Sustainability and Innovation: The Case of a Global Carpet Manufacturing Company

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Declaration of originality

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Adam Luqmani
December 30, 2016
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I also thank my managers and colleagues from Interface who have contributed their time and energy into this work by making me a true employee of the company, by participating in interviews, by allowing me to observe their activity, by holding frank discussions with me and by answering a huge number of follow-up questions. In particular, I recognise the efforts of Eddie, Graeme, Chris, Steve, Olly, Peter, Agustina, Nigel, Jon, Luca, Heather, Miriam, Gareth, Brian, Adrian, Margaret, Orla, Linda and Ramon.

Finally, I thank and recognise my partner Kerry-Anne, to whom I dedicate this thesis.
Abstract

Sustainability requires urgent, radical innovation from the private sector. However, private sector-led sustainability which meaningfully advances social, environmental and economic goals remains a rare occurrence. Despite the potential role of balanced environmental strategies such as ecological modernisation, there remains a lack of understanding of how such theories can be translated to actions at the level of a single organisation.

This thesis explores the topics of ecological modernisation, employee engagement and sustainability-oriented innovation, grounded by a case study of Interface, a global manufacturing company. The work helps to build an understanding of the practicalities of organisation-level ecological modernisation, corporate sustainability and innovation in practice. It makes use of a case study research strategy combined with a grounded theory methodological approach. Three themes; ecological modernisation, employee engagement and sustainability-oriented innovation, are discussed and are applied to the analysis of the case material.

The following key findings emerge:

- Ecological modernisation, a theory typically applied and discussed at the macro-sociological level, is explored at the level of a single organisation, where it is used to contextualise the actions of Interface which contribute to wider, system-level sustainable disruptions. This is found to be a useful unit of analysis compared with typical explorations of EM, and reveals a number of interesting pathways by which EM organisations might impact upon the wider system in which they operate;

- Social dimensions of EM theory are discussed and explored. By considering Interface at the centre of a larger, interconnected network of actors, it is found that there are numerous dynamics at play, including the role of employees and their levels of engagement, the role of competitors and the wider industry, the role of customers and the role of suppliers;

- Temporal dimensions of EM are revealed and discussed, and several barriers are shown to emerge for Interface as it progresses further into a
20-year journey towards sustainability. Most strikingly, the low-hanging fruit is no longer available, and Interface finds itself in the “tall canopy” in seeking further reductions in emissions and waste;

- *Net-Works*, a radical, innovative recycling project is presented and compared with other, less successful innovations from Interface. The contextual factors that gave rise to *Net-Works* are a combination of a radical goal, deliberate adoption of a social goal, and a safe failure space. Success is owed to developed capabilities, incorporation into an existing product, and partnering with an NGO and academia for accountability and credibility.
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## Abbreviations

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<th>Description</th>
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<tbody>
<tr>
<td>6MR</td>
<td>6-Monthly Report</td>
</tr>
<tr>
<td>AD</td>
<td>Anaerobic Digestion</td>
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<tr>
<td>CCL</td>
<td>Climate Change Levy</td>
</tr>
<tr>
<td>CCS</td>
<td>Carbon Capture and Storage</td>
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<tr>
<td>CRC</td>
<td>Carbon Reduction Commitment</td>
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<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
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<tr>
<td>EM</td>
<td>Ecological Modernisation</td>
</tr>
<tr>
<td>EMEA</td>
<td>Europe, Middle East</td>
</tr>
<tr>
<td>EMEAI</td>
<td>Europe, Middle East and India</td>
</tr>
<tr>
<td>EPD</td>
<td>Environmental Product Declaration</td>
</tr>
<tr>
<td>EPSRC</td>
<td>Engineering and Physical Sciences Research Council</td>
</tr>
<tr>
<td>ESA</td>
<td><em>Evergreen Services Agreement</em></td>
</tr>
<tr>
<td>FSSD</td>
<td>Framework for Strategic Sustainable Development</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
</tr>
<tr>
<td>GT</td>
<td>Grounded Theory</td>
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<tr>
<td>LCA</td>
<td>Life Cycle Analysis</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
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<tr>
<td>QUEST</td>
<td>Quality Using Employee’s Suggestions and Teamwork</td>
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<tr>
<td>SLA</td>
<td>Social License to Operate</td>
</tr>
<tr>
<td>SD</td>
<td>Sustainable Development</td>
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<tr>
<td>SOI</td>
<td>Sustainability-Oriented Innovation</td>
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1 Introduction

1.1 Thesis Topic

This thesis explores the topics of corporate sustainability, employee engagement and innovation, grounded by a detailed case study of a manufacturing company. Research in this area contributes to some of the most pertinent questions in sustainability today, such as how businesses can contribute to the achievement of sustainability, the viability of a long term, aggressive commitment to an environmental goal, and the factors which enable radical, sustainability-oriented innovation. This work makes a timely contribution to the literature on organisation-level ecological modernisation (EM), corporate sustainability and innovation in practice; areas in which better understanding will make a significant contribution to the global sustainability challenge. It makes use of a systematic case study research strategy combined with a grounded theory methodological approach to analyse the topic and case material in detail, and build explanatory theory.

The title of this thesis, *Sustainability and Innovation: The Case of a Global Carpet Manufacturing Company*, reflects the core themes of this work. Regarding sustainability, concepts such as ecological modernisation (EM), employee engagement, innovation and corporate social responsibility are discussed in relation to the organisation-level activities of the case company in the context of the wider corporate sustainability landscape. A central argument of this thesis is that EM – a framework which normally operates at the macroeconomic scale – can be usefully applied at the micro-level, in relation to a single organisation. Regarding innovation, this thesis places emphasis on sustainability-oriented innovation (SOI). SOI is an emerging field of research in which there is a need for greater understanding of how to practically and successfully innovate for sustainability, how to embed innovation into the workforce, and the role of employees in these agendas. This thesis contributes to these themes through a descriptive case analysis.
1.2 Statement of the Problem: The Role of Corporate Sustainability

The need for humanity to achieve sustainability is the defining challenge of our time. It means addressing a seemingly intractable array of interrelated global problems such as a changing climate, increasing resource scarcity and the need to provide energy and other resources for a growing global number of middle-income earners living with increasing affluence. At the same time, humanity must continue to develop while mitigating or adapting to the effects of increasingly frequent extreme weather events, rising sea levels, ocean acidification and shifting harvest seasons.

Perhaps the most urgent issue is that of climate change. The global climate system is rapidly warming, and threatens the prosperity of all human life on Earth, present and future (Pachauri et al., 2014). The release by humans of greenhouse gases (GHG) such as carbon dioxide (CO$_2$), methane (CH$_4$) and nitrous oxide (N$_2$O) over the past 250 years has resulted in dramatically increased concentration levels of these gases in the Earth’s atmosphere. In 2013, atmospheric CO$_2$ concentrations recorded at Mauna Loa, Hawaii exceeded 0.04%, or 400 parts-per-million (ppm) (Showstack, 2013). This concentration has been increasing at a rate of approximately 2ppm per year for the past 25 years, with levels of 350ppm measured in the year 1990. It is estimated that current concentration levels have not been present for more than 800,000 years (Showstack, 2013). For comparison, modern humans are thought to have emerged around 200,000 years ago (Bradshaw and Sheppard, 2000). As a result of these changes in the composition of the Earth’s atmosphere, the planet is estimated to have experienced an increase in surface temperatures of approximately 0.85°C since the year 1880 (Hansen et al., 2006).

The economic and social cases for action now (rather than later) have been made, e.g., by Stern et al. (2006), and the ability to solve these problems using existing technologies has also been articulated (Pacala and Socolow, 2004). However, despite the urgent messages contained in these works and many others from the scientific community, current action to address climate change and achieve sustainability has failed to achieve significant reductions in global GHG emissions, which rose a further 0.2% in 2016 (Le Quéré et al., 2016).
The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement, which entered into force in November 2016, holds some promise for creating the necessary political willpower and momentum to address climate change at a national and state level. However, the contribution of non-state actors such as cities, civil society, academia and the private sector is recognised as critical in the identification of realistic targets (UNFCCC, 2015a). The absence of any significant market intervention by the world’s governments in favour of sustainability goals has placed substantial importance on the role of self-regulation mechanisms in the private sector to address climate change. Put simply, we need cities, communities, companies and businesses to step up and bridge the gap in dealing with emissions on their own accord.

