dictated only by scientific knowledge or governmental power structures. Ultimately, this behaviour sets *'aside the relatively deterministic understandings of climate and the ways it might change offered by the natural sciences'* (Geoghegan & Brace 2011: 295-96). This cultural, subjective, lay knowledge-dependent *'life giving'* then allows the business leaders to *'develop [their] own logic of participation'* (Nerlich et al. 2010: 107).

My participating business leaders also emphasized the need they had to develop their own logic of participation in approaches to climate change. Mark 1, for example, informed me that his initial engagement with climate change started with recycling paper waste, which led to an entire shift in his business operations. From recycling paper and accounting for it's carbon footprint, his business developed an understanding of climate change-related topics, in this way opening access to customers in the green sector and in renewable energies.

> *'[...] we've looked at our business [...] and we picked out areas where it is potentially going to have an impact on the environment. For us that's car travel, car miles, office waste and electricity usage. So we've put plans in place in order to look at how we can use that to actually minimise our impact on the environment and climate change.'* (Mark, Business Leader, interviewed in 2012)

Matt informed me that he engaged with climate change through taking one step at a time, steps that for his company meant mitigating and adapting to climate change. He explains:

> *'With the big side of climate change you might not see the benefits but it's those small steps. The butterfly effects that you start with recycling paper but then three years down the line you get solar panels. [...]. Our first project [meant] 18 months of solid work trying to up the level of recycle use in Cornwall and suddenly you are immersed in recycling, compost, nappies etc.'* (Matt, Business Leader, interviewed in 2012)

These findings demonstrate that the business leaders were finding their own ways of exploring climate change and developing individual ideas of what responses to it could mean. My participating business leaders seemed to build lay knowledges through their actual encounter with the practices they engaged in (cf. Leyson & Geoghegan 2012). The fact that the participating business leaders rarely understood the specific relationships between science and business practice indicates how really climate change engagement is about how one can make this messy, scientific construct relevant to everyday life. The message-based approaches of communication such as the 'hypodermic model' and the 'deficit model' are discredited by my research findings, thus confirming previous studies (Miller 2001, Sturgis & Allum 2004).

Lewontin (1992: 86) describes approaches in which actors find their own ways of exploring life as being '*constructionist*'; organisms do not find environments but are placed into an environment without choice; neither do they '*adapt themselves to the environments or die*' but '*construct their environment out of bits and pieces*'. My data thus shows that the participating business leaders and their organizations '*construct their environment out of bits and pieces*' (ibid.) like organisms, in order to be able to cope with the complex, ever-changing and uncertain nature of climate change. Based on these findings I suggest that the participating business leaders came together in a '*continuous effort to understand connections [...] in order to anticipate their trajectories and act effectively*' (Hoffman 2006) enabling them to make sense of something that impacts their lives in multiple ways. They came together in the communities of practice under the umbrella '*climate change*' with an open mind as to what that might involve. My data shows that scientific experts joined the internal meetings and that affiliates were from ISOs and community members from, for example, the local villages. Such close collaboration and interaction between the business leaders and others also happened when they were not formally taking part in a community of practice meeting. My participating business leader Amy, for example, explained that, on climate change-related issues, she spoke with other business leaders whose intention was to engage with climate change as well.

> '*Another thing I do is just to ring other people that do similar jobs [...] in similar hotels. I would definitely call Claire's hotel. We have a very good*

working relationship actually. [...]. There is no point in re-inventing the wheel. We are all in it for the same reasons. But we wouldn't share other information.' (Amy, Business Leader, interviewed in 2012)

Claire also explained in her interview with me that she regularly consults representatives from the local villages in which her business is placed to derive climate change-related business practices. These findings show that a formal and informal interaction between a diverse range of economic actors allowed my participating business leaders to make their business practices responsive not only to local changes in the climate and the impact of these, but also to the local communities' needs. This shows that the participating business leaders were able to consider local contexts in relation to the impact of changes in the climate and engage in line with what recent climate change studies have posited about climate change engagement needing to be based *'on a local level, attending to its distinctive spatialities and temporalities'* (Geoghegan & Brace 2011: 297). This coming together that I have identified here can be termed sense-making. Ancona (2013:15) believes sense-making is crucial in current, *'ever more complex'* times, *'where unpredictable events and shifting political, economic, environmental, and social conditions'* are the order of the day. People have to think and act in an ongoing situation with incomplete events and information. She refers to Weick et al. (2005: 410) who talk about people *'being thrown into an ongoing, unknowable, unpredictable streaming of experience in search of answers to the question, 'What's the story?'* Overall, my data shows that the SMEs came together with other SMEs and also other economic and social, human and non-human actors to make sense of climate change and bridge the gap between climate change science and business practice. Coming together face-to-face enabled them to *'play the game indefinitely even if we never know if we have found the order'* of how to act best but in a ways that allows for responses *'to current social needs and take[s] into account current social conditions'* (Ancona 2013: 5). The participating business leaders showed through their participation in the niches that climate change is a complex, non-linear, evolutionary and interactive phenomena which requires an equally complex, non-linear, evolutionary and interactive process of understanding, communicating and managing it. Diverse actors must interact with each other away from the rationalized and organizing binaries of modernity in order to allow for this innovative approach. Citizen-led approaches to climate change thus acknowledge that climate change is not just physical but also social, not just non-human but also human

and most importantly not just a scientific but also a non-scientific phenomenon. Civil society thereby ignores the hierarchical structures of interaction by viewing the actor-communities of practice that shape, and are shaped by, climate change as a holistic actor-network. Business leaders in this sense demonstrate what Hulme (cf. Hulme & Blackman 2009, Hulme 2010, Hulme 2013) has repeatedly argued: that climate change cannot be solved but only lived [Figure 18].
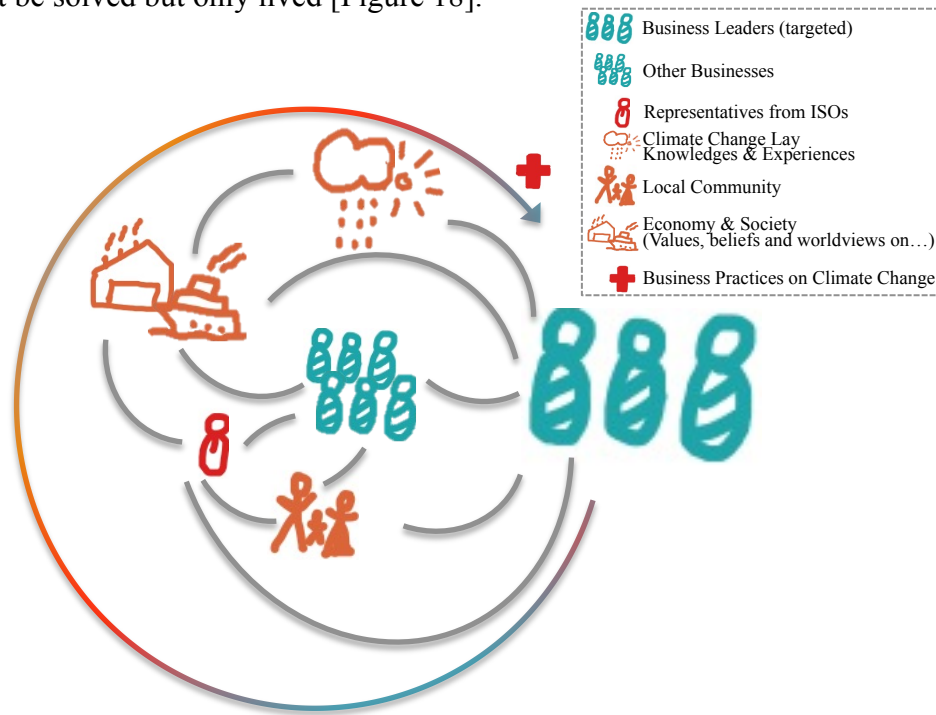

Business Leaders (targeted)

Other Businesses

Representatives from ISOs

Climate Change Lay Knowledges & Experiences

Local Community

Economy & Society (Values, beliefs and worldviews on…)

Business Practices on Climate Change

Figure 18: Sense-Making through Interaction and a Holistic View of the World[33]

Figure 18 illustrates the ways in which the business leaders used personal interaction with a variety of human and non-human actors to make sense of climate change. These actors are business leaders, scientific experts, intermediaries, representatives from local communities, researchers and local politicians as well as values regarding social, economic and environmental developments, landscape and regime structures and also lay knowledges on climate change. The business leaders came together in a continuous effort with this variety of actors with an open mind as to what climate change engagement might involve. This means that the business leaders created a community of practice on climate change where each actor continuously made sense of climate change through interaction with each other and based on the interactive and evolving character of innovation.

This interdisciplinary sense-making that I have identified here shows that the participating business leaders were attempting to make sense of climate change outside the '*overly-simplistic approaches*' that currently define the communication of ISOs (cf. Chapter 5) (Lindegaard 2013: 13). The participating business leaders seemed to choose a more holistic route to understanding climate change. The community of practice was thus not restricted by a dictated need and direction for

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[33] Own creation.

innovation, a situation that has been criticised by Lindegaard (2013) most recently. My participating business leaders seemed to acknowledge that climate change was as complex, interconnected reality, with '*the variability and uncertainty that characterizes changing climates*' (Lindegaard 2013: 13). I conclude that the participating business leaders wanted to improve their '*understanding of reality*' (Ancona 2013: 15) through such wider views on climate change and 'to *comprehend, understand, explain, attribute, extrapolate, and predict*' impact (Starbuck & Milliken 1988: 51); This sense-making activity shows that climate change is part of a multifaceted interaction among society, economy and the environment and a problem that is shaped through human and non-human actors and consequently needs to be dealt with not only by the natural sciences.

7.2.3. Finding Protected Spaces to Engage with Climate Change

I outlined in Chapter 2 that SMEs often suffer from limited resources such as narrow technical knowhow and restricted research capabilities (Deakins & Freel 1998, Bougrain & Haudeville 2002, Klerkx et al. 2009, Cassells & Lewis 2011). They also rely heavily on the decision-making of individual business leaders and cannot – due to their size-related limitations - apply concepts and routines when trying to innovate (Hutchinson & Quintas 2008, Bergh 2009). SMEs instead depend on trustful, personal and informal relationships with other businesses, individuals and research organizations to enable learning and innovation (Kaufmann & Tödtling 2002, Perrini et al. 2007, Bergh 2009) (cf. Chapter 2). To be able to carry out learning and innovation my research data suggest that the business leaders of my study came together as individual citizens rather than representatives of SMEs. My BL4LC observation below for example shows that the community of practice members were trustful and intimate with each other [Participant Observation 11]:

> '*People interrupt each other. It seems that some of the business leaders feel very emotional. [...]. I am taken by surprise by the informality of this meeting. Despite the suits that the business leaders wear nothing really reminds me of a business meeting. Everyone speaks when and as they like. I wonder whether or not we even follow the agenda. But I feel comfortable. Everyone does. They get up and get a cup of tea and cookies in-between. They know each other by name and seem to have met each other before many times.*'

Participant Observation 11: Quarterly Meeting in 2011 at the Cornwall Marine Network

This coming together was casual and unlike formal business conventions. This interaction around climate change contrasts with the rational and linear ideas with which ISOs communicate climate change. The following CoaST observation reflects an atmosphere in which the participating business leaders interacted informally, more as friends than as business peers [Participant Observation 12]:

> *'Bright red and green jumpers shine in between the many smiling faces. I feel comfortable and excited amongst the chatting of all these delegates. They seem to know each other. [...]. This is a big social club. [...]. As I walk out I see Chris 1. He greets me with a kiss on the cheek. [...]. There are two old ladies [...] (who) remind me of Amish people. [...]. The day ends with a dance so Manda invites us all to stand up. It consists of shouting, jumping and humming. I am surprised to see the local councillor join in. This is a very exciting atmosphere. It feels very intimate. People here know each other by name. I seem to have joined a little community. [...]. We all want to change the world. Today that seems possible.'*

Participant Observation 12: Ten Year CoaST Anniversary 2013 at the Heartlands

My above observation shows that the participating business leaders felt comfortable and acted outside of their traditional business roles. This observation also shows that the participating business leaders had established their own routines and behavioral patterns (cf. Blommaert 1998). Such contexts are seen in the literature as spaces that have established '*reciprocal, reputational, or customary trust*' (Cooke 2007: 88). I conclude that in the communities of practice I observed, the participating business leader were in spaces in which they trusted and were trusted.

My findings also show that the participating business leader carefully protected their trusted space. My analysis of BL4LC's internal minutes, for example, reveals that there was detailed documentation of members' attendance. Detailed attention was paid to attendance at meetings and little attention was paid to achieving material outcomes. The group even reflected on the attendance of participating business leaders in some of their internal documents. For example, one document said [Document Analysis 4]:

> *'Of the 40 or so private-sector people on the mailing list [...], only 20 have attended at least one meeting in the past year. [...]. This structure cannot become too formal as we are all engaged in a voluntary capacity, giving freely of our time and expenses.'*

Document Analysis 4: Draft Criteria for Membership BL4LC

Additionally, the participating business leader Des explained that the members fear new business leaders and their impact on the group:

> *'But some members criticize this because they fear that new members want to use us as a promoting platform. LinkedIn increased our exposure [...]. That is a challenge.'* (Des, Business Leader, interviewed in 2012)

Shortly after this comment was made I observed that a number of new business leaders were taken off the membership list, clearly indicating that business leaders with different values and beliefs were not welcomed. My findings here indicate that the participating business leaders valued being together with other business leaders. They enjoyed the trusting relationships and they seemed to have similar values and beliefs on climate change. I conclude from the above that my observed communities of practice were benefiting from social capital. The literature explains that social capital enables people to act more effectively when pursuing shared objectives (Putnam 1993) and that social capital contributes positively to economic development (Knack & Keefer 1997, Temple & Johnson 1998). Social capital empowers people to make autonomous, economic and social choices the literature further suggests (Todaro & Smith 2006, Friedman 1992). Such empowerment takes place through *'community decision-making, local self-reliance, direct democracy and social learning'*. I can therefore conclude that the communities of practice that I observed here empowered business leaders to make choices regarding the impact of climate change.

The above data shows that the problem of climate change had entered the participating business leaders' belief systems, *'beliefs that emerge, not from individual preferences, but from societal norms'* (Hoffman 2012: 32) (cf. Chapter 2). This is a concern that Hoffman (2012) raises in his article *'Climate Science as Culture War'*. He points out that climate change really is a debate over '*values, worldviews, and ideology'* (ibid.: 33) and suggests that people adopt views on issues which '*reflect their identity, worldview, and belief systems'* to reinforce the connection with their referent groups and to strengthen their definition of self (ibid.: 32). The evidence from the research presented here suggests that the wider belief system of individual business leaders reinforced their engagement with climate change. In the case of Cornwall, where economic actors emphasised the importance of personal

relationships and where, according to the business leader Caroline, '*a sense of place [...]*' existed and, '*[...] businesses go into things naturally*', the informal and formal networks of personal relationships encouraged such a climate change belief system. The SMEs from my study managed to establish '*a set of socially accepted beliefs on climate change*' (Hoffman 2012: 32) around them. Hoffman (2012: 32) explains that people adapt their views on issues through their existing '*identity, worldview, and belief*', called ideological filters. People filter issues such as politics, opinions and science through their existing values and try to make the identities, worldviews, and beliefs that they take on certain issues match the identities, worldviews, and beliefs of people in their personal communities of practice. Hoffmann (2012: 32) concludes that therefore climate change '*provoke[s] a violent debate among cultural communities*', especially among communities who feel that climate change either threatens them or those who feel it supports them. Hulme (2008) also argues that climate change science is always entangled with social discourses. Consequently, if people want to engage with climate change due to their world view then they will find other people that have similar views to reinforce the connection with their referent communities of practice and to strengthen their definition of self (cf. Shove 2010). Coakes & Smith (2007: 77) explain that such a group's shared belief systems '*provide safe places for the creation and support of innovatory ideas*'. Such places where the socio-economic system can be questioned safely and citizens can think about different ways of doing things are called '*niches*' (Smith & Raven 2012, Seyfang & Longhurst 2013). Niches, as I already briefly introduced in the Literature Review, are protected spaces '*where new sociotechnical configurations and practices can be experimented with and develop away from the selection pressures of the dominant system*' and offer '*supportive networks to allow experimental new systems to take shape*' (Seyfang & Longhurst 2013: 882). Niches aim to provide 's*olutions that respond to the local situation and the interests and values of the communities involved*' (Seyfang & Smith 2007: 585). Seyfang (2009: 7625) argues that a '*space where different values are practiced can be a powerful contrast with mainstream systems, enabling people to visualise a world were everyday practices might be different, and reflecting critically on mainstream provisioning*'.

My assumption that the communities of practice on climate change offered the participating business leaders a safe place away from the existing pressures of the

system was supported by the findings from my online survey. In the online survey, the participating business leaders indicated that they understood responding to climate as part of a notion of positively impacting on society, the economy and the environment [Figure 19]:
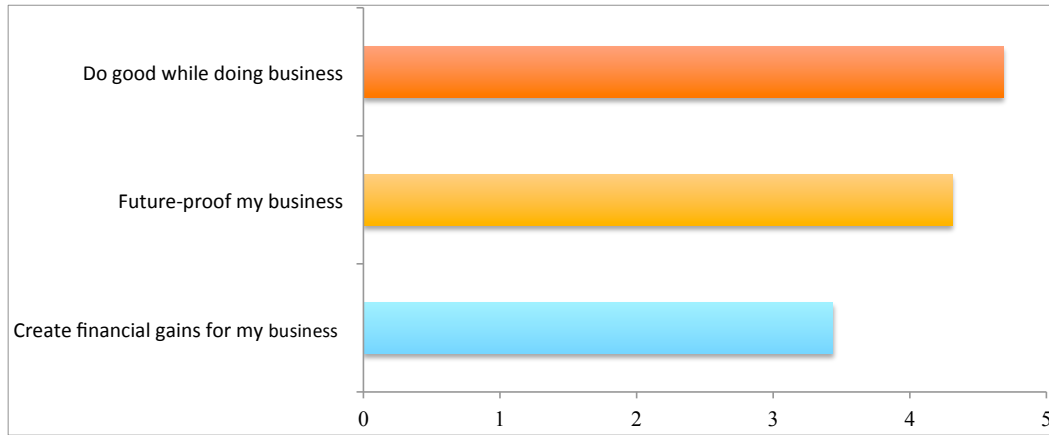

Figure 19: Aims of Engaging with Climate Change[34]

The survey data here shows that the participating business leaders perceived the bigger picture around climate change engagement. For the participating business leaders, engagement with climate change was seen as behaving in a morally responsible way to safeguard economic, environmental and societal concerns. This, I suggest, is evidence that the participating business leaders could see that improving one aspect of the socio-economic system does not work but that innovation must entail interconnected feedbacks. This finding is also supported by findings from my workshop during which the participating business leader stressed that meaningful, profitable and sustainable engagement with climate change required new socio-economic systems and new social, economic and environmental expectations. I conclude from this that the participating business leaders have different values from what traditionally rent-seeking firms are after. These findings show that the participating business leaders aimed to create '*alternative ways of doing things*' (Seyfang & Smith 2007: 595). These citizen-led niches that the business leaders of my study have created showed that trust enabled the participating business leaders to opt for mainstream change in society's systems. The notion of the 'risk society' thus contrasts with the notion of citizens being able and wanting to actively participate in the way society is structured. The current 'risk society' needs more collective, traditional and trustful views in order to engage in public discourses on climate

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[34] Own creation.

change. Hence my participating business leaders need to be treated as citizens, not just as business entities, as defined by CSR, and not just as people representing a *'business institution',* but more as individuals, as part of the society per se (cf. Heiskanen et al. 2009).

The findings also show that to engage with climate change in meaningful, profitable and sustainable ways business leaders needed to think about '*what sort of society and economy we might wish to be included in*' (Scott-Cato & Hillier 2010: 5, cf. Mulgan et al. 2007: 5, cf. Mumford 2002, Scott-Cato & Hillier 2010). The participating business leaders showed that to be able to engage with climate change sustainably, they need new socio-economic systems that allow for a more '*sophisticated form of capitalism*' (Porter & Kramer 2011: 12). Jackson (2009: 489) argues that such alternative systems (cf. Chapter 3) should be based on other indicators than growth because current economic models are based on '*relentless consumption growth*' making combating climate change impossible. Jackson (2009) challenges the traditional belief that only economic growth can deliver prosperity. Porter & Kramer (2011) explain that most companies cannot recognize the importance of social issues because of the current understanding of growth. In the past, views of doing business have been too narrowly focused on gaining and maintaining competitive advantage, overlooking the importance of societal needs, and location (Jackson 2009, Porter & Kramer 2011). Hoffman (2012) also believes in the necessity for a new view of the ecosystem, the human role in it and acceptance of global ethics and governance. This would involve changing '*conceptions of science, economics, religion, psychology, media, development, and governance'* (Hoffman 2012: 5) beyond current experience. Niches have been shown to be particularly important when systems prevent people from changing their behavior and when people are wanting 'revolutionary' and sustainable change (Grabher 2005, Seyfang & Longhurst 2013). This discussion mirrors one of the most important findings of this chapter and reflects on the earlier findings of my thesis: these communities of practice show that fundamental assumptions of modernity are under question. The way in which individuals are seen as separate from each other and as individuals that make rational decisions comes into question with climate change. It is through these reflections that what Hulme (2013: 298) means when he states that climate change '*stands in for something else'* becomes

apparent. My findings here show that engagement with climate change stands for the way in which people choose to live.

My data, however, also reflects the weaknesses and threats that make working within these citizen-led communities of practice challenging. The following observation for example shows that the participating business leaders have to deny the values of their belief systems in order to receive funding [Participant Observation 13]:

> *'A representative from the council explains that they want to support the ambitions of SMEs to grow. Someone says that this is something most business leaders in this room disagree with. 'Business is not just about growth; after all a growing number of economists recognizes the limits of growth and the need for prosperity to combat climate change', someone adds. The council lady replies: 'No, it's not just about growth but it's an argument to secure funding.' I am disappointed that nobody in the room supports the other two people who just criticised the growth assumption. [...]. They stay quiet because they want to secure the funding too.'*

Participant Observation 13: Quarterly Meeting in 2013 at Francis Clark

My observation here shows that the participating business leaders needed to operate within a given socio-economic system. This community of practice had to accept given power structures in order to prosper. Consequently, the members could not act out all the attributes that characterised their niche. A member explained that without the support of the local council, for example, their (possible) capabilities would be insignificant.