Debates about the role of the private sector in addressing the challenges of sustainability are active and vigorous, and while some companies are taking steps towards sustainability, many of the world’s most significant contributions of GHG emissions arise from the private sector (Edenhofer et al., 2014). Unless radical changes occur in the approach to sustainability in the private sector, there is a risk that achieving sustainability will prove to be an impossible task in the timescale required to prevent dangerous and irreversible climate change (Schaltegger and Lüdeke-Freund, 2012). However, there are examples of genuine sustainability leadership and excellence among businesses. While many companies struggle with the basics of sustainability, there are some (such as Interface, Patagonia and Unilever) that have embraced sustainability as a business model, and claim to be better-off as a result. These organisations appear to have adopted an alternative business model from the dominant, neo-classical one seen in most applications. While there is a substantial body of work which considered environmental strategy from a policy, macro-economic or regulatory perspective, the body of work focusing on sustainability at the organisational level is still underdeveloped (Sharma, 2002; Bansal, 2003). If the strategies of these organisations can be understood and their success demonstrated in a manner which appeals to the neo-classical worldview, then it is feasible that the institutions that have built our modern society – democracy, science and capitalism – could be more closely aligned with the achievement of global sustainability by learning from those who are doing it already.
This research presents a timely examination of Interface’s strategic response to sustainability. It discusses the significant challenges to its approach, as well as the exciting opportunities that it presents. While many publicly-traded manufacturing companies today can be said to have an environmental programme comparable to that of Interface, very few have been engaged with sustainability at a holistic, company-wide scale for the length of time that Interface have. This long history of commitment to sustainability makes Interface a fascinating subject for examination, and offers an opportunity to explore issues such engagement of employees, sustainability leadership, and moving beyond the so-called “low-hanging fruit” in addressing sustainability challenges. Such issues will no doubt become increasingly relevant as the many nascent corporate sustainability programmes of today develop into mature programmes over the coming decades.

1.3 The Case Organisation: Interface

Interface® Europe (henceforth “Interface Europe”) is the European division of Interface, Inc. (henceforth “Interface”). Interface is a global, publicly-traded manufacturing company. The company’s primary product is carpet – specifically, carpet tiles. Interface is of interest because it has promised to eliminate its environmental impact entirely by the year 2020. In two decades of working towards this environmental target, the company claims to have reduced the whole-life GHG footprint of its products by more than 50% through reductions in material waste, improved product design, engagement with suppliers and increased energy efficiency. Over the same period, the company has approximately doubled its sales, influenced environmental policy at the national level and claims to have engaged and inspired its workforce. The company has also created numerous new products and services which it says have been driven by innovating around sustainability and environmental contexts (Anderson, 2009). Interface’s radical actions on sustainability appear to have led to a shift in the carpet tile industry as a whole towards sustainability, where Interface’s competitors have followed the company’s lead. The company and its former CEO Ray Anderson are frequently referred to as sustainability leaders (see, e.g. Epstein-Reeves and Weinreb, 2013; GlobeScan and SustainAbility, 2015). This recognition for sustainability has been earned despite the company’s carbon-intensive and material-intensive products, and Interface’s relatively
modest size compared with more well-recognised companies in the same category, such as Unilever, IKEA, Nestlé, BASF and Wal-Mart.

1.4 Defining Key Terms

1.4.1 Overview

This section briefly introduces some of the most important terms of this thesis: sustainability, sustainable development, corporate social responsibility, corporate sustainability and sustainability-oriented innovation. Given the pertinence of these terms to the content of this thesis, and particularly given the variability in definitions of these terms found among sources in the media and academic literature, a clear definition for this thesis is required. Table 1-1 provides a summary of these terms as discussed below.

1.4.1 Defining Sustainability

The term “sustainability” in the broadest sense describes the ability of something to be continued indefinitely. Thus, a sustainable system (e.g. ecosystem, economic system, etc.) is one which can be operated in its present form indefinitely. Precisely what is meant by the term “indefinitely” is dependent upon the context. Few things truly last forever; just as individual organisms live and die, so too do species and genera emerge and become extinct. Even planets like Earth range between periods of being supportive of life to periods of being hostile to life over large timescales (billions of years). Thus, in practical terms, the concept of being able to continue “indefinitely” on Earth is viewed within the context of a finite time span. This makes the term “sustainability” one which is more usefully defined in the context of human actions and activities, i.e. sustainable agriculture, sustainable design, sustainable energy sources, etc.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Sustainability</td>
<td>A system-level property which describes the ability of a system to operate in its present state indefinitely.</td>
</tr>
<tr>
<td>Sustainable Development</td>
<td>A global development paradigm describing human, social and economic transformations which contribute to an enlargement of people's choices to lead a long, healthy life, are able to be maintained, supported and intensified indefinitely for current and future generations.</td>
</tr>
<tr>
<td>Corporate Social Responsibility</td>
<td>A self-regulation mechanism which typically involves corporations aspiring to hold themselves accountable to various stakeholders beyond shareholders and investors, and typically include some form of reporting.</td>
</tr>
<tr>
<td>Corporate Sustainability</td>
<td>An approach to business management consistent with the principles of sustainable development. This includes consideration of long term impacts and the dependence upon natural resources, systems and wider society.</td>
</tr>
<tr>
<td>Ecological Modernisation</td>
<td>A theory which describes reforming of existing institutions of capitalism, science and democracy in order to mobilise them for sustainable development.</td>
</tr>
<tr>
<td>Sustainability-Oriented Innovation</td>
<td>The production, assimilation or exploitation of a product, process, service, method, structure or social institution that is novel in its application, and which improves economic, environmental and social outcomes throughout the life cycle of the application, compared to relevant alternatives.</td>
</tr>
</tbody>
</table>

Table 1-1 – Summary of definitions for key terms

1.4.2 Defining Sustainable Development

Building upon the relatively abstract concept of sustainability, the concept of “sustainable development” (SD) can be defined as a form of development which is able to be perpetuated, or as a form of development which leads to sustainable systems. Development is itself a broad concept which has been defined as a continuing process of human social and economic transformation that leads to an enlargement of people’s choices to lead a long, healthy life (UNDP, 1995). Thus, sustainable development describes human, social and economic transformations towards this end which are able to be maintained, supported and intensified indefinitely. By far the most frequently cited definition for sustainable development is the one which was created and popularised by the United Nation’s World Commission on Environment and Development (the Brundtland Commission), in its report “Our Common Future” (1987).
The commission defined SD as “...development that meets the needs of the present without compromising the ability of future generations to meet their own needs...”. While popular, there are those who criticise the definition offered by the Brundtland Commission (e.g., Lele, 1991; Sneddon et al., 2006). This is discussed further in the literature review.

1.4.3 Defining Corporate Social Responsibility

In the corporate world, a term which is sometimes linked with sustainability and sustainable development is "corporate social responsibility" (CSR). CSR is a global movement and idea which could be said to govern the behaviour of some organisations. It can be described as an ethical code that requires an organisation to consider the impact of its activities on its reputation. Drawing on stakeholder theory for a more robust definition (Freeman, 1983), CSR may be described as a form of self-regulation in which an organisation holds itself accountable to individuals or organisations which have influence over, or which are influenced by, the organisation, beyond their owners or shareholders. This could include customers, governments, suppliers, employees and wider society, among others. CSR can result in a company undertaking charitable or philanthropic activity, or addressing concerns of its employees, or working to reduce its environmental impact. CSR typically involves some form of public communication about progress towards defined goals, which may include production of reports or presentations to key groups. CSR is as a way of proactively managing social and reputational risk for the organisation. CSR can also be an effective marketplace differentiator, and can therefore be pursued for competitive advantage, by appealing to customers seeking products with green credentials, for example. Some view CSR as a positive force for change acting upon the private sector which drives it to go beyond the minimum requirements of regulations (often viewed as rather weak and reactive), and to contribute to sustainability in a substantial way. CSR is also viewed with cynicism as its close link to communications and reputation management can make it a powerful marketing tool and even provide incentive for deception. There are a range of factors to consider, which are discussed in more detail in a review of the literature.
1.4.4 Defining Corporate Sustainability

“Corporate sustainability” is a term which overlaps heavily with CSR. In one sense, it refers to the corporate response to sustainable development. It is sometimes also used to describe a strategic approach to the long-term success and survival of the organisation (i.e., to “sustain” the organisation), and consequently leads to consideration of the organisation’s reliance on resources like nature or talent, and how these can be managed effectively (Hart, 1995). Corporate sustainability is also used as a term to describe a wider movement or collection of ideas found within the academic and grey management literatures which relate to the undertaking of social and environmental goals by businesses such as the triple bottom line (Elkington, 1997), natural capitalism (Hawken et al., 1999), industrial ecology (Allenby and Graedel, 1993), cradle to cradle (McDonough and Braungart, 2002), circular economy (Pearce and Turner, 1990; Andersen, 2007), ecological modernisation (Spaargaren and Mol, 1992; Hajer, 1995; Andersen and Massa, 2000), and others. In this thesis, this collection of ideas is described as the “corporate sustainability”. While there is a difference between the terms CSR and corporate sustainability, in many contexts they are used interchangeably, or with CSR being an umbrella term which includes corporate sustainability.