> *'[...] we need the Council to believe in us. Without the Council's support we are not worth the existence because everything revolves around this council. It's very powerful.'* (Des, Business Leader, interviewed in 2012)

I also noticed a dependence of BL4LC on the local council: a number of council representatives regularly supported BL4LC at its meetings. Ben, for example, who works for one of the participating ISOs was responsible for a variety of BL4LC actions in 2012/13 and chaired many of the quarterly meetings. My observations also show that BL4LC's goals were very reactive rather than revolutionary [Document Analysis 5].

'Identifying problems with Superfast Cornwall roll-out and providing these to the Superfast [...] Team. [...]. Responding to the 'Cornwall & Isles of Scilly Local Enterprise Partnership: Economic Growth Strategy for Cornwall and Isles of Scilly 2012 – 2020'. Identifying weaknesses of the 'BREEAM (Building Research Establishment Environmental Assessment Methodology) 'Excellent' Building Standard' when applied within Cornwall's infrastructure and providing these weaknesses to the Building Research Establishment team and the UK Green Building Council.'

Document Analysis 5: Main Activities BL4LC

My findings here show that BL4LC had to operate with a certain amount of (political) naivety: the group wished to change the socio-economic system, but at the same time relied on the support of this very system. This naivety has also been identified within the Transition Towns movement. Scott-Cato & Hillier (2010: 878) suggest that niches often do not challenge the totality of a socio-economic system '*but rather attempt to change it, by thinking transversally and embracing more eco-sustainable ways of living*'. Previous research has also shown that niches require the support of existing aspects of the socio-economic system to allow them to develop and transition that system (Mumford 2002). Seyfang (2009) explains that, nevertheless, niche innovations often struggle to diffuse into the wider socio-economic system without top-down support. My investigations show that the niche activities of the participating business leaders were promising but that they stood in isolation to the current climate change communication. There was no opportunity for the niche to influence the linear, top-down approach of climate change communication. Even though some representatives of ISOs were active actors within the niche, they were unable to influence the current communication systems [Figure 20].
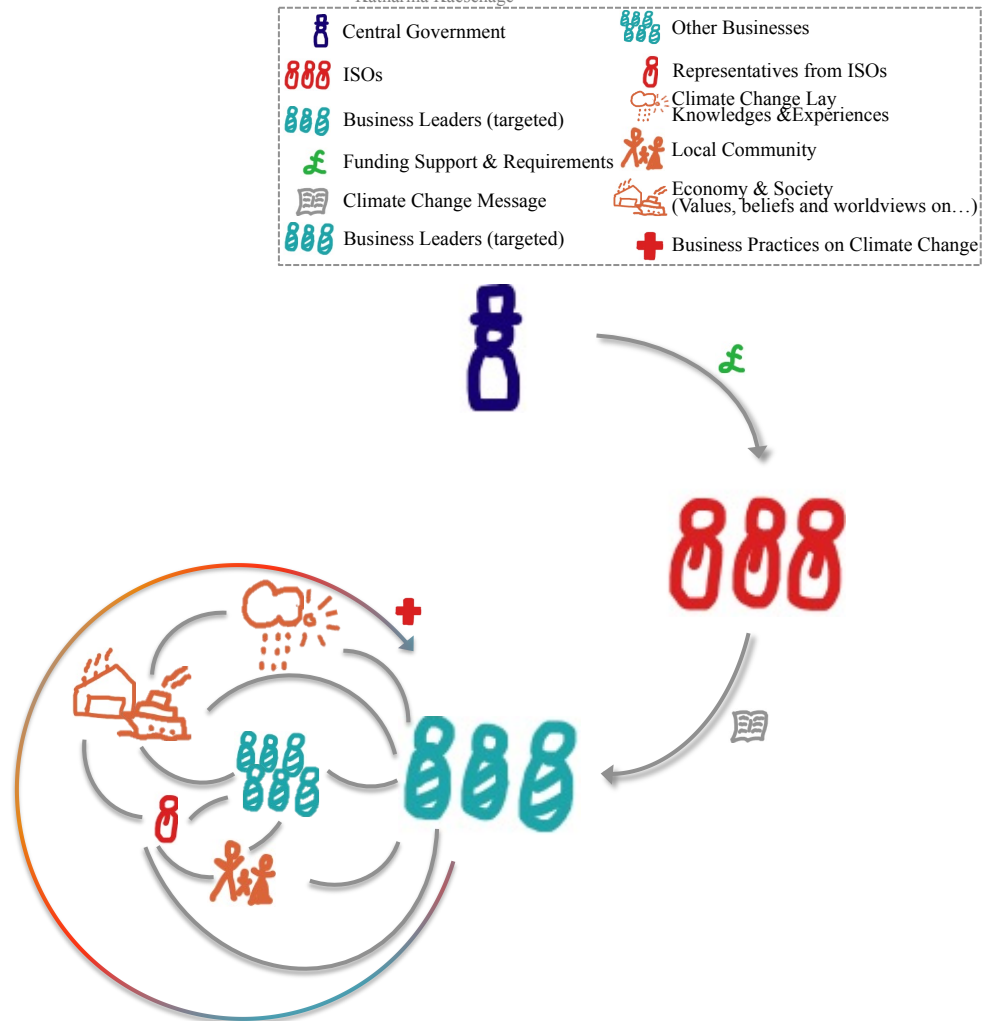
Figure 20: Niche Activities Outside of Current Climate Change Communication[35]

Figure 20 illustrates how the sense-making niche of business leaders stands in isolation to current climate change communication. In Chapter 5, I showed that ISOs, as the main communicators of climate change knowledges for SMEs, focused on persuading businesses to engage with climate change and are locked in rigid, short-term funding and government structures. Their message failed to deliver information on business practices related to climate change and did not help business leaders to make climate change engagement more meaningful, profitable and sustainable. This misguided and ineffective climate change communication is constructed as linear and top down: Government dictates the climate change-related topics that ISOs can communicate and leaves limited options for SMEs to influence the message. This chapter has shown that business leaders of SMEs developed niches to make climate change knowledges relevant to their decision-making. These niches allowed the diverse actors to move away from the 'organizing binaries' (Gregory et al. 2009: 7) and linear assumptions on innovation dictated by Government and ISOs. These niches stand in isolation to the current climate change communication. There was no opportunity for the niches to influence the linear, top-down approach of climate change communication. Even though some representatives of ISOs were active actors within the niche, they were not able to influence the current communication.

In order to achieve the system wide change that the business leaders in my study were aiming for, I suggest that the niche(s) should be maintained over a longer period of time and that interaction with other niches must be encouraged. My suggestions here

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[35] Own creation.

are based on ideas from the literature that give recommendation on how to stimulate the potential impact of niches on wider socio-economic systems (Kemp & Rotmans 2005, Markard et al. 2012, Boons et al. 2013). The niche concept that the participating business leaders here followed, and in which the participating business leaders put civil society, is at the centre of (potential) innovation, and seems to be a promising approach to managing climate change in a more meaningful, profitable and sustainable way. The above investigations have shown that the niche promises to stimulate epistemological change (cf. Gallopín el al. 2001). If government and policy makers would try and utilize these promising niches, I would hope that the most recent call to revolutionize climate change communication would be followed up. Government and policy makers could harvest the benefits of: (1) being able to connect scientific knowledges with lay knowledges; (2) being able to see the relationship between projected changes and experienced changes; (3) being able to marry rational assumptions with emotional ones; and (4) acknowledging the interrelation of changes in natural and human systems which all work with and on the '*changes in our understanding of the world*' (Gallopín et al. 2001: 223).

7.3. Conclusion

This chapter has investigated how the participating SMEs addressed the gap that exists between climate change science and business practice through their interaction in business communities of practice.

The research revealed that the two climate change-related communities of practice constituted an important resource for the participating SMEs to make sense of climate change. The communities of practice created few materialized learning outcomes, but members benefited from coming together with other business leaders. They valued the informal structures manifested in face-to-face interactions. In these communities of practice the participating business leaders were able to '*give life*' to climate change through reflecting on their own social settings, concerns and understandings. This life giving seemed to be very different to the over emphasis on scientific evidence with which climate change is normally approached. The sense-making activities I observed are also detached from mainstream assumptions of doing business and focus on establishing the economic and social resilience of the participating businesses in relation to climate change. I learned that the participating business leaders made sense

of climate change through interdisciplinary knowledge-making. In these niches social and economic understandings around climate change can merge so that the participating business leaders had the opportunity to think outside the rigid dominant mental models of the current socio-economic system (cf. Chapter 2).

My research here shows that climate change cannot and should not be viewed within the organizing binaries of modernity - within segments of disciplines or along divisions between human and non-human actors. Instead, the participating SMEs showed that there is a need for a multi-actor approach to learning to enable innovation for climate change. The participating business leaders made sense of climate change in a non-linear, evolutionary and interactive process in which actor-networks interacted and co-evolved. This approach shows that to enable a sustainable management of climate change, the participating business leaders needed to neglect some of the individualistic characteristics of modern decision-making and that they needed to think as a collective, sharing lay knowledges and passing on experiences (cf. Chapter 3). I also showed that when the participating business leaders tried to engage with climate change, the socio-economic system rarely supported their efforts. Consequently the participating business leaders searched for secure spaces in which mitigation and adaptation were easier to work out and perhaps more rewarding.

This chapter has also shown how the participating business leaders joined BL4LC and CoaST as citizens rather than business representatives. Within these niches, they were empowered to pursue their efforts through shared social belief systems and they found room to develop novel thoughts on climate change. The fact that the participating business leaders considered business practice in relation to their local contexts shows that it might be crucial to consider local contexts when engaging with climate change. I recommend that the UK Government should consider such local considerations when designing climate change-related policies to try and make engagement with climate change more meaningful, profitable and sustainable. UK Government should also use the bottom-up citizen-led niches in which the participating business leaders engaged in 'public discourses', to allow for evolutionary climate change communication and equally allow for *planetary responsibility'* for climate change (cf. Ostrom 2012). Consequently, there must be an integration of 'citizen-led niches' in the climate change-related policy debates led by government. This would allow a