1.4.5 Defining Ecological Modernisation

The theory of ecological modernisation (EM) is an idea which emerged in the academic literature in the 1980s and has since been refined, debated and discussed. It describes an approach to environmental reform which seeks to gradually transform (rather than replace) the core institutions of modern society; science, politics, the market place, in pursuit of rational, feasible and pragmatic action towards environmental protection (Spaargaren and Mol, 1992; Hajer, 1995). It is not anti-growth or anti-capitalist, nor is it necessarily in favour of unregulated markets. Rather, EM advocates the “middle way”; innovations which redirect these institutions towards more environmentally-viable versions, decoupling economic growth from environmental degradation. EM is important to this thesis as it describes the approach taken by Interface in the management of its sustainability programme.
The ideas of EM are often posed as being in conflict with progressive environmental goals. For example, in their recent book, Wright and Nyberg (2015) disparage EM as a mythology that economic growth leads to environmental improvement. A similar argument is made by Foster et al. (2011), who state “ecological modernization theorists simply added...the corporate greenwashing claim that the eco-modernizing tendencies intrinsic to capitalism or “the market system” allowed the “expansion of the limits” of growth” (pg 41). This argument, while commonly seen, rather misses the point of EM, which is not to promote a “business as usual” approach to sustainability, but rather to reform existing institutions of capitalism, science and democracy in order to mobilise them for sustainable development. This thesis contributes to an important and active debate in the literature by exploring the theme of ecological modernisation in the context of Interface, and considers its strengths and practical limitations when applied at the level of an individual organisation.

1.4.6 Defining Sustainability-Oriented Innovation

Innovation which produces improved sustainability may be described as “sustainability-oriented innovation” (SOI), a term first introduced by Hansen et al. (2009). A more specific definition for SOI was developed by the researcher and is presented in this thesis (Luqmani et al., 2016): SOI is the production, assimilation or exploitation of a product, process, service, method, structure or social institution that is novel in its application, and which improves economic, environmental and social outcomes throughout the life cycle of the application, compared to relevant alternatives. Innovation is typically presented as an important mechanism for organisations, institutions and individuals can deliver improved sustainability. Simply put, innovation involves the application of new ideas or methods to solve problems or make improvements. The concept is relevant to many contexts, including products, processes, organisations and institutions (Mortensen and Bloch, 2005). The magnitude and nature of the improvement determine whether the innovation may be considered radical or incremental, although this is a blurred line (Leifer, 2000).
1.5 Research Theme and Questions

1.5.1 Presentation of Research Questions

The above introduction has summarised the topics of this thesis and begins to position the work within the context of the wider research landscape. Within these themes, this thesis improves understanding of ecological modernisation as it is applied in practice. It explores organisational factors and features of ecological modernisation. In particular, this work develops a greater understanding of the practical benefits and limitations of a “strong” ecological modernisation strategy, and closely related concepts such as sustainability-oriented innovation and employee engagement. These are important topics which are relevant to the wider discussion on sustainable development and embedding sustainability in practice. This area is in urgent need of research that moves beyond policy-level or institution-level, theoretical analysis and focuses more on practice-based research at the organisational level. At the organisational level, research must still be informed by the policy and system-level debates which define the organisational contexts, but placing focus at the organisational level more readily contributes to the development of some operating principles and strategies for managers and practitioners. This work contributes to addressing the needs of a growing number of organisations which are moving forward on sustainability, and which are developing their internal governance, capabilities and approaches to achieving this. This research contributes to an important central question which has significance for the wider sustainability agenda: How is ecological modernisation operationalised at the organisational level? In seeking to address this question, the research examines the case of Interface, asking some more specific questions:

In the context of a mature, global manufacturing organisation which has adopted an ecological modernisation approach:

- R1: What are the important aspects in implementation of an ecological modernisation strategy at the level of an individual organisation?
- R2: What are the interactions between employee engagement and sustainability in the context of an ecologically-modernising organisation?
- R3: How is innovation with respect to sustainability managed in this context, and what are the enabling contextual factors for success?
These three questions are the themes of this research, which are tackled in the core chapters of this thesis (Chapters 5, 6 and 7).

1.5.2 Development of Research Themes

This project was initially designed to develop an energy reduction strategy for Interface’s European operations. During the first year, the research began in the direction of a technical engineering research project focusing on recycling technologies and energy efficiency of carpet production. However, as described in the second of the accompanying 6-monthly reports, towards the end of the first year of this research project, the partnering company closed its manufacturing operations at the site which this project was based. While disruptive to the research project, this created an opportunity to refocus the project in a different direction. The framing of the study to explore the theme of ecological modernisation was done opportunistically.

The decision was taken to undertake a case study looking at strategic management of sustainability at Interface. This descended from considering the question “what alternative choice of topic for this research could lead to the greatest impact?” Following an advisory steer from the academic staff at Surrey University during attendance at the Sustainability for Engineering and Energy Systems academic conference in 2012, and with awareness of the value of social research in tackling sustainability research problems following the training in social research methods as part of the doctoral training centre taught modules, the decision was taken to pursue a qualitative case study research project using social research methods. The topic area of ecological modernisation emerged after exploration of the organisational and management literature, initially “implicitly”, through the work of Elkington (1997), Schaltegger and Lüdeke-Freund (2012) and others, who describe sustainability in the context of a business model and corporate social responsibility. Further exploration led to the work of Stubbs and Cocklin (2008), who framed Interface as being aligned with ecological modernisation in order to extend understanding of how sustainability is undertaken in firms. This led to a more explicit focus on the specific concept of ecological modernisation and the relevance of Interface to the debates surrounding this subject. The decision to shift the emphasis from engineering and towards social science has necessitated retraining of the researcher and additional effort on the part of the
supervisory team, but the result of this decision has been a valued learning experience, as well as producing a high-quality research publication in an important topic area (Luqmani et al., 2016).

The broad research theme of understanding ecological modernisation at Interface has been in place since the decision to move in the direction of a social research project. The more detailed research questions were developed iteratively through the collection and ongoing analysis of the case material, as part of a grounded theory research strategy in which analysis and data collection are undertaken in parallel according to a broad research theme, without first establishing testable hypotheses. The methodology chapter describes the research approach, including the selection of a qualitative case study using the grounded theory research strategy, and the techniques for data collection and analysis.

1.6 Thesis Structure

1.6.1 Overview

The structure of the thesis is now briefly summarised. It is considered that this structure offers a parsimonious presentation of the research data, analyses and discussion, each of which have developed organically throughout the course of the project. The grounded theory research strategy, while valuable in enabling this study to adopt a systematic and exploratory approach, can make presentation of the results more complex compared with other approaches such as those taken by experimental, hypothesis-testing research projects. As a result, rather than a single “results” chapter, this thesis make use of three core chapters which contain results (presented in phenomenological groupings), preceded by a contextual chapter, and incorporating analysis and discussion of these phenomena within these chapters.

1.6.2 Structure

Following this introduction, there is a review of the academic literature in order to position and inform the work and to provide context for the case analysis. The methods chapter describes the research philosophy, strategy and techniques used in collection and analysis of the data. This is followed by the core chapters which share a common
contextual description of the case organisation. The core chapters contain the case phenomena, their associated analyses, and discussion including further relevant literature to support the development of explanatory theory. Finally, the conclusion chapter draws together the various analyses and their contribution to the research questions discussed above.
2 Review of Literature

2.1 Introduction

2.1.1 Overview

This chapter discusses and critically examines the bodies of literature relating to this work and provides an exploration of the underpinning theory and evidence needed to ground this research appropriately. First, the research landscape in which this work is situated is identified and discussed, including other relevant theories and models addressing the research problems. Important concepts and their associated debates are described and discussed. This is followed by a summary. In broad terms, the topics covered in this review are: sustainable development and theories and methods for implementing it, corporate sustainability and social responsibility, employee engagement and sustainability-oriented innovation.

2.1.2 Review Structure

First, the concept of sustainable development (SD) is discussed in order to provide an overarching context to this work. The review then leads into a discussion of implementation strategies for SD, focusing particularly ecological modernisation. Implementation of SD in an organisational context is of particular relevance to the current work, and the review highlights the need for rigorous empirical case studies to improve understanding of the operationalisation of sustainability. A discussion of corporate social sustainability follows, which describes several important concepts and perspectives used in this work such as the neo-classical perspective, enlightened self-interest and deep ecology. The next topic is innovation – in particular, sustainability-oriented innovation (SOI), a special form of innovation. This review discusses conceptual models of innovation and the link with sustainability. Finally, this review discusses employee engagement and its relation to sustainability.

In the interests of brevity and focus, this chapter does not provide a review of the scientific basis or evidence for human-induced climate change. This chapter assumes prior understanding of these topics from the reader, and acceptance of the fact that
climate change is a phenomenon driven by human activity. For a reliable explanation of the scientific basis of these issues, see Pachauri et al. (2014). For a balanced and approachable introduction to the topic of sustainability, renewable energy and climate change, see MacKay (2008).

2.1.3 Positioning this Work within the Wider Research Landscape

This thesis spans several areas of research. By focusing on ecological modernisation and its application in practice, it aligns with work in sustainability management and organisational science, but is relevant to (and draws upon) several strands of research activity in the areas of sustainable development (Brundtland et al., 1987; Baker, 1997; Robèrt et al., 2002), corporate social responsibility (Carroll, 1991; Hart, 1995; Sen and Bhattacharya, 2001), industrial ecology (Allenby and Graedel, 1993), circular economy (Pearce and Turner, 1990; Andersen, 2007), sustainability-oriented innovation (Adams et al., 2012) and other related concepts. Together, these areas are considered to constitute a meta-discipline of corporate sustainability, concerned with the theoretical and practical study of the implementation of sustainability and sustainable development in organisations. The common goals of these areas of research are to provide theory, critical thought and improved understanding to support direct, effective decision making, strategy, policy and action to bridge the research-action gap and help the existing institutions of our society (such as democratic governments, non-state actors, scientific research and innovation) to achieve sustainability (Bansal et al., 2012). It is a broad, socio-technical area of research, including contributions from social and behavioural sciences, economics, engineering and the physical sciences as well as incorporating evidence and action-based research from practitioners in industry. This thesis contributes to the aims of this broad area of research by providing an empirically grounded case study of an organisation which embodies the traits of ecological modernisation, and which is purported to demonstrate the validity of such an approach.