'new 'mode' of knowledge production' in which the traditional boundaries' overlap, one which fosters a *'hybrid imagination', mixing natural and social, local and global, academic and activist forms of knowledge in new combinations'* (Jamison 2010: 820). In order to do this, UK Government needs to actively engage as an '*active, entrepreneurial, risk-taking agent'* (Mazzucato 2013: 12) within the innovation system. Such a '*smart but also inclusive'* view on governing (Mazzucato 2013: 183) would acknowledge, I assume, the true interconnection of actor-networks in opposition to the *'organizing binaries'* (Gregory et al. 2009: 7). This means that the participating businesses and the other niche actors would be able to feedback on their current climate change engagement to UK Government. The government could then continuously update the topics that are given to the participating ISOs. This approach would change the top-down, simplified and linear communication of climate change to a more holistic and interactive approach [Figure 21].
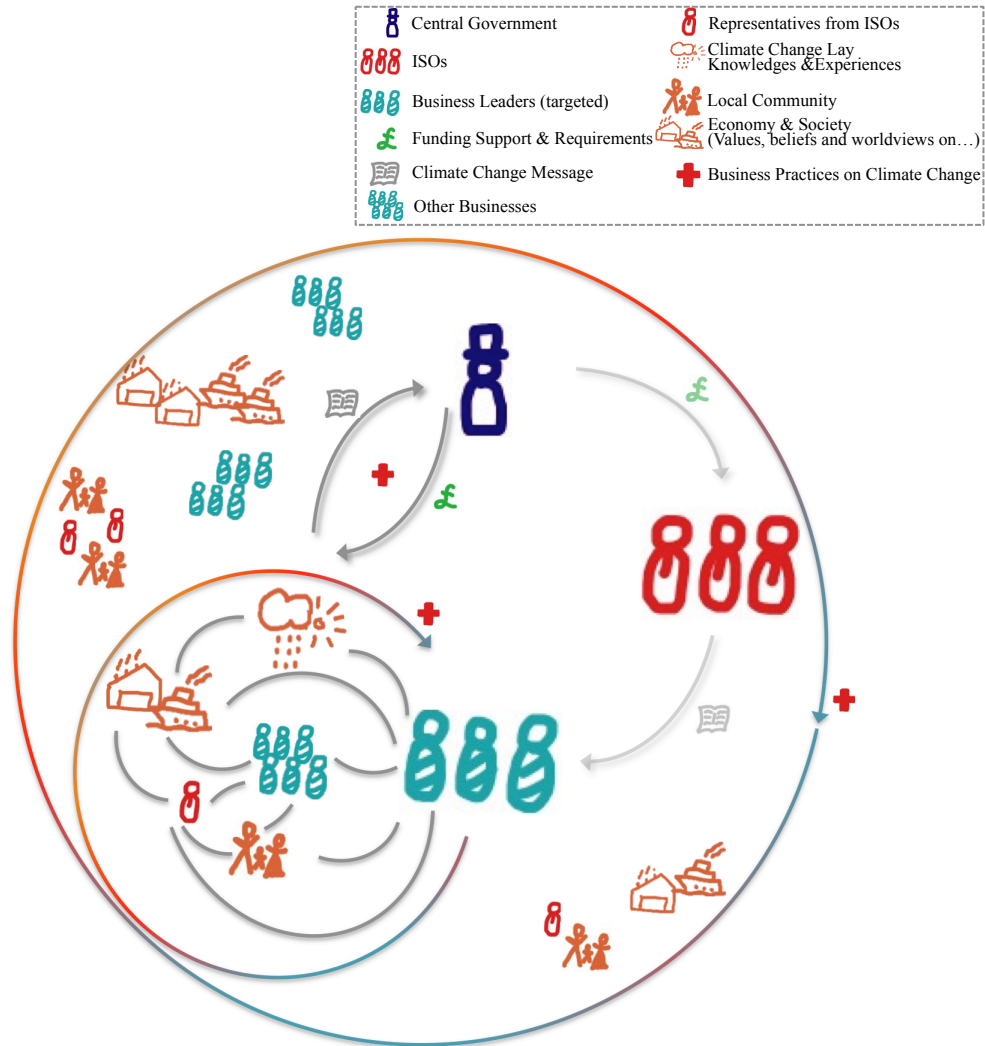
Figure 21: Schematic Representation of Future Climate Change Communication[36]

Figure 21 shows the way in which the niche could be connected to climate change communication. The figure displays the current niche activities as an integrated part of climate change communication. Before deciding on the climate change-related topics that ISO should communicate to businesses, the Government communicates with the niche on what is needed to make their engagement more meaningful, profitable and sustainable. This means those businesses and their niche actors constantly implement and feed back on their current climate change engagement to the Government. Therefore, the Government can continuously update the topics that are given to ISOs. ISOs then communicate to businesses inside and outside of the niche but are equally part of the niche. The direct dependence of the climate change message on UK Government's requirements and support thereby decreases.

This chapter emphasizes the importance of formal and informal knowledge exchange for SMEs to be able to engage with climate change. I therefore advise that the current '*governmental top-down frameworks and goals*' on climate change meet '*with local geographies and 'bottom-up' local desires and aspirations*' found in niches on climate change (Moir & Leyshon 2013: 1020). I would hope that a corporation of

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[36] Own creation.

Government with niches would accelerate a more polycentric understanding of climate change and increase the number of possible mitigation and adaptation actions. Once the sense-making processes in the niches were better comprehended, solutions developed in these niches could then be applied to other niches, and perhaps the socio-economic system. Such an integration of citizen-led sense-making within governmental decision making would allow climate change communication to move away from the out of date and inappropriate, simplistic and linear, and overly scientific approaches with which government currently manages climate change.

More generally, the niche activities of the participating business leaders showed that business leaders cannot wait for an effective global solution to manage climate change in meaningful, profitable and sustainable ways. There need to be a more self-conscious public that addresses climate change (cf. Ostrom 2009, Ostrom 2010). Individuals need to make use of the democratic opportunity of being the 'public' with regard to climate change. My research demonstrates that citizen-led approaches are promising to manage climate change in more meaningful, profitable and sustainable ways for a diversity of economic actors. The niches reveal that the business leaders, who were largely motivated to engage with climate change through personal values, made sense of climate change through viewing it as an issue that concerned them as citizens. This behaviour supports what Giddens (1999) and Beck (2006) describe as behaviour characteristic of a reflexive society. This understanding of climate change evolves organically and cannot be dictated only by scientific knowledge or governmental power structures. These citizen-led approaches also remind us that actors only find meaning through their actual encounter with other actors and that therefore climate change, too, must be understood through the diverse cultural, personal, organic and scientific actors that have created climate change in the first place. Ultimately, then, climate change can be managed through the *'goals, ambitions and destinies we foresee for ourselves'* (Hulme's 2010: 298). To do this, society needs to undergo radical social change by developing social belief systems, a social consensus, which changes the socio-economic system.

8. Discussion

In this PhD thesis, I set out to understand the ways in which the business leaders of SMEs make sense of, and engage with, climate change. I investigated why the SME leaders engaged with climate change, which climate change knowledges were communicated to them, and how they overcame the gap that exists between business practice and climate change science. These investigations were based on the research questions:

(1) Which climate change knowledges are communicated to SMEs and how?

(2) Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?

(3) How do SMEs overcome the gap that exists between business practice and climate change science?

The findings in response to these research questions, have implications for public policy and practice on the communication of climate change to SMEs specifically and climate change communication more generally. Additionally, lessons can be learned on how SMEs may be able to manage climate change in the future.

To answer the research questions, I used Cornwall's business community as a case study. Using both qualitative and quantitative research methods, I critically examined 31 SMEs (from a variety of different sectors) which planned to engage with climate change, 5 ISOs which communicated climate change knowledges and two communities of practice that aimed to make sense of climate change. I used a range of research tools including open interviews and participant observations, supplemented by limited quantitative data collection in the form of an online survey. Viewing the research context, its participants, the business communities of practice and climate change knowledges through the lens of ANT offered me the opportunity for exploring the interconnection of human and non-human actors. Importantly, this perspective also enabled me to view climate change as a social construct separate from the rational choice based assumptions with which climate change is predominantly approached. Use of this interactive research method, and the development of the ANT perspective, were only possible through becoming part of the business community and taking part in the *'lives'* of the participants. Key to this active participation was building trustful relationships with the participants through attending business

meetings regularly, showing genuine interest in their businesses and communicating the potential benefits of my research to the participants.

8.1. Contributions to Knowledge

This thesis makes three main contributions to knowledge. (1) Theoretically, this thesis explores the under-investigated subject of business and climate change. This subject is currently understood through broad assumptions about a variety of businesses regardless of their size-specific needs. The business literature in particular conveys climate change as easily manageable and somewhat tangible. The majority of studies in this field also tend to focus on larger corporations only and address climate change as simply an aspect of CSR. The detailed investigation of SME's understanding of and engagement with climate change in this thesis thus contributes to the theoretical knowledge.. Additionally, this thesis delivers insights into the previously unexplored communication aspect of climate change and business by investigating what kind of climate change knowledges are communicated to SMEs and how.

(2) Methodologically, this thesis looks into the theoretical gaps outlined above through the eyes of ANT – Actor Network Theory - to reveal the reality of climate change as a social construct away from the organizing binaries of modernity.

(3) Empirically, this thesis delivers important and unique findings that I have summarized in three empirical chapters: (1) the climate change message for SMEs is largely persuasive and does not deliver practical steps forward for business leaders; (2) the SMEs receiving this message are already persuaded to engage with climate change due to their personal values and want more practical information about how to go about it; (3) the business leaders from the SMEs thus peer-to-peer 'sense-making' of climate change to enable a more sophisticated engagement with it for themselves but also their localities and society more generally.

Overall, this thesis shows that SMEs appear to be a misunderstood audience with respect to their potential leadership capacity in the climate change challenge. The participating ISOs tended to communicate climate change in an overly simplistic

manner to the participating SMEs and focused on the urgency of engagement with climate change. SMEs hearing this persuasive message were already willing to engage with climate change; their motivations to engage were lay-knowledge-dependent, derived from personal values, space and place identity. What they were really looking for was practical advice on how to mitigate, and/or adapt to, the impact of climate change climate change. Consequently, current climate change communication did not help these business leaders to develop business practices and make their engagement with climate change more meaningful, profitable and sustainable. Some of this ineffective and somewhat mis-targeted communication is a consequence of rigid funding structures and a Government that is perceived to be uncommitted to economy-wide mitigation and adaptation behaviours. The SMEs in the study tried to overcome the limitations of current climate change communication and the accompanying lack of business practices through forming and joining climate change-related business communities of practice. By doing this, SMEs were able to make sense of climate change in niches *'away from the normal selection pressures of mainstream systems'* (Seyfang & Longhurst 2013: 881) with other economic actors and to benefit from social belief systems, '*beliefs that emerge, not from individual preferences, but from societal norms'* (Hoffman 2012: 32).

8.2. Implications for Public Policy and Practice

Following on from these contributions of my PhD, I will now list the implications of the findings for public policy and practice. Climate change must be communicated as an issue that impacts businesses as citizens and which defines the world within which businesses operate and 'live'. This PhD thesis demonstrates that businesses' understanding of climate change emerges around transient sense-making activities and does not appear to be formulated through interpreting specific scientific knowledges and/or business reasoning. Business leaders make sense of climate change through interdisciplinary knowledge-making, where social, economic and environmental understandings merge. How business leaders understand climate change science is therefore fundamentally at odds with the 'deficit models' of knowledge exchange. Policy makers should give business leaders the opportunity to '*give life'* to climate change using their own social settings, concerns and understandings. These sense-making opportunities must be detached from mainstream assumptions of what it means to do business and focus on establishing economic and

social resilience to climate change. One way for policy makers to provide this sense-making opportunity would be through targeting established belief systems, *'beliefs that emerge [...] from societal norms'* (Hoffman 2012: 32). Policy makers should target groups, communities and audiences which already support engagement with climate change and utilise those. ISOs should also target other business communities of practice in which other shared social beliefs exist. This would enable and motivate business leaders to engage in the public discourse on climate change. This would also allow a wider range of business leaders to collectively develop values, beliefs and culture on climate change-related issues and foster, and accordingly reinforce, engagement with climate change. This approach would also create formal and informal knowledge exchange between SMEs and the UK Government and allow for climate change-related debates among different business groups.

For policy makers to target niches would also mean that policy makers and ISOs need to acknowledge that business leaders are different from how they were previously assumed to be. Not all business leaders are principally rationally motivated, values-free, profit-maximisers. Climate change appeared to have an impact on the participating business leaders as citizens through creating social, economic and environmental changes. Therefore, ISOs need to move away from chronic persuasion debates and work with the realities and complexities of the business audience. To do so, communicators need to acknowledge that climate change is not just about science and potential (financial) socio-economic risks only but rather more generally about how business leaders view the world. Consequently, climate change scientists as well as communicators do not need to communicate climate change science to SMEs *per se* but instead need to comprehend the value-driven audience of SMEs and their specific social contexts.