2.2 Definitions of Sustainable Development

2.2.1 Brundtland Commission

Sustainable development (SD) is a development paradigm which has gained prominence over the past three decades. By far the most frequently cited definition for
Sustainable development is the one which was created and popularised by the United Nation’s World Commission on Environment and Development (the Brundtland Commission), in its report “Our Common Future” (1987). The commission defined SD as “…development that meets the needs of the present without compromising the ability of future generations to meet their own needs…” The Brundtland Commission definition for SD has been highly influential in shaping attitudes towards development within the international community. It has gained widespread recognition, and its message of intergenerational equity (i.e., considering the rights of future generations to develop and live well; Bärlund, 2005) has become enshrined at the highest level within political documents. Most notably, this includes Agenda 21 (Sitarz, 1993), the adoption of which by nearly all of the world’s nations created the first real global partnership to address climate change at the Earth Summit in Rio, Brazil, 1992.

However, while attractive in its simplicity, the Brundtland Commission definition for SD also has its detractors (Lele, 1991; Sneddon et al., 2006). The word “development” is ambiguously defined; according to the commission report, development involves “a progressive transformation of economy and society [to meet] the satisfaction of human needs and aspirations”, although it is not clear whether there is a distinction between development, economic development or economic growth. Indeed, in a world where the population is still growing, and where increasing numbers of humans aspire to more affluent standards of living, the concept of development as defined in by the Brundtland Commission must be strongly tied to the concept of economic growth. Jackson (2011) explored the economic reality of addressing climate change under a paradigm of continued economic growth. Examining approaches to delivering the recommended carbon reduction targets (building upon Albritton et al., 2001), Jackson determined that in order to address climate change and maintain an average global growth rate of 2% from 2010 to 2050 (tackling global poverty), the carbon intensity of the world’s economic and productive systems would need to improve by a factor of approximately 130. This would mean reducing from 768g of CO₂ per dollar of output (2010 values) to just 6g of CO₂ per dollar of output in 2050. The author further argued that this kind of scale of improvement is unfeasible, and thus the pre-eminence of seeking continued economic growth among policy makers should be questioned (Jackson, 2011).
A further issue with the *Brundtland Commission* definition for SD is that it tends to evoke a rather iterative and incremental approach to development; one which builds upon past developments, and which gradually shifts towards more sustainable development and away from less sustainable development. Over the past 28 years, this incremental approach has brought limited success in making the kind of deep, systemic changes which are required in order to bring the world’s macroeconomic systems into acceptable, sustainable limits. This contradicts the statement in the commission’s report that “If industrial development is to be sustainable over the long term, it will have to change radically in terms of the quality of that development” (pg. 179). In other words, the *Brundtland Commission* definition of SD simultaneously reinforces the approach of incremental change while calling for radical change. Daly (1990) pointed out the oxymoronic nature of the term “sustainable development”, which he argued could be equated with the concept of “indefinite economic growth”. Daly argues that there is an inherent contradiction within the *Brundtland* definition, since on the one hand it argues for meeting the needs of the present (i.e. tackling current issues of poverty and lack of access to clean water), while at the same time making no comment on the controversial topics of continued population growth and the consequential increased resources required to serve them.

Daly (1990) distinguished the concept of “growth” as being necessarily distinct from that of “development”; since in a finite ecosystem (i.e. planet Earth), perpetual growth clearly cannot be sustained. This idea is supported by the findings of *The Limits to Growth*, which reported on computer simulations of exponential growth within a finite earth-like system (Meadows *et al.*, 1972). Furthering this concept, Jackson (2011) proposed a model where prosperity is the focus; where macroeconomic systems are used to improve human happiness, fulfilment and wellbeing, and where economic growth is not a required outcome. Max-Neef (1991) created a list of nine fundamental human needs which have always, throughout human history, required fulfilment – subsistence, protection, affection, understanding, participation, idleness (or leisure), creation, identity and freedom. He also identified synergistic satisfiers – activities which fulfil multiple needs at once – and pseudo-satisfiers – activities which address needs at a surface level (such as stereotypes seemingly satisfying the need for understanding, or charity temporarily meeting the need for subsistence) but do not represent true or
lasting fulfilment. Finally, Max-Neef identified destroyers – activities which may meet some needs at the cost of preventing the fulfilment of others (such as censorship meeting the need for protection at the expense of understanding, participation, creation and so on). Max-Neef’s work provides a theoretical basis for assessing how social needs are being met within the context of sustainable development, and contributed to the development of an alternative definition of sustainable development, the Framework for Strategic Sustainable Development (FSSD; Robèrt et al., 1997).

2.2.2 Framework for Strategic Sustainable Development (FSSD)

In order to provide a basis for action and critical thought on the subject, Robèrt et al. (1997) created a scientific definition of unsustainability to support the delivery of sustainable development at a more detailed level than other definitions. The authors describe the Brundtland definition as being a principle of sustainability, at the philosophical level and therefore a starting point for developing a more detailed framework for action (Robèrt et al., 2002). To respond to this need, Robèrt et al. created the Framework for Strategic Sustainable Development (FSSD) in 1989. The FSSD captured the combined consensus of fifty scientists – including natural scientists, doctors, economist and ecologists. It has been refined and developed over the past 25 years. It currently sets out four key areas of “unsustainability”, which must be eliminated or controlled in order to for a society to be considered sustainable.

According to the Framework for Strategic Sustainable Development (Robèrt et al., 1997), a sustainable society is one in which:

1. Nature is not subject to systematically increasing concentrations of substances extracted from the earth’s crust
2. Nature is not subject to systematically increasing concentrations of substances produced by society
3. Nature is not subject to systematically increasing degradation by physical means
4. People are not subject to conditions that systemically undermine their capacity to meet their needs

(These four items are not in any particular order, and all are required for sustainability).
The use of the term “systematically increasing” within the FSSD points toward the notion of addressing these issues at the system level. By creating a stable, steady-state flows throughout the ecological system, the FSSD addresses the primary mechanisms by which humans can cause ecological impacts. From this framework, it is clear that fossil fuel extraction for combustion, for instance, is unsustainable in its current form. It results in a systematic increase in the level of carbon from the Earth's crust into the atmospheric, violating principle 1 and 2. However, recycling of previously mined minerals and materials is entirely consistent with the FSSD, and is a useful method for maintaining the flow of materials in a steady state by offsetting the need for virgin material extraction.

The FSSD framework is supported and promoted by a non-profit educational organisation set up by Robèrt called “The Natural Step”, although over time the two terms (FSSD and The Natural Step) have become more or less synonymous (Missimer et al., 2010). This organisation has developed tools and approaches for teaching and using the FSSD framework in a real-world context, such as performing a sustainability assessment of an organisation or activity, guiding policy and making decisions. The approach includes developing an awareness of the need for action, creation of a vision for change, designing a plan for implementing changes, and commencing with activity. The Natural Step has received several awards such as The Blue Planet Award in 2000 and the Mikhail Gorbachev’s Millennium Award in 1999, and it has been adopted by a number of high profile organisations across the world. In the UK, these organisations include BP, Carillion, Sainsbury's, Yorkshire Water, Forum for the Future, Co-operative Bank and Interface Inc. However, the adoption of the Natural Step approach by these organisations does not necessarily verify its quality or effectiveness. A more critical review of the Natural Step approach reveals it to be a variant of the popular and ubiquitous “Deming wheel” (plan-do-check-adjust) which emerged in 1950 (Moen and Norman, 2006), and which is found at the core of nearly all modern quality control systems. The “backcasting” approach to planning, which the Natural Step advocates, was first discussed in the literature by Robinson (1982), who made use of it for developing pathways for energy policy. Robinson noted that backcasting was superior to forecasting when used for illustrating arguments, and it enables a style of thinking which is unconstrained by the present-day initial conditions.
Overall, while the novelty of the Natural Step approach with which it is associated may be dubious, the underlying FSSD framework provides useful ground rules and definitions for unsustainability which enable individuals to think more critically about the implementation of sustainable development aspects in any application. This definition of “unsustainability” contrasts with the Brundtland Commission definition for SD, which is more popular and easier to communicate, but does not succinctly provide a robust framework for assessing development activities in pragmatic terms at a detailed level.