I conclude that to enhance the number of SMEs engaging with climate change, to maximize the potential socio-economic value of climate change for society and to establish a low carbon economy, communication needs to target the personal values of business leaders. The message should highlight the local impacts of climate change, the potential 'feel good factors', particularly the benefits of engagement with

(the local) society and economy, and the possible financial benefits for the engaging business [Figure 22].

REGIONAL
IMPACTS

FINANCIAL
BENEFITS

FEEL GOOD
FACTORS

Figure 22: Key Factors for Climate Change Communication to SMEs

More generally, it can be seen that climate change communication needs to be more aware of individual audiences (cf. O'Neill & Hulme 2009) and that climate change is as much a discussion about values, cultures, and beliefs as it is about modelling climate variability.

The citizen-led solutions that the business leaders in this research study chose to make sense of climate change and the value-based motivations of the business leaders within those citizen-led approaches, show that climate change both impacts on, and is created by, the personal, multi-actor interaction of individuals. Therefore climate change needs to be communicated, understood and managed through such multifaceted interactions and knowledges. SME leaders show the need for a multi-actor approach to learning and innovation with regard to climate change and for challenges to be posed to the traditional and conservative science practices that many scholars now criticise (Hulme 2009, Ostrom 2012). The citizen-led niche approach moves away from simplistic views on business decision-making and reveal that business leaders make sense of climate change through viewing it as an issue that concerns them as citizens. This understanding of climate change evolves organically and cannot be dictated by either scientific knowledge or governmental power structures only. The UK Government, policy-makers and ISOs therefore need to make use of bottom-up developments where people engage in 'public discourses' on climate change, and to allow for evolutionary climate change communication and equally, for *'planetary responsibility'* for climate change (cf. Ostrom 2012). This would allow climate change communication to move away from the out of date and inappropriate, simplistic, linear, and overly scientific approaches that have been identified as dominating climate change communication.

Overall, the niche approaches that business leaders chose in order to 'securely' engage with climate change shows that society needs a new socio-economic system; first and foremost a socio-economic system that enables the 'doing' of business in meaningful, profitable and sustainable ways and a society that requests such features in its socio-economic systems. This PhD research shows that to enable meaningful, profitable and sustainable engagement with climate change, a seemingly revolutionary change in people's beliefs is needed. I can therefore support Jackson (2009: 489) in his request for '*resilient ecological macroeconomics (...) no longer predicated on relentless consumption growth*' but that enable a new '*sophisticated form of capitalism*' (Porter & Kramer 2011: 12). The business leaders in this study who engage with climate change feel a sense of responsibility for the environment and society due to being in leadership positions and wanting to '*do business while doing good*'. New types of economic exchanges, new economic models, and innovative proxies to measure prosperity are needed to address this challenge. Climate change communicators therefore need to acknowledge that '*debate over climate change, like almost all environmental issues, is a debate over culture, worldviews, and ideology*' (Hoffman 2012: 32). Climate change can only be mitigated and adapted to if the socio-economic system understands and incorporates this notion. We thus learn that we must view climate change in the full reality of it having consequences for people's lives. This seems to be the most important lesson to yet be learned.

8.3. Conclusion: Thinking Differently about Climate Change

Overall my research shows that climate change needs to be viewed from the perspectives of the ones who cause and will be affected by climate change: citizens. To do this, I would recommend that different groups of people take this citizen-led responsibility on board. UK's Government needs to fully commit to climate change regardless of election periods and decide to put it at the heart of its policies and make use of these citizen-led approaches to manage climate change. If the government uses the niches that exist in connection with climate change, then the development of a climate change message that focuses on the true social/cultural aspects of climate change and the three key aspects that motivate business leaders to take action would become easier. Integrating niches within climate change communication through

linking niches to the decision-making of the government would enable a long-term, progressive and interlinked approach towards climate change. Communicators and SMEs would be allowed to continually and gradually (in their own time) engage with climate change. The diversity of lay knowledges, local communities, values and experiences could then directly feedback into the reality of business decision-making and learning and develop business practices that are not only meaningful, profitable and sustainable but also impact on and change the socio-economic system [Figure 23].
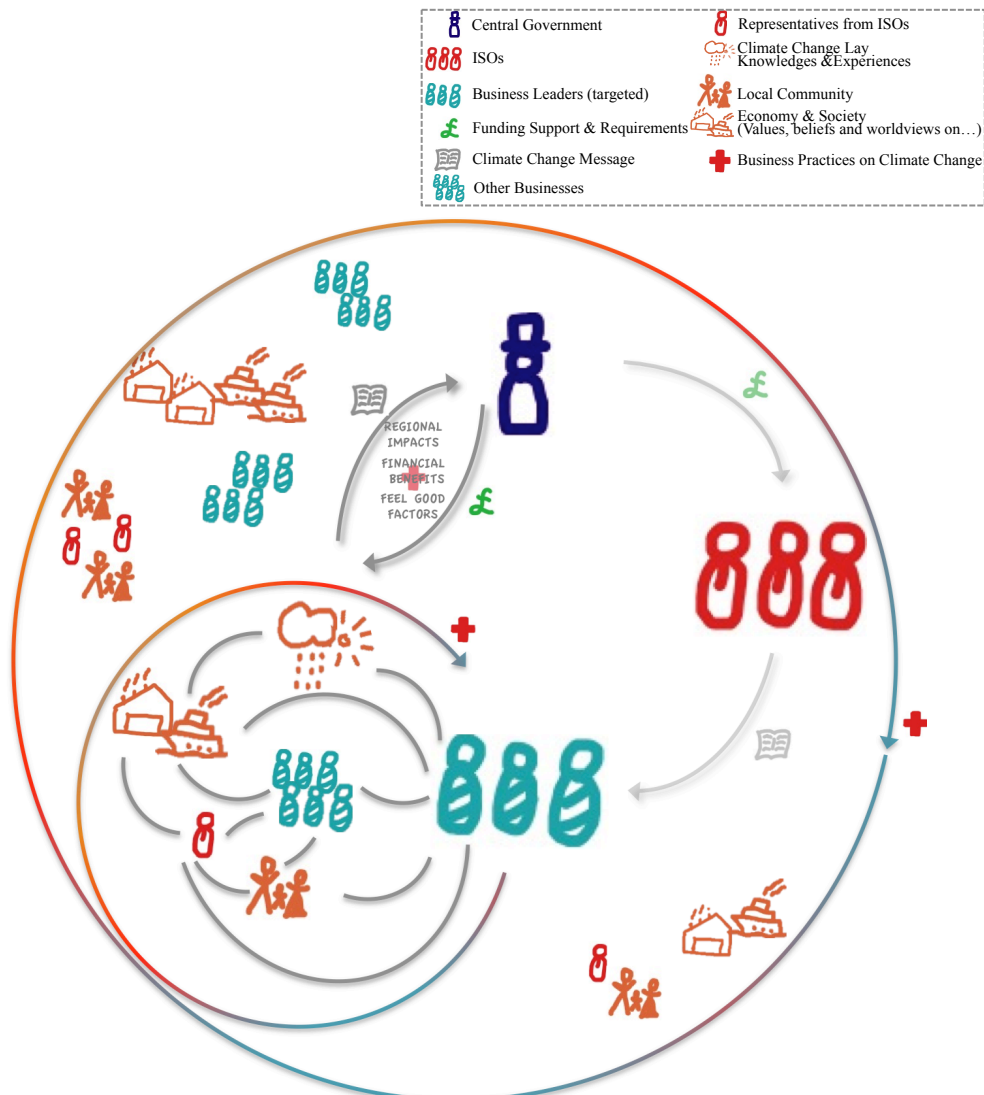

Figure 23: Schematic Representation of a Holistic Understanding and Communication of Climate Change[37]

Policy makers at a national and especially EU level can then move away from implementing funding structures that are based on traditional regional development

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[37] Own creation.

ideas. Although this research has been funded by the ESF, somewhat ironically this PhD reveals that it was the nature of some of the funding bodies' approaches that limited the participating ISOs' effectiveness when communicating climate change. Such integration is only possible, however, if communicators and the Government accept not only the physical but also the social/cultural complexity of climate change, a phenomenon that is part of *'our understanding of the world'*. ANT allowed such a perception of climate change unlike those based on the rational choice based assumptions of modernity. Society that separates climate change from its own social constructs along organizing binaries does not allow individuals to understand their role in climate change or the role that climate change has for them. My PhD illustrates that businesses and societies are inevitably interconnected and dependent on each other to respond to the challenges of climate change. Businesses are crucial in the establishment and facilitation of this new economic system and as actors that can redefine socio-economic systems. Many discussions found in the literature seem to overlook the fact that businesses are well placed to stimulate and lead behaviour change across societies, through both their fiscal resources and their social nature. Consequently, businesses are able to lead by example on how to innovate to the impacts of climate change in the (current) capitalist system, and deal with the finite, much changed planet more responsibly. In this sense, the business leaders of this study exemplified the self-reflexivity that they would like to characterise the world that they want to live in, according to their values and cultures, values that are needed to mitigate, and/or adapt to, the impact of climate change climate change. Society may need to undergo radical social change by developing social belief systems, a social consensus, which changes the socio-economic system from the bottom up. This will also require reconsideration of the ways in which Western societies deal with risks and for people to see that their security is not vested in science and government powers alone. Society as a whole needs a more active participation in dealing with climate change-related risks, recognising that risks associated with climate change are created and managed through the ways people choose to live. This thesis thus shows that climate change is a *'wake-up call in the face of the failure of government'* (Beck 2006: 343) which requires people to address their *'confusion and anxiety about the goals, ambitions and destinies [they] foresee for'* themselves (ibid.).

8.4. Suggestions for Further Work

This research, due to its interdisciplinary research approach and the lack of prior studies in the field of SMEs and climate change, should be seen as the first glimpse into a very complex field. The research was conducted through a continuous interaction with the business leaders by monitoring business meetings, conducting interviews with representatives from ISOs that worked with the participating business leaders, and by triangulating various different research tools. This in-depth and personal engagement with the study participants produced findings that are unique and specific to the business community in Cornwall, yet the results are still applicable and useful for business communities around the world. There appear to be no obvious reasons why similar businesses elsewhere in the UK or indeed Europe should have radically different characteristics. It would be useful to replicate this research in other regions where culture and climate change exposure might be different. Future studies should investigate how and if decision-making with regard to climate change varies in different cultures and locations. A replication of this research would allow generalizing the research findings further and develop contrasts with regard to some of the cultural drivers for climate change engagement. More specifically, it is necessary to find out if business understanding and engagement with climate change is different across regions and cultures. A focus on specific sectors would also be interesting so that a cross-sectional analysis of these research findings could be carried out. In a region such as Cornwall, for example, marine businesses would be of interest to examine to see whether there are different forms of climate change knowledges and hence different business practices related to climate change.

As I only researched SMEs that already intended to engage with climate change the insights into why businesses engage with climate change are somewhat limited to businesses that are able to overcome the value action gap and are en route to combating climate change. By concentrating on engaged businesses it has been possible to establish just what it is that motivates these businesses to take an active interest in climate change, and by doing so I have shown that attempts to involve a wider range of businesses using the science *per se,* or improving the *'quality'* of the science that is available are very likely to be unsuccessful. Further research should

focus on businesses which are not yet engaging with climate change to learn how and if their personal values and engagement within business communities of practice differ from the ones in my study. This could help ascertain whether the values and understandings of unengaged businesses are different from already engaged businesses. If unengaged businesses were prepared to start engaging with climate change, any changes in their personal values regarding their local communities, environment and economy should also be investigated.

My qualitative data is heavily reliant on the nature of my observations and interpretation. This means that my research could never have been fully objective. I stood in a circular relationship with my research participants (Rose 1997). My research participants and I were able to influence the direction and outcome of my research and in that sense, the participants were able to influence the knowledge I would find during the research. In the future, it would therefore be useful to investigate some of my research findings in a more quantitative manner.

I also joined the climate change-related business meetings to see how climate change was communicated to, and understood by, SMEs, but some of these events did not have climate change communication as their sole purpose. Even though I acknowledge throughout the thesis that these events were a means of observing climate change messages, and also how climate change might be communicated through other means, the interpretations on climate change communication were to some extent subjectively perceived for my research purpose. Larger scale studies should focus on climate change events that solely communicate climate change to businesses and compare whether the message communicated there is the same as observed during my study. This leads me to another point for further research. Future studies should concentrate on the need to understand the cultural aspects of climate change, and how this can be brought into discussions with businesses.

Within the study region it would be valuable to follow up this work by examining similar businesses to see the extent to which claims of intended climate change engagement are being followed up. I deliberately also chose to not distinguish between mitigation and adaptation strategies because at the heart of this research was

a focus on intentional engagement with climate change and the overall reasons for this engagement. It would thus be interesting to investigate differences in motivations, intention and actual engagement between those people considering either mitigation or adaptation actions.

Future research in related but previously unconnected fields such as innovation studies and carbon communities could explore further the opportunities and potential of focusing on niches to expand climate change understanding and engagement. This research has shown that the niches are important spaces for climate change engagement and that more surprisingly business leaders do not feel that climate change engagement can be meaningful, profitable and sustainable in current socio-economic systems. The applicability of the research findings for other communities of practice and regions must however be considered with caution as both communities of practice in Cornwall are relatively young. Only time will show how much these niches can achieve for the participating SMEs and what kind of change the niches can create for other businesses. The existing literature from related research such as that into low carbon communities and social innovation, however, suggests that these are not unique efforts of businesses but also happen in similar forms within other societal groups. In the light of the lack of literature on business communities of practice and climate change engagement, and also on alternative solutions to climate change, the study does deliver interesting and important insights into this unexplored field.

My research demonstrates that SMEs may consider mitigation and adaptation strategies if prevailing socially accepted beliefs on climate change seem to demand it. However, prevailing social norms currently do not support or encourage SMEs to mitigate, and/or adapt to, the impact of climate change climate change. Further, little is understood about how SMEs can offer leadership to the business and wider economic community to achieve mitigation and adaptation. Thus, while my PhD demonstrates both(1) the need for social change, by establishing a social belief system with regard to climate change, and (2) opportunities for SMEs to offer leadership and innovation to allow them to mitigate, and/or adapt to, the impact of climate change climate change, it is still uncertain how this can be achieved in meaningful, profitable and sustainable ways. A follow-up study could demonstrate how SMEs could offer

leadership to the business and economic community to innovate for social change. Future research questions could be: *How do societal norms currently impact the sustainable and profitable practices of SMEs? What kind of social change would enable SMEs as a whole to engage with climate change? How can SMEs offer leadership to the business and economic community to innovate for social change?* Most importantly, an investigation into whether and how climate change-related niches might transform the socio-economic systems of 'doing business' will be necessary. Future research projects should consequently investigate the potential impact of citizen-led solutions to managing the mitigation and adaptation behaviours with regard to climate change. This approach promises to provide something that for long has been missing from the climate change debate: putting citizens at the centre of the management of climate change.

9. Appendices

Appendix 1. Semi-Structured Interview Questions for Business Leaders

(RQ2) Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?

1. Could you briefly tell me about yourself and your business? What do you do, what is your expertise? How does it relate to climate change?

2. What does your business do in relation to climate change?

3. Since when have you been aware of climate change? Have you experienced climate change?

4. Why do you engage with climate change? Who initiated climate change engagement in your business?

5. Is climate change a concern of all the SMEs in Cornwall?

6. Why do only a few SMEs in Cornwall/South West engage with climate change?

7. What role do issues such as sustainability and low carbon play?

(RQ1) Which climate change knowledge is communicated to SMEs and how?

8. Do you know enough about the risks and opportunities associated with climate change?

9. What would you need more information about?

10. Where do you get information on climate change from?

11. How do you engage with climate change? What do you do and how do you know what to do?

12. Do you think it is relevant for your business to keep up to date to the latest climate change (science) developments?

13. How do you keep up to date with the latest climate change information?

14. How do ISOs help you with your intention to engage with climate change?

(RQ3) How do SMEs overcome the gap that exists between business practice and climate change science?

15. How do you manage to engage with climate change?

16. Where do you get information on climate change from?

17. How do you understand climate change in relation to your business? How do you develop business practices?

18. Which community, action or interests groups and organizations are concerned with climate change?

19. Are you involved in any of these groups?

20. How did you get involved with those groups and why?

21. Which are the actions that your business currently takes to deal with the risks and opportunities associated with climate change?

22. What is the role of business networks such as Coast and BL4LC?

23. What is the role of personal relationships?

24. What should the government do to support private sector engagement with climate change?

25. What should the private sector do to support business engagement with climate change?

26. Why do we always see the same people/SMEs at climate change-related business events?

27. How could we reach unengaged SMEs?

28. Where do you see the difference between climate change and sustainability?

Appendix 2. Interview Questions for Representatives of ISOs and Business Networks

(RQ1) Which climate change knowledge is communicated to SMEs and how?

1. Could you for a start briefly tell me about your ISO and your role as an intermediary for climate change and business? What do you do, what is your expertise? How does it relate to climate change?

2. How do you engage with local (Cornish) SMEs on climate change?

3. What do business leaders want to know from you?

4. Do you know enough about the risks and opportunities associated with climate change? What would you need more information about?

5. Where do you get information on climate change from?

6. Do the SMEs you work with know enough about the risks and opportunities associated with climate change? What would SMEs need more information about?

7. Where do the SMEs that you work with get information on climate change from?

8. Which community, action or interest groups that are concerned with climate change are helping you communicate about climate change? Why are you involved with these groups?

(RQ2) Why do SMEs engage with climate change? What are the factors that trigger SME leaders to engage with climate change?

9. Why do the SMEs that you work with engage with climate change?
10. What role do first hand climate change experiences play?
11. What is the role of the business leader?
12. Is climate change a concern of all the SMEs in Cornwall?
13. Why do only a few SMEs in Cornwall/South West engage with climate change?
14. Do SMEs understand climate change? What role do issues such as sustainability and low carbon play?

(RQ3) How do SMEs overcome the gap that exists between business practice and climate change science?

15. How do SMEs manage to engage with climate change?
16. How do ISOs/you help SMEs with their intention to engage?
17. What is the role of business networks such as Coast and BL4LC?
18. What is the role of personal relationships?
19. What should the government do to support private sector engagement with climate change?
20. What should the private sector do to support business engagement with climate change?
21. Why do we always see the same people/SMEs at climate change events?
22. How could we reach unengaged SMEs?

Appendix 3. Open Interview Questions for Key Informants

1. Can you tell me about climate change and business in Cornwall?
2. Who communicates climate change to SMEs?
3. Which SMEs engage with climate change?
4. What is the general feeling about climate change and business in Cornwall?
5. What role does the public sector play?
6. Which role does the private sector play?
7. Which other key informants should I speak to? Which business leader and/or communicator should I get in touch with?

Appendix 4. Example Essays from a Participant Observation

Below I give two examples of the essays that I wrote for each personal observation during the course of the PhD.

Climate Change-Related Business Event B

Today I am attending an event by B in the Met Office. We are in a glass room with lots of businessmen wearing suits. The room is small and air is thin. It has the feeling of a short scheduled meeting and everyone around me seems uncomfortable. The room is too small for wearing a suit. I only just arrived and already the intermediaries are presenting some facts and figures on climate change science. I have seen these slides before. And I assume so have some of the other participants. The slides are available online on the ISO's webpage, free for download. These slides have also been used at one of the ISO's events I attended before. While going through the expected temperature changes for the UK, the graph displaying the different temperatures across the UK is shown. One of the businessmen asks why there are different temperature developments across the UK. One of the intermediaries says she does not know and continues with her presentation. The man looks disappointed. We then are sorted into small groups of four to discuss what our business is already doing on extreme weather events related to climate change. I feel out of place between two business leaders from companies who both have experienced either an extreme flood or drought. We take notes on the flip chart. Some of the SME leaders seem lost and state that they have done nothing but that they want to be prepared. They want to know what they can do. We have to answer questions on management practices. Some of the SME leaders do not know some of the terms. It is a bit too general. Neither do the intermediaries when we ask them about some of the terms. So we write ideas on what we think the different categories might mean and what they might mean for climate change and vice versa. Each group presents their thoughts. Our group hopes for a right and wrong praise. […]. We heard about climate change science, and we heard about management tools. Both stand separate from each other – the link between them is unclear. The business people look hot and tired. They talk about wondering what they could do on extreme weather events when they walk out the door. Something we had hoped to learn here today.'

Climate Change-Related Business Community of practice Meeting – CoaST Birthday

I am excited while I drive up to the CoaST Birthday Party. As usual I am running late and the traffic was busy on the way there. I am unsure where to park but find the small car park just behind B&Q that belongs to the Heartlands. I don't have any cash so I use the pay service per phone. I didn't bring my own lunch as stated in the invitation so I wonder if I can pay with card for the £10 lunch that will be available later. I see the guy from eco drive get out his car and I am glad he does not stop to chat. I'm in a rush and do not want to forget anything. I walk up to the building – it's colder than I had anticipated – and as I enter there is already a busy atmosphere. I see coffee, a big birthday cake with the CoaST logo and multi-coloured macaroons. I greet Claire and after grabbing a coffee and catching up we make our way inside the conference room. I see Caroline at the back so I make my way over to her and say hi. Then I seat myself at the front next to Claire. I like her grey vans shoes. I can see Manda at the front getting ready and chatting to some of the speakers. I see Steve, Mark and Chris. Matt sits amongst the delegates. I am surprised that there are not only business leaders but also council people and ISO representatives. It is really a very mixed group of people. People are seated at big round tables with lots of flyers from businesses. There is also a white envelope that Manda has put on each table. I quickly add hand-outs about my research on each table hoping someone will get in touch with me. At the back of the room are about eight businesses and other organizations that have displayed their tourism and sustainability related activities on exhibition walls. I notice a man with a big professional film camera. He videotapes the entire event and looks very professional. The room looks amazing now. The tables have filled. There must be about 100 people here and it is very colourful. People have not dressed for a business event. Bright red and green jumpers shine inbetween the many smiling faces. I feel comfortable and excited amongst the chatting of all these delegates. They seem to know each other. Maybe they don't but that does not seem to matter. This is a big social club. Family.

Manda opens the event and welcomes everyone with her usual enthusiasm and excitement. She does not present an agenda for the day and says she wants to keep things open and dynamic and keep us focused. It makes this day mysterious. Manda

then tells us about CoaST and how it developed from an idea into an international business network. Then a professor says that sustainability and business is about cooperation and Roger gives a talk on the importance of water efficiency. They give very specific information on water efficiency and renewable energies especially wind. There is room to ask questions and time for discussion. Water seems to be a current topic I was unaware of. There is a lot of discussion on how to deal with people that lobby against wind energy. A Transition lady seated amongst the guests says that clear information on facts is missing and wishes someone could provide that. Manda gives an overview of CoaST and its development over the last 10 years. She talks about the reluctance of people to listen when she started and the change she has seen over the years. She tells us that CoaST has grown and is active all over the world now.