2.2.3 Sustainable Development Ladder

Noting that the definition of SD had diverged following the Brundtland definition, Baker (1997) proposed a “ladder” of sustainable development, with four notional “rungs” or approaches identified:

1. Ideal Model, termed the most “ecocentric” or “biocentric” approach, in which nature is promoted and protected; “labour-intensive, appropriate” technology is the preferred choice, governance is decentralised, and in which the role of the economy is to meet “needs”, not “wants”;

2. Strong Sustainable Development, in which environmental management and protection are applied, clean technology and product life-cycle management are preferred, and some institutions are restructured, and the marketplace is environmentally regulated;

3. Weak Sustainable Development, in which neo-classical principles are applied to environmental management, with consideration of the environment as a measureable resource or service with economic value, as described by Pearce and Turner (1990);

4. Treadmill, termed the most “anthropocentric” approach, and epitomised by manipulation of the environment to serve production and growth. The authors characterise the current state of the global economy as being representative of the “treadmill”.

The authors make no effort to veil their own preference for the “ideal model”, a rather drastic vision of sustainable development which altogether rejects the concept of
development as it exists today in favour of a radical, biocentric worldview in which nature is protected and given equivalent moral standing to humans. The authors disparage popular environmental accounting approaches to SD such as Natural Capital (Costanza et al., 1997), used by the World Bank among many others, as weak and anthropocentric. The suggestion that an “ideal model” of development would include a halting of economic growth, decentralisation of institutions, and a return to “labour intensive technology” is as distant from the principles of Brundtland as to be incomparable. The author’s vision suggests that this conceptualisation of SD is actually rather regressive with respect to technological progress and economic development, similar to the sufficiency or deep ecology schools of thought (Naess, 1973; Daly et al., 1994). The concept of an economy which serves only humanity’s absolute needs (i.e. minimising affluence in order to reduce overall consumption) has been described as a poor strategy, undermined by a “rebound” effect which results from an imposed lowering of demand for consumption, which in turn lowers prices, and thus shifts consumption to different alternatives (Alcott, 2008).

2.2.4 Natural Capital and Sustainable Development

The ladder conceptualisation of Baker (1997) is distinct from the work of Pearce and Atkinson (1993), though both theories share the terms “weak” and “strong” with regard to sustainable development. Pearce and Atkinson (1993) adopts a neo-classical stance and makes use of natural capital accounting to define an economy as “weakly” sustainable as long as it saves at a rate which is greater than the combined depreciation of natural and man-made capital. An economy is defined as “strongly” sustainable if certain critical natural capitals had any depreciation. The natural capital concept has been criticised (Hinterberger et al., 1997). These authors note that Pearce and Atkinson’s conclusion that Japan is the world’s most sustainable economy is clearly incorrect, given Japan’s mediocre record with respect to sustainability according to most measures (see, e.g., Hsu and Zomer (2016), who rank Japan’s environmental performance as 39th out of 180 countries). This example suggests that the method for calculating sustainability proposed by Pearce and Atkinson (1993) cannot be reliably applied. Hinterberger et al. (1997) go on to point out that “nature is not an asset like a savings account, but a naturally ever-changing ecological environment”, drawing
attention to the oversimplification inherent in the concept of considering the environmental in terms of assets.

2.2.5 United Nations Sustainable Development Goals

One framework which seeks to identify and promote appropriate goals for SD from an objective standpoint is the United Nations’ Sustainable Development Goals (SDG; UN General Assembly, 2015). These goals were introduced in 2015 and have a target year of 2030, replacing the previous Millennium Development Goals (2000-2015). The SDG include specific targets addressing poverty, hunger, health and inequality in pursuit of a peaceful, equitable society. In addition, the SDG framework draws on the work of Rockström et al. (2009), which defines a “safe operating space” for humanity – safe operational boundaries for perpetual consumption of the planet’s resources and production of waste (many of which are currently being exceeded). The SDG framework advocates the delivery of sustainable systems for water, food, energy, and other critical services, in accordance with the safe operating space. According to the SDGs, humanity must focus on development which considers long-term impacts on the ecosystem, and design an equitable society which can exist sustainably within the ecological boundaries (UN General Assembly, 2015).

2.3 Ecological modernisation

2.3.1 Overview

Ecological modernisation (EM) is an economic, sociological and political theory which has risen to prominence in recent years. It describes a particular framing of environmental problems (such as the need for sustainable development) as being solvable, and compatible with the continued existence of the institutions of modern, democratic, western societies; science, politics and the marketplace (Spaargaren and Mol, 1992; Andersen and Massa, 2000; Mol and Sonnenfeld, 2000). EM theorists hold that the challenge of addressing climate change and sustainable development may be reframed as an opportunity to build a highly efficient and productive low-carbon economy (Bailey et al., 2011). They propose that sustainable development can be delivered directly through existing institutions of liberal, democratic and globalised
capitalism, given a suitably supportive social and political context (Gouldson and Murphy, 1997; Bailey et al., 2011).

2.3.2 Principles of Ecological Modernisation

EM theory has been proposed, debated and developed by European scholars in Germany (Huber, 2000; Jänicke, 2008), the Netherlands (Spaargaren and Mol, 1992; Hajer, 1995) and the UK (Jacobs, 1991; Gouldson and Murphy, 1997). These scholars and others debated and discussed EM as a perspective for designing and describing environmental governance, organisational transformation and other projects of sustainable reformation. EM theory gives an optimistic frame of reference. It rejects the notion that achieving sustainable development must come at the cost of economic growth (Bailey et al., 2011). The theory suggests that there are alternative ways in which a “double dividend” or “win-win” can be achieved (Andersen and Massa, 2000).

EM seeks to decouple growth from carbon emissions and resource consumption. Thus, rather than developing through continuous expansion of production and consumption, the direction of economic development is instead pointed towards an ever-increasing level of efficiency (energy, resource and material efficiency). This increased efficiency saves costs and increases productivity of existing resource flows, giving room for growth without the need to expand resource consumption. However, a sustainable system cannot rely on perpetual efficiency improvements. A second pillar of EM is innovation – a force which not only supports the pillar of efficiency and implements new solutions, but which also creates gradual reform in the institutions of society which become, ultimately, more sustainable. Using the tools of efficiency and innovation, EM presents a framework for helping to reach sustainability without the need for a dramatic (and arguably unrealistic) overhaul of the macro-economic system. Rather, EM enables reconciliation between the dominant neo-classical approach of industries and economic institutions on the one hand (i.e. companies must focus on wealth creation for shareholders), and on the other hand, the need for these institutions to address sustainability and climate change on the other. This makes the theory attractive as a form of carbon governance, since it offers a route to a solution compatible with the market. EM is a pragmatic theory, and it describes perhaps the most obvious path to sustainability, given current economic realities. Some authors even argue that EM is already occurring, albeit at a slow pace, and critics argue that EM may simply be
dismissed as a side-effect of economic development, regardless of policy (Gouldson and Murphy, 1997; Pepper, 1998; York and Rosa, 2003).

What drives the reforming process of EM? Several factors are suggested by the literature. One fundamental driver is a growing body scientific evidence for the need to act, which is then followed by a social recognition of the same, leading to a regulatory response which drives innovation (Gouldson and Murphy, 1997). The innovation process is also driven by rising material and resource costs (making the need for a solution more pressing for affected organisations), and by recognition of the opportunities that lie in the transition to greater environmental efficiency. Mol and Sonnenfeld identify the role of firms (more generally, economic agents) in driving wider EM reforms, noting that there is “Increasing importance of market dynamics and economic agents...as carriers of ecological restructuring and reform” (pg. 6). This concept of proactive (EM-driving) behaviour in firms helps to conjure an image of what a model EM organisation might look like, and helps to conceptually situate a proactive firm within the wider EM landscape – as a “carrier of reform”, not only becoming more sustainable itself but also shaping the world around it. This vision contrasts with the idea of a sustainable business from Hawken (1994), Braungart and McDonough (2000) and others, who present a more passive and self-contained conceptualisation of the organisation; one which co-exists with the natural environment as part of an integrated environmental and industrial ecosystem. According to Hawken et al., such an organisation could still be driven by profit and subject to forces of the market, but the “rules of the game” (incentives of the macro-economic system, including ideas such as carbon taxes) would be changed so that sustainable behaviour was the most obvious and profitable approach. Within EM, organisations take an active role in the modernisation process, influencing and reforming markets and social institutions as carriers of reform (Mol and Sonnenfeld, 2000). This is what makes EM an attractive theory for many environmentalists – it does not necessarily require changes in the macro-economic system in order to take place, but rather, it promises gradual changes, making it much more palatable in mainstream debate (Gouldson and Murphy, 1997). It is not entirely clear how these change mechanisms work in practice, and there is a recognised need to understand the operational considerations of EM at the level of the
individual organisation (Welford, 1998), although very few seem to have tackled this topic (Baylis et al., 1998a; Baylis et al., 1998b).

2.3.3 Social Dimensions of Ecological Modernisation

At its core, ecological modernisation theory is about social transformations (Mol and Sonnenfeld, 2000). In a sense, the social aspects of EM are the most vital, as they catalyse and enable these transformations. In order for the technological and innovative changes of EM to take place, they must first be driven by changes in social systems (e.g., politics, civil society; Gouldson and Murphy, 1997). This is true whether transformations arise through the actions of a single influential leader, or through the small actions of many individuals. While EM theorists readily discuss EM at the level of global and national policy, a key component which appeared to be missing in detail from the EM literature is an account of the role of individual people, organisations, groups and culture within EM theory – such as employees and managers, customers, shareholders, civil society and wider society. How do these actors feature within EM? In particular, what does EM offer in relation to the challenges of culture, consumption and sustainable lifestyles? (Mol et al., 2014). Another consideration relating to the social dimension of EM is the concept of “sectoral dynamics” – the extent to which an individual actor can influence the wider context in which it exists (say, an individual employee influencing a company, or a company influencing its wider industry). Are these influences carried by market forces, or through alternative paths? Again, this topic appears to have had very little coverage within the literature and could be usefully explored in order to understand the mechanisms of EM at the individual and organisational level.

2.3.4 Relation of Ecological Modernisation to Other Ideas in Corporate Sustainability

Under the umbrella term of corporate sustainability, there are a large number of authors who promote related concepts which are strongly congruent with EM. These include industrial ecology (the mapping of material and energy flows throughout the life-cycle of products or services; Allenby and Graedel, 1993), the triple bottom line (a framework for reporting and accounting which encourages a balance of social, environmental and economic outcomes; Elkington, 1997) and cradle-to-cradle design (an approach to product and service design which minimises material waste and mimics
natural cycles (McDonough and Braungart, 2002). All of these concepts describe an approach to environmental reform which emphasises “win-win” opportunities. Examples of this are activities which reduce material waste while also reducing costs, or improving sales by promoting environmental aspects of products as a marketplace differentiator, or taking inspiration from nature to develop improved recycling or disposal techniques. Others have also written about the business case for sustainability, which also overlaps strongly with the concept of ecological modernisation (Schaltegger and Lüdeke-Freund, 2012). These authors argue that the economic and environmental goals of an organisation can be simultaneously addressed without the need to trade-off one or the other. However, Schaltegger and Lüdeke-Freund do note a limit to this approach, beyond which there is an increasing marginal cost to these activities and they become no longer cost-positive.

2.3.5 Major Criticisms of Ecological Modernisation
The concept of increasing marginal cost relates to the primary challenge to EM theory, which comes through a critique of its efficacy for bringing about long-term environmental reform. Critics of EM point out that it does not tend to lead to radical transformation or system-level redesign of global production, but rather a very gradual pace of change characterised by continuous efficiency improvements and waste reduction while maintaining the status quo of “business as usual” operations. As a result, some authors have described EM theory as “sustainable capitalism” which allays environmental concerns and soothes consciences while distracting from the urgent need for radical, system-level changes (Blühdorn, 2001; York and Rosa, 2003; Baker, 2007; Bailey et al., 2011). Further, some authors argue that there is a lack of empirical evidence to demonstrate that EM can lead to rapid environmental reform within the necessary timescale (York and Rosa, 2003). The EM perspective is also criticised for its lack of discussion about how people can meet their needs – indeed, the EM perspective has been criticised for being blind to issues of social justice, and therefore not a true mechanism for sustainable development (Gouldson and Murphy, 1997). Bailey et al., 2011 add that EM “focuses on efficacy and efficiency, but has little to say on issues of social justice”. Another criticism of EM is that it is strongly pro-development, and does not leave any room for consideration of the fact that there may be fundamental tension
between the goals of sustainability and perpetual economic development (Berger et al., 2001).

2.3.6 **Strong and Weak Ecological Modernisation**

In a balanced review of the EM field of discourse, Andersen and Massa (2000) note a divergence in these discussions between two differing versions of EM: “weak” and “strong”. The first form could be summarised as a concept of neo-classical or utilitarian eco-efficiency measures; equating EM theory with a process of profit-seeking efficiency improvements which happen to reduce waste and therefore improve environmental outcomes while simultaneously increasing profitability for shareholders; a “win-win”. This conceptualisation is most reflective of the work of Huber (1985), who presented EM as a technocratic process of economic and environmental improvement. “Strong” EM, on the other hand, has been characterised by Andersen and Massa (2000) as a pragmatic approach to acting upon the precautionary principle when confronted with evidence of environmental harm (Boehmer-Christiansen, 1994), with reforms and innovations driving consciously towards the reduction of those environmental harms (yet with an equally keen focus on economic outcomes). EM theory as described by Mol and Sonnenfeld (2000) and others more recently are far less focused on efficiency; the argument has becomes more developed and carefully considered, and includes incorporation of social dynamics as well as environmental and economic ones. Regrettably, this debate is complicated by the fact that many organisational case studies in the literature claiming to demonstrate EM actually present the “weak” form of Huber (1985). Given the time that has now passed since the prominent work of Mol and Sonnenfeld (2000), arguing a case against “weak” EM is really a misinterpretation of the theory, typically suggested by detractors of EM who question its current status as one of the leading theories of ecological reform (e.g. Pepper, 1998; Coffey and Marston, 2013; Klein, 2014). These authors equate EM to “greenwash”; a smokescreen used by policy makers in governments and corporations to legitimise business-as-usual activities while making cost-effective efficiency improvements and failing to deliver any of the radical system-level change needed to achieve sustainability (Machiba, 2010). Some of the critics of EM make similar arguments against capitalism, neo-classicism and consumerism, criticising these ideas for their inherent weakness in accounting for environmental concerns. Some authors (e.g., Klein, 2014) go on to offer instead a broad
array of questionable alternatives, such as deep ecology, biocentrism, sufficiency, and anti-globalisation. There is a wealth of empirical studies which show forms of EM in practice (York and Rosa, 2003; Coffey and Marston, 2013), although these studies have tended to report about the “weak” or “utilitarian” form of EM (Christoff, 1996; Andersen and Massa, 2000). Such studies can offer valuable insight into the realities of the EM worldview at the operational level, but one challenge facing this field is the need to demonstrate how “strong” EM can be realised in practice, rather than continuing to fuel the “weak” EM arguments with examples of eco-efficiency and low-impact, incremental innovations.

Meanwhile, in the private sector, many of the world’s largest companies claim to have readily adopted such a worldview; promising to promote goals such as environmental sustainability, wellbeing and social equity through their core business activities in their annual reports, with full support of their shareholders (see, e.g., Chevron, 2015; ExxonMobil, 2015; Microsoft, 2015). In practice, implementation of sustainability principles appears highly variable, with examples of sustainability best-practice counterbalanced by underwhelming performance and even deceptive, green-washing behaviour (Delmas and Burbano, 2011). Addressing sustainability challenges like global warming will require radical change extending beyond current efforts (Machiba, 2010). The Intergovernmental Panel on Climate Change noted that “stabilising temperature increase to below 2°C relative to pre-industrial levels will require an urgent and fundamental departure from business as usual” (Pachauri et al., 2014). If companies are to make a substantial contribution to addressing these issues within the framework of the prevailing corporate sustainability paradigm, there is a pressing need for managers to better understand how to undertake strong, effective action on sustainability.

2.3.7 Porter Hypothesis

One popular theory concerning the regulation of environmental action is the “Porter Hypothesis”. This is the idea that well-designed environmental regulations, rather than being limiting or anti-competitive, can actually drive competitive advantage (Porter and Van der Linde, 1995; Ambec et al., 2013). Sometimes called a “win-win” concept of environmental regulation, Porter and Van der Linde argue that well-designed (strict but flexible) regulations drive innovation in companies, and therefore lead to improved
environmental performance and sometimes improved business outcomes – making up for the costs of compliance – through six or more pathways (Porter and Van der Linde, 1995):

1. The creation of the regulation itself highlights areas in which inefficiencies might exist, and where there may be opportunities to address them;
2. Simply mandating collecting information about particular pollutants or other indicators leads to awareness and therefore action;
3. Regulation provides investors with greater certainty about environmental regulation;
4. Regulation acts as “outsider pressure” which motivates greater innovation efforts;
5. Regulation helps to create a level playing field to give room for innovation and experimentation to take place while removing the incentive to adopt a “laggard” strategy;
6. Forcing companies to adopt new solutions proactively even if there is a “incomplete offset” gap between the old and new approaches (i.e. when the new solution or innovation does not fully offset the cost of compliance)

Reviewing the Porter Hypothesis after 20 years of debate, practical evidence and hindsight, Ambec et al. (2013) conclude that empirical evidence for the idea regulation leads to innovation is well supported (this is known as the “weak” form of the hypothesis, since it does not require the innovation to pay for itself through improved business performance). Further, regarding “strong” notion that these regulations lead to improved economic outcomes, there is “mixed evidence, with more recent studies providing more supportive results” (Ambec et al., 2013). Leitner et al. (2010) also explored the Porter hypothesis, building an empirical model to describe the interaction between regulation and innovation. They highlighted the importance for policy makers to understand the complexities of innovation and regulation, indicating that the need for well-designed regulation in the Porter hypothesis is not a simple requirement. The Porter hypothesis has clear implications for the ideas of CSR and for ecological modernisation. Indeed, it describes a way in which the core mechanism for environmental reform, innovation, is driven by well-designed regulation. It also
indicates the existence of a market-based incentive mechanism between environmental regulation, innovation and improved business performance – an important idea which enables the most optimistic versions of ecological modernisation to be realised. While the Porter hypothesis is promising, it is not without its detractors. Brännlund and Lundgren (2009) reviewed literature and empirical evidence from Sweden (where tax-supported CO₂ regulations have been in place since 1991) and determined that, while there may be individual organisations which succeed in achieving the “free-lunch” scenario (whereby action driven by regulation pays for itself), the answer to whether the “strong” version of the Porter hypothesis is supported by empirical evidence is: “probably not”. The Porter hypothesis is interesting for the current research, as it could describe a powerful driver for companies to regulate themselves. If a company publicly commits itself to a challenging environmental target, it is placed under similar forces to that of legally-enforced regulation – placing the social license to operate (SLO) in the balance, rather than a true risk of legal repercussions. If the company is then successful in shifting the preferences of the marketplace, the “risk” of losing the SLO begins to extend to others within the sector. Interface is actually an example of this; driven by the actions of its CEO, the company adopted stringent, self-imposed environmental targets which the company claims have driven positive performance in multiple domains – industrial, social, political.