Then the second part of the day starts: selected delegates can quickly present their projects. Diverse people present very different things: Sustainable leadership, walking in Cornwall, learning within communities etc. Then there is the coffee break. As I walk out I see Chris and he greets me with a kiss on the cheek. He tells me about a transition Truro book that I should read it! It is on how behaviour change happens. I go outside and have lunch. I chat to Claire while eating and then I run into Paul. I decide to be more proactive and ask him how things are going. He tells me that he has just been made redundant at his ISO. I feel sorry and find it difficult to find the right words. I quickly make my way around the room and check the exhibitions. It is funny, so diverse. There are two old ladies that sell their sustainable soap. They remind me of Amish people. Then there is the Third Block: Knotty problem solving. Each table opens an envelope. Our table has Claire's problem that she experienced a few weeks ago. Her staff do not get to work sustainably. There is no bus service and they do not have enough parking places in the summer. What can they do? Each table discusses its problem. It's interesting. We come up with an electric vehicle that should be purchased by the hotel to offer its own transport service. Claire presents our problem and solution to the room. I take the letter and envelope home.

Fourth Block: Panel Discussion with each panellist introducing their topic and view on wind etc. There is not too much on climate change but a lady hosting the

discussion shows an IPCC climate change graph and says that climate change is the reason we are all doing this. On the panel are Chris, Julian (a local counsellor), Steve (from the councils) and Andy who says that Cornwall council does a lot on renewable energies. A community energy man talks about many different issues and states that his business is made up of the low carbon fund, community power Cornwall and low carbon society. Steve gives a short speech on his strategy towards making a real change in Cornwall. He says that people used to call him "dangerously responsible". He reads out the plans from the LEP and discovers that they aim for "growth which is benefiting the natural environment". He wants to know what that means and how that is possible. What is economic growth for, if it makes life worse? Sounds like the triple bottom line to him. We should do better, he says. He says that people need to speak to each other before projects are planned and talk to environment, nature, and economic people first. Manda then moves on to speak about the economics around climate change. She talks about the bottom of the pyramid and the Diabot in Morocco. She also talks about population growth, resources and oil. She then shows a carbon emissions graph by the Potsdam climate institute and quotes Tim Jackson on prosperity without growth. She wants to rewrite the rules based on people who hold values. The more we practice the stronger we get, she says. She refers to Aristotle who said that "brave by doing brave things" and therefore Coast aims for "we have a different plan". Then Pete speaks about WREN. Manda then introduces the CoaST champions and the Professor summarizes the day and says that it is about education and sustainability. He explains that problems have not yet been solved but there is a community of critical people here, which is extraordinary. There needs to be a dialogue between us and the power executers, he says. But it works and we need to wake people up he says. In the past we let democracy go to sleep he proclaims. Manda adds that there is a line of sight. We should all have a line of sight. Always be ready. Understand our maps and territories, have a clean rope and balance risk. We need to have a deep trust in our own ability and people around us.

The day ends with a dance so Manda invites us all to stand up. It consists of shouting, jumping and humming. I am surprised to see the local councillor join in. This is a very exciting atmosphere. It feels very intimate. People here know each other by name. I seem to have joined a little community. Some very quirky people. I feel part of

this family, people agree with my findings. We all want to change the world. Today that seems possible.

Appendix 5. Practitioner's Workshops

Below I give an insight into the layout and proceedings of the two practitioner's workshops that I conducted for the data collection.

Appendix 5.1. Agenda Workshop 1

WORKSHOP - Knowledge Diffusion, Innovation and Networks on Climate Change in Cornish SMEs"

Tremough Innovation Centre
Tremough Campus
Penryn
Cornwall TR10 9TA
Tuesday Sept 11th 2012
www.cornwallinnovation.co.uk/tremough-innovation-centre

AGENDA

08:45 – 09:15   **Registration and Refreshments**

09:15 – 09:25   **Welcome & Purpose of Today**

Dr Mike Leyshon   – University of Exeter
Kathi Kaesehage   – University of Exeter

09:25 – 09:35   **Climate Change and Business - The Importance of Sharing**

Chris Maynard   – LEAP

09:35 – 09:45   **This Research & Findings so Far**

Kathi Kaesehage   – University of Exeter

09:45 – 10:40   **Exercise One – Finding Solutions**

All delegates & facilitators

10:40 – 10:55   **Coffee Break**

10:55 – 11:45   **Exercise Two – SWOT Analysis**

All delegates & facilitators

11:45 – 11:55   **Wrap Up & Way Forward**

Kathi Kaesehage   – University of Exeter

12:00 – 13:00   **Lunch, Refreshments and Networking**

13:00   **Close**

Appendix 5.2. Agenda Workshop 2

Kathi Kaesehage: Breaking Down Barriers in Communication

Explore the relation between personal convictions, ethics, Cornwall and climate change Create a map of the correlation between personal values and business practice. Develop a tool kit to embedded personal values into (your) business practice.

This workshop gives an unrivalled opportunity to take advantage of recent research findings, learn from other businesses and develop ideas on how to "do business while doing good". This workshop provides the opportunity to develop business actions with well-informed, like-minded people and understand its relevance in the wider context of sustainability to enhance businesses opportunities.

Postgraduate Researcher Kathi Kaesehage, who investigates the triggers of businesses taking advantage of the opportunities of climate change in a meaningful, profitable and sustainable way, will lead this workshop. Katharina has successfully worked with local businesses and organizations, organized businesses exchanges and held presentations at business events.

Appendix 5.3. Pictures of Practitioner's Workshop 1 & 2
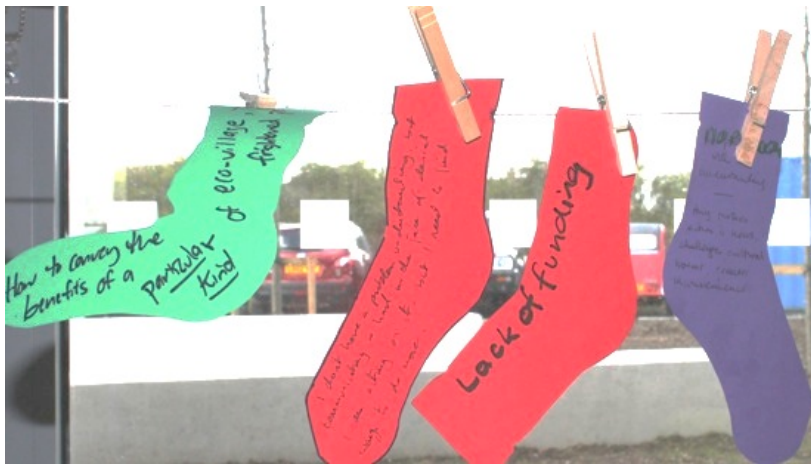
Appendix 6. Online Survey

Below are the questions and structure of the online survey.

Kathi's PhD - Follow up Survey

1. Information on your Business

> 10%

This section asks for information on you and your business. This information allows me to allocate your survey responses to your interview. This information will of course stay confidential.

The rest of the survey consists of multiple-choice questions.

＊1. Your name

＊2. Business Name

＊3. Number of Employees

＊4. Industry

＊5. Service/product offered

＊6. Founded in year

7. Location

8. My business is unique because....

＊9. Role/position of participant

10. In this position since

11. Age of participant

12. Last (educational / training) degree

＊13. Who is responsible for climate change issues in your business?

＊14. Who initiated the engagement with climate change in your business'
> A member of staff
> The business leader/owner

[Next]

Powered by **SurveyMonkey**
Check out our sample surveys and create your own now!

Kathi's PhD - Follow up Survey

2. PERSONAL BACKGROUND, VALUES & IDENTITY

> 20%

1. My education (e.g. school and/or University) included a climate change component (excluding specific training courses on e.g. carbon accounting).
> Yes.
> No.

2. I have completed a specific training course that relates to climate change (e.g. carbon accounting).
> Yes.
> No.

3. I have the following climate change knowledge(s):
> Detailed scientific understanding about cch (e.g. I read the IPCC and can explain the green gouse gas effect)
> Knowledge on a specific issue related to climate change (carbon, renewable energies…)
> General awareness that climate change is happening
> No knowledge

4. When doing business I aim to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Maximize profits and grow.					
Run a prosperous business that has positive influences on society and the economy.					

5. Choose one option each.

	Yes.	No.
My business mitigates climate change.		
My business adapts to climate change.		
My business communicates climate change to other businesses, customers and/or governmental representatives..		

6. When mitigating and adapting to climate change through my business I aim to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Make money / create financial gains / make a profit.					
Future-proof my business					
Combat climate change and minimize its consequences.					
Do good for the natural environment and society while doing business successfully..					

7. I have lived in Cornwall for
> up to 5 years   5 to 10 years   more than 10 years   I was born and/or raised in Cornwall

8. The benefits of doing business in Cornwall are:
> The same as in any other part in the UK.
> Customers and businesses are more aware of the natural environment and it's value for society than in other parts of the UK.
> There is a unique business culture where profit and growth are not the main goal.
> Other (please specify)

Kathi's PhD - Follow up Survey

3. Motivation to Engage with Climate Change

39%

1. How much do you agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I feel responsible for society and the natural environment.					
Mitigating and adapting to climate change enable me to combine my personal values with my business activities.					

2. My personal interest to mitigate and adapt to climate change is driven by:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Knowing scientific evidence and the potential consequences for environment and humans.					
Seeing change in the natural environment around me and its					

Kathi's PhD - Follow up Survey

4. Climate Change Understanding

40%

1. Climate change is:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Mainly a natural problem					
Mainly a scientific problem					
Mainly an economic problem					
A social, economic and environmental problem					
A problem that changes MY LOCAL environment and climate.					
A problem that changes the environment and climate GLOBALLY.					

Other (please specify)

2. I think climate change has ALREADY IMPACTED my business through?

Physical impacts such as:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
changes on the local climate (e.g. recent storms).					
Wanting to help create a better/sustainable society and economy.					
Minimizing financial risks and maximizing opportunities for my business.					

3. My initial engagement with climate change was triggered by:

Personal values & interest

Financial reasons & profit

Prev   Next

Erosion

Extreme weather events

Floods

Non-Physical impacts such as:

Policy changes

Customer demand

Local market pressure

Global market pressure

Other businesses

Other (please specify)

3. I have seen/experienced the following changes in the natural environment and climate, which I attribute to climate change:

4. How much do you agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Hearing about global changes in the climate and natural environment motivate me to combat climate change.					
Seeing/experiencing changes in the LOCAL natural environment and climate motivate me to combat climate change.					

5. What do the following terms mean to you?

	It makes me feel scared.	It is an issue than I can act upon.	It is a future issue.	It is a current issue.
What does the term 'low carbon' mean to you?				
What does the term 'climate change' mean to you?				
What does the term 'sustainability' mean to you?				

6. 'Sustainability', 'climate change' and 'low carbon' are:

All the same.   Separate and disconnected issues.   Seperate but interconnected issues.

7. I understand climate change through the following term(s):

Low Carbon

Sustainability

Renewable Energy

Economic Crisis

Scientific Definitions about climate change.

Other (please specify)

Kathi's PhD - Follow up Survey

5. CLIMATE CHANGE ACTIVITIES

`50%`

1. Which mitigation activities does your business do?

Carbon accounting

Carbon reduction

Waste management

Renewable Energies

Other (please specify)

2. Which adaptation activities does your business do?

Communicate climate change to local community

Communicate climate change to other businesses

Communicate climate change to employees

Implement / develop new products/services

Install/use physical protection (sand barriers, etc.)