2.4 Corporate Sustainability and Self-Regulation

2.4.1 Overview

The term “corporate sustainability” has come to prominence over the last 20 years. It collects together the overlapping concepts of sustainable development, corporate social responsibility, stakeholder theory and corporate accountability (Wilson, 2003). The role of companies in delivering SD has been discussed by several writers (Elkington, 1994; Michaelis, 2003; Bansal, 2005; Edenhofer et al., 2014). Furthermore, crucially, many businesses themselves now recognise the importance of climate change and sustainability. Gledhill et al. (2010) interviewed senior managers in more than forty organisations and determined that major business leaders now recognise the significant business risks posed by climate change (Gledhill et al., 2010). Snowden and Cheah (2016) surveyed more than 1,400 CEOs in 83 countries and found that 50% identified
climate change and environmental damage as a one of the key threats facing their organisations, with resource scarcity and climate change among the five global trends most likely to transform wider expectations of businesses. The risks posed by climate change include unpredictable increases in energy and material prices, disruptions to supply chains, and the demands of an increasingly environmentally-conscious customer (Snowden and Cheah, 2016). Business leaders also recognise the opportunities available for those companies that are ready to innovate towards environment, sustainability and resource efficiency. However, despite repeated calls for action in the private sector from the UN and national governments since the Earth Summit in 1992 (Kemper and Martin, 2010), and despite commitment to emissions reductions by many high-profile CEOs, there remain substantial, unexplored opportunities for large reductions from this sector. This presents the question: how can decarbonisation in the private sector be mobilised?

There has been some progress towards mobilising the private sector, along with governments and society as a whole, in sustainability through global political action. This is being done primarily through the activities of the United Nations Framework Convention on Climate Change (UNFCCC) treaty and the associated pledges made by countries (Intended Nationally Determined Contributions; INDCs), which together account for approximately 86% of global emissions (UNFCCC, 2015a). The UN’s 21st conference of the parties (COP21) at Paris in 2015 produced the strongest political commitment yet, securing unprecedented international agreement by nearly 200 represented nations. Attendees agreed to act to reduce carbon emissions, and to limit warming to 2°C or less by 2100. However, the pledged actions will still not be sufficient to avoid dangerous amounts of climate change (UNFCCC, 2015a). Even greater contributions to reduce emissions will need to be made, either by strengthening the nationally pledged goals within the UNFCCC, or through additional action by non-state actors such as civil society, local authorities and businesses.

The need for sustainable development has dramatic implications for every aspect of human civilisation, particularly the private sector which plays a central role in the production of emissions (Edenhofer et al., 2014). The world’s businesses are among the most significant contributors to environmental harms, including greenhouse gas
emissions. Illustrating this, a study which reviewed historic fossil fuel production records traced 15.8% of the world’s cumulative emissions of CO$_2$ and methane to ten of the largest investor-owned companies between 1751 and 2010 (Heede, 2014). There is a major opportunity for further, dramatic emissions reductions action in the private sector in order to support the INDCs and avoid dangerous climate change, even in developed nations. For instance, it has been estimated independently by several organisations that improvements in the industrial sector in Europe could amount to reductions of 20% or more in energy use (Lavery et al., 2013). Indeed, the UNFCCC recognises the need for action from the private sector, and the Paris deal (quoted below) includes a reference to the private sector, “welcoming” any contributions, (although a formal target for these portions is not present): “The Conference of the Parties...welcomes the efforts of all non-Party stakeholders to address and respond to climate change, including those of civil society, the private sector, financial institutions, cities and other subnational authorities;” (Adoption of the Paris Agreement; UNFCCC, 2015b).

2.5 Corporate Social Responsibility

There is no universally accepted definition of corporate social responsibility (CSR) (Hemingway, 2002). Broadly speaking, CSR describes a self-regulation mechanism for companies. According to the International Institute of Sustainable Development (IISD), CSR is a concept which promotes accountability of corporations to various stakeholders beyond shareholders and investors (IISD, 2013). However, even this simple statement is open to variation and interpretation – which stakeholders should be included? Which aspects of the organisation should be held accountable? The range of activities and variables which may be included within CSR can vary greatly between organisations. In order to assess the quality of any particular CSR programme, the assessor must apply conceptual boundaries and an analytical framework. Typically, a company which takes on CSR aims to attend to the needs of society, for a range of reasons. CSR can be a powerful force for companies to make a positive contribution to society. Climate change mitigation and environmental initiatives are examples of the kind of activities that might arise from CSR. Other examples of CSR focus areas are employee welfare, external engagement, charitable contributions and systematic changes to business practices.
The subject of CSR is studied from several perspectives. Some writers discuss more philosophical issues of organisational identity - the legitimacy and role of the firm within wider society. Some examine cases of CSR activity to elucidate motivations, conditions and drivers of CSR, the moral position of the firm, and philosophical aspects of business. CSR is also studied in order to find and understand opportunities for leveraging CSR activities to gain competitive advantage (Hart, 1995; Sen and Bhattacharya, 2001; Maignan and Ralston, 2002). This section presents various conceptualisations of CSR found within the literature. It discusses the various approaches to thinking about CSR, and organisations’ motives and rationales for engaging in CSR activities. A useful approach for understanding how and why companies engage in CSR activity is to present a conceptual framework from which the behaviour can be analysed. The review then considers those strategies in terms of their potential to contribute to the issues of climate change and global warming. This review discusses these concepts; the “moral obligation” of the company, concepts around the neo-classical perspective, the idea of a social license to operate, stakeholder theory and the phenomenon of for-benefit enterprises.

2.5.1 Early Conceptualisations of CSR

The act of companies and organisations taking responsibility for their contribution to society has existed for centuries (Carroll, 1999). In the 20th Century, the scientific literature has begun to describe what some authors now recognise as the modern era of social responsibility, starting with Bowen (1953); (Carroll, 1991). Bowen proposed the earliest definition for what is now recognised as modern CSR; “the obligations of businessmen to pursue...those lines of action which are desirable in terms of the objectives and values of our society”. Further, Bowen suggested that it was a moral obligation of the business owner to respond to societal needs. In Bowen’s early conceptualisation, the mechanism for incentivising (or enforcing) this activity is the morality of the individual owner. The “obligation” which is placed upon the businessmen comes from his or her values and judgements about the needs and requirements of society which they perceive. Furthermore, this definition (and other variants) focuses on the moral “push” to act, while not acknowledging the “pull” effects – potential opportunities presented by undertaking CSR activities.
Expanding Bowen’s definition, Mosley et al. (1996) added “...beyond the requirements of the law that are desirable in terms of the values and objectives of society.” The added focus on going beyond the minimum standards of law suggests that CSR is a voluntary or discretionary action, over and above the normal operating limits of the business. This in turn implies that certain activities are not considered to be CSR; for example: compliance with environmental regulations, ensuring minimum legal employee working conditions, or meeting minimum legal requirements for health and safety. While this conceptualisation provides a surface-level explanation for most CSR behaviour observed empirically, it presents further questions. How far beyond compliance ought a business to go in order to meet the desires of society? Upon whose moral judgement are these decisions based? Empirical evidence shows that a business’ CSR activities vary greatly depending on the perspective applied. For example, a neo-classical perspective might suggest that the only responsibility of the company is to create wealth – and that consequently CSR activities will be undertaken only in service of this goal. Conversely, a more expansive perspective on CSR may view a company as a kind of “public policy instrument”, through which various social needs are addressed, and where economic success is simply a means for sustaining the firm. Most companies today operate somewhere between these two extremes (Devinney, 2009). The scope of observed CSR activity ranges across this continuum, dependent upon many variables including sector-specific factors, perceived risks, opportunities, and time scale and boundaries determined by the organisations’ decision makers, as well as their own moral values and preferences (Hemingway, 2002).