Other (please specify)

Kathi's PhD - Follow up Survey

6. Networks, Learning and Relationships

`60%`

1. Which local support organizations and business networks do YOU consult REGULARLY to understand and engage with climate change?

None.

Cornwall Council (inkl. Cornwall Development Company)

Environment Kernow

Chamber of Commerce

Federation of Small Businesses (FSB)

LEP

Cornwall Marine Network

MET Office

CoaST

Eden Project

Local colleges & universities (such as events by the Environment and Sustainability Institute (ESI))

Climate South West

Environment Agency (inkl. Cornwall Sustainability Awards)

BL4LC

Other informal networks

Peer businesses & personal contacts

Other (please specify)

2. The organizations/networks that best help me to mitigate and adapt to climate change are:

Cornwall Council (inkl. Cornwall Development Company)

Environment Kernow

Chamber of Commerce

Federation of Small Businesses (FSB)

LEP

Cornwall Marine Network

MET Office

CoaST

Eden Project

Local colleges & universities (such as events by the Environment and Sustainability Institute (ESI))

Climate South West

Environment Agency (inkl. Cornwall Sustainability Awards)

BL4LC

Other informal networks

Peer businesses & personal contacts

Other (please specify)

3. Climate change related businesses events hosted by support organizations (this excludes private sector business networks!):

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Do not help me to engage with climate change.					
Deliver practical information on business engagement with climate change.					
Inspire and motivate to engage with climate change.					

4. If you are a member of BL4LC, how have you become a member?

Economic forum and 3Cap.

Personal recommendations of other members

Word of mouth

Other (please specify)

5. The following local/regional business networks are concerned with climate change:

Chamber of Commerce

BL4LC

CoaST

Federation of Small and Medium Enterprise

Other (please specify)

6. I am part of the following business networks because they are concerned with climate change:

Chamber of Commerce

BL4LC

CoaST

Federation of Small and Medium Enterprise

Other (please specify)

7. I am a member of the above business networks that are concerned with climate change due to:

Their concern with climate change

The opportunity to network WITHOUT specific interest in climate change

The opportunity to network and learn from other businesses that are concerned with climate change

The opportunity to lobby government toward climate change commitment / hold Cornwall council accountable.

The general concern with environmental and economic problems

The opportunity to make sense of climate change

Kathi's PhD - Follow up Survey

7. Perceptions

70%

1. How much do you agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Understanding my economic, environmental and social impact on customers, suppliers and the local community helps me conceptualize climate change and to actively engage with climate change.					
Personal contacts make engagement with climate change easier.					
Climate change can only be solved if society changes the way it thinks about the economy.					
Climate change is a debate over values, beliefs and ideologies.					

Other (please specify)

8. These networks provide me with:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Information on how climate change impacts my business and the economy					
A space to develop solutions for climate change related issues					
Encouragement from other business leaders that that are concerned with climate change					

Other (please specify)

9. I am concerned about climate change. I would like to mitigate and/or adapt but I cannot do this as well as I would like to.

Yes

No

10. I cannot mitigate and/or adapt to climate change as well as I would like to because...

11. Who/what helps you to engage with climate change?

	Strongly disagree.	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A
Other businesses						
Local council						
The local University/colleges and scientists						
Personal contacts/relations						
Other (please specify)						

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Climate change is very individual for every business. Businesses have to try out how climate change affects their business and what they can do about it.					
Support institutions such as the local Chamber and the Council struggle to see that climate change engagement is driven through personal values instead of financial drivers.					
Sharing information through private sector business networks work well due to trust, shared identity and personal relationships. We have same belief system on climate change.					
Private sector business networks on climate change struggle to influence local economy due to rigid funding structures.					
I am happy to share climate change related information with peer businesses but I am more					

Kathi's PhD - Follow up Survey

8. UK Governemnat and Climate Change Policies

`80%`

1. How much do you agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The UK government makes mitigation and adaptation activities easy.					
Cornwall council makes my mitigation and adaptation activities easy.					
Businesses need more incentives and regulation to engage with climate change.					
Compared to other European countries the UK government is slow to integrate climate change within its policies.					
If businesses could communicate regularly amongst each other, with government and					
society on a level playing field, climate change engagement would be much greater.					
There is a need for social change, a change of economic and social systems, to allow businesses to engage with climate change in a profitable and sustainable way.					
Current economic models (profit maximization) do not fit climate change engagement.					
Aiming for profit maximization and growth does not allow combating climate change.					

2. My business is affected through climate change related policies.

Yes.

No.

3. Which climate change related policies are relevant for your business?

ISO 14000

Carbon Reduction Commitment

Energy Efficiency Scheme

Climate change Levy

Feed-In Tariffs

Green Deal

Landfill tax

	Strongly disagree.	Disagree.	Neither agree nor disagree.	Agree.	Strongly agree.
Connected issues such as low carbon and renewable energies					
Other (please specify)					

9. Last but not least

`96%`

1. When engaging with climate change I need to know:

	Strongly disagree.	Disagree.	Neither agree nor disagree.	Agree.	Strongly agree.
Science on climate change					
Local impacts of climate change					
Global impacts of climate change					
Difference my action makes to climate change					
Difference my action makes to local community and staff					
Difference my action makes to my business					
Actions I can take as a business / practical information					
I need to be motivated / encouraged to engage					

2. Why do you join the following networks?

	BL4LC	CoaST
Lobby government		
Share experience and learn from other businesses		
Learn from governmental representatives		
Receive practical information on how to engage with climate change		
Be around people who value nature and feel responsible to society		
Gain reputation of my business (PR)		
Know where I can get information from and be informed about events		
I am not a member		
Other (please specify)		

Prev   Next

Appendix 7. Likert Scale Ratings of the Observed Climate Change Events

Event	The event communicated the science of climate change.	The event communicated climate change related business practices.	The event convinced of the need to engage with climate change.	The event served the research purpose of the organizers.
A	5	4	5	4
B	5	4	5	4
C	4	4	5	4
D	1	1	4	5
E	4	1	4	4
F	1	2	5	5
G	4	2	5	5
H	1	4	4	1
I	2	1	5	5
J	2	2	5	5
K	3	2	5	5
L	1	2	5	5
M	1	2	5	5

* 1= Strongly Disagree 2= Disagree 3= Neither Agree nor Disagree 4= Agree 5=Strongly Agree

Annex Figure 1: Individual Likert Scale Ratings
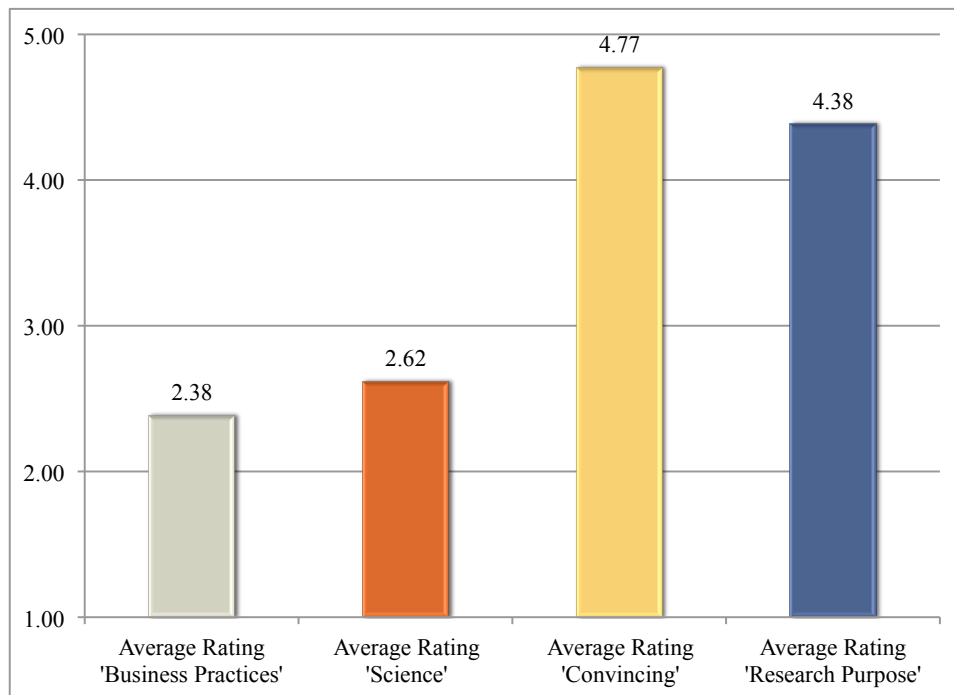
Annex Figure 2: Average Likert Scale Rating

Appendix 8. Feedback Participants

Below I give some of the feedback I received from the study participants towards the end of the study. The feedback is displayed in the form of original quotes as received by the participants.

It has been very interesting to see Kathi take on this research and she has a special talent for ensuring she is being impartial in her approach.

The climate change message is as far from the ears of many businesses. […]. I look forward to seeing the successful conclusion of Kathi's efforts and think that she has done an excellent job in engaging with business representatives consistently and enthusiastically in the pursuit of her studies.

It has been very useful to have an independent observer at events and hence to receive very knowledgeable and constructive feedback. Thank you for your enthusiasm and diligence and attendance at every meeting over the past three years.

Fantastic to be involved. The range of people and organisations Kathi has managed to retain contact with is impressive. It's a piece of work that is vital and should help shape the business and learning landscape in Cornwall.

Great - good valued work.

Very interesting and am keen to find out more. Kathi has a strong focus and it has been good to see her engage with members of Cornwall's business community

Love the fact that there is understanding that we don't need more science. This is about communications and values….

I think its a long overdue and important area of research!

It has been very interesting to be involved and I feel research like this is highly valuable and more so for other businesses to share and become aware.

I think that the approach taken has been engaging and interesting. I now hope to see Kathi translate this into making a measurable, verifiable difference to both the local and wider community.

Detailed and precise. Kathi is good at sorting through information to focus on the significant issues and challenges.

Kathi has done some very important work and clearly communicated that work.

It has been a pleasure to be involved and contribute to Kathi's work over the last three years. She is very thorough and organised and contributes to the BL4LC group discussions - who consider her to be a core member. She deserves to do well in her PHD as she has worked very hard.

Well-done Kathi, stay in touch and send me a copy.

Kathi has done an excellent job of making me think about the range of issues contained within this survey. It is comforting to know that there are people of her calibre conducting this type of research.

We need to have more of a wake up call for politicians, corporations and the public. There are any number of canaries […] indicating that serious environmental change is under way [...] Will it take the Thames barrier to be overtopped to make people realise that the game is up and we all need to pull together to ensure a future for our grandchildren?

People should stop chasing materialistic values and get out in the real natural world more.

Despite many of us Cornish businesses being active and involved with the climate change issues I feel that progress is slower than it could or should be. For many the break through is still to come. However, those of us who are engaged have and seem set to continue to stay engaged.

The workshop was really impressive. Getting all those people into one room and everyone discussing these issues was a fantastic achievement. I think the lack of solutions and continuation of challenges that happened […] prove that Kathi is carrying out some really necessary research.

[…] presentations by […] 'climate change' organisations can sometimes feel too much like being lectured. A 'holier than thou' attitude is sometimes taken. Understanding the challenges that businesses face and offering practical advice and support on real solutions that make a difference to both climate change and the business itself would be a better approach.

She's been a huge asset to Business Leaders 4 Low Carbon

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