2.5.2 The Pyramid Model of CSR

In a key review of the field, Carroll (1979) conceptualised a set of four responsibilities of a company which form the basis for CSR. Carroll later developed these four named responsibilities into a hierarchy which is presented in the widely recognised form of the “CSR pyramid” (Carroll, 1991). These were: economic responsibilities, legal responsibilities, ethical responsibilities and discretionary responsibilities (see Figure 2-1). Carroll’s conceptualisation positions the economic and legal responsibilities (the responsibility to create wealth and stay within the law) at the base of the pyramid, asserting that these are mandatory activities which cannot be avoided. Ethical responsibilities are those which are expected by society but are not strictly codified in
law, such as having respect for people, avoiding direct harm to society, and being a just, moral and fair organisation (Jamali, 2007). The ethical responsibility is difficult to define, since the definition of what is considered “just” or “moral” can vary across time, between regions and from person to person. Philanthropic and voluntary activities are at the pinnacle of Carroll’s pyramid.

Carroll’s widely cited pyramid model has expanded and broadened the discourse on CSR. It is particularly popular with management consultants, maybe because it is easily relatable and is intended for universal application. However, despite its popularity, Carroll’s pyramid has several aspects which other authors have called into question. For example, the reasoning behind presenting the four areas of CSR in a hierarchy model is not clear. In some occasions, Carroll explained that it indicates dependence (with the upper tiers dependant on the lower tiers; Carroll, 1991). At other times, the author proposed that this structure represented the chronological order of how CSR developed (with the lower tiers coming earlier, and the upper tiers emerging later; Carroll, 1979). A third interpretation for the pyramid shape was offered in Edmondson and Carroll (1999); that based on empirical evidence, the hierarchy represented the order of importance that each of these responsibilities hold with company managers (economic first, discretionary last). Regardless of the reason behind the structure, Carroll’s broad categorisation of CSR activities is not sufficiently nuanced to describe the range of CSR activity which can be observed among today’s businesses. Indeed, many authors view the economic, legal and ethical responsibilities which Carroll describes to be largely outside the scope of CSR discourse. For example, this was presented in the above interpretation CSR by Mosley et al. (1996), who defined CSR as being only those responsibilities which were beyond legal requirements. Even an organisation that disregards social values will seek to maintain a minimum level of legitimacy in order to
avoid being penalised in the marketplace or by regulators. Such an organisation will operate within the limits of the law, and adhere to ethical principles such as workplace health and safety and non-discriminatory employment practices, for example. Applying the single label of “CSR” to all activities within the pyramid (which are actually just the main activities of any business) is not a useful definition. Finally, when it comes to “discretionary responsibilities”, Carroll’s model and work appears to conflate separate activities and concepts such as philanthropy, ethical business practices, environmental protection and corporate citizenship (Carroll, 1999; Visser, 2006).

Carroll’s work considers “morality” to be the primary driver for companies to provide social benefits. This does not capture other drivers for CSR which have been identified in this review, such as competitive advantage (Porter and Kramer, 2002), opportunity for innovation (Esty and Winston, 2009) and societal legitimacy (Gunningham et al., 2004). Indeed, relying upon a sense of moral responsibility as the driver for philanthropic activity is actually an inherently unstable proposition, as it brings into question issues around the purpose of the company and may conflict with other ethical and moral perspectives. Moral-driven actions are rejected as lacking in utility if they do not bring value to shareholders.

2.5.3 Social License to Operate

A different conceptualisation of CSR that is increasingly referred to in the literature (particularly in recent years) is the idea of businesses requiring a social license to operate (SLO). Business owners are mindful of the fact that their activities are under scrutiny by key groups of stakeholders in civil society (local communities, non-governmental organisations and wider society) (Gunningham et al., 2004; Prno and Slocombe, 2012). Company managers recognise that they must conduct their business in a manner which is socially acceptable, so that society “gives” that licence, but it can also be “removed”. In theory, the SLO is a form of self-regulation in order to avoid “social sanctions”. It prevents the company from undertaking activities which present a risk of ecological harm, or which impact the safety of its workforce, for instance. If a company behaves in a manner which is deemed unacceptable by society, then the company will lose its “license to operate” and will be punished through negative
publicity, a damaged reputation and consequently, decreased profits (Gunningham et al., 2004).

There is empirical evidence which supports the theory of the SLO. One such instance is Monsanto’s poorly managed introduction of genetically modified crops to European markets in the 1990s, which resulted in a major loss of trust from the public and substantial implications for the company (Moore, 2001). Another pertinent example is BP’s 2010 Deepwater Horizon oil spill and the highly public, protracted cleanup process. Overall, the spill and associated negative publicity was estimated to have resulted in a decline in sales by 3.6% for BP, and a reduction in margins of 4.2 cents per gallon of oil, resulting in overall financial losses far in excess of the direct costs of cleaning up the spill (Barrage et al., 2014). The SLO conceptualisation suggests the notion that reputation management is a principal driver for CSR activity. It follows, then, that a company’s public visibility, the transparency of its actions, and its existing reputation are all important factors for CSR activity. A concept related to SLO is the resource based view, whereby the company’s reputation and brand are efficiently managed as intangible resources with an expected rate of return (Wernerfelt, 1984; Peteraf, 1993).

2.6 Neo-classical Perspective

2.6.1 Overview

The above conceptualisations present CSR as a discretionary activity (Carroll, 1991; Mosley et al., 1996). In these models, the CSR activity undertaken by companies is governed by the “moral obligations” of the company managers – and this is considered to be a powerful driver to produce a positive contribution to society. This perspective is challenged by considering discretionary CSR under the neo-classical view of economics. Neo-classical economics proposes that the economy is composed of rational, selfinterested companies and individuals who exchange labour, goods and services in markets in order to maximise their own utility. It considers the self-interest of individuals to be a basic driver for the structure, behaviour and motivation of organisations. Popularised as the “Chicago School” of economics by writers such as Coase (1937), Friedman (1970) and Stigler (1971), the neo-classical view is the
dominant, mainstream view held by economists, politicians and executives in more recent times (Brenner, 1993; Key, 1999; Stormer, 2003).

Under this perspective, the “moral obligation” to act (as discussed by Bowen (1953); Carroll (1991) and others) competes with the pre-existing business motivations to make profit for shareholders. This creates tension between the company manager, who is “diverting” these profits, and the company shareholders, who would otherwise receive the profits. The validity of the “moral obligation” of companies to contribute to society is famously and emphatically argued against by Friedman (1970). Friedman considers those who promote the social benefits of corporate social responsibility to be “preaching pure and unadulterated socialism”, and “undermining the basis of a free society” (pg 173, Friedman, 1970). Friedman argues that any moral responsibility to act lies with the individual shareholders, and that consequently the company should only be focused on the creation of wealth for those shareholders (within the boundaries of the law), in order to extend their opportunities to act. From this point of view, donating profits to a cause is therefore equivalent to the company manager spending the shareholders’ money (Friedman, 1970).

In economic terms, negative impacts on society and the environment are considered to be external costs (externalities), extracted from shared commodity pools (or “commons”) such as natural resources and the atmosphere. Under the neo-classical perspective, external costs should be ignored unless they affect the relevant control mechanisms (i.e. the price of the company’s products). Acting in a way which reduces the company’s profitability in order to reduce negative externalities is therefore considered to be a poor strategic decision. The neo-classical perspective therefore does not recognise discretionary activities as a legitimate activity of the business. Hence, the true “moral obligation” of the company within the neo-classical perspective is to create wealth for the shareholders, and any act which inhibits this is considered to be immoral. Note that this does mean that all forms of CSR are incompatible with the neo-classical worldview. Rather, it indicates that purely discretionary activities with no return on investment should not be undertaken. Regardless of one’s worldview, this is perhaps a pragmatic approach. In times of economic strain, empirical evidence shows that discretionary philanthropy is among the first things to be withdrawn by companies.
(Porter and Kramer, 2002). The 2008 global financial crisis offered an opportunity to observe how a large number of companies responded when placed under economic stress. The Committee Encouraging Corporate Philanthropy (CECP) reports that the years surrounding the 2008 financial crisis resulted in a substantial reduction in overall charitable donations from major corporations as a proportion of company profits (CECP, 2013).

2.6.2 Neo-classicism and CSR

An assumption which underlies the neo-classical perspective is that CSR activities represent an overall financial loss for the acting company. Other views present CSR as an opportunity for the company to create value. A report on this issue by the World Business Council for Sustainable Development (WBCSD) stated in its findings that “a coherent CSR strategy, based on integrity, sound values and a long-term approach, offers clear business benefits to companies and a positive contribution to the well-being of society” (pg 3, Holme and Watts, 2000). The level of CSR activity within a company is considered to be a strong indicator of management quality, which in turn is a predictor of a company’s expected financial performance. Thus, a desire to attract investment by signalling strong company performance can be a key driver of CSR. This notion is supported by data from the Carbon Disclosure Project (CDP), a voluntary process in which major corporations and their shareholders may report their greenhouse gas emissions (Fox et al., 2014). Carbon Disclosure is an example of a discretionary CSR activity – it informs internal external stakeholders of the company’s performance with respect to carbon emissions, but is not normally a legal requirement. The CDP analysis is based on the S&P 500 industry leaders. The data compares “Q1 companies” (Q1 being defined as those whose carbon disclosure scores placed them in the top 25% among all reporting companies) against non-respondents (those companies which did not disclose their emissions). The authors found that the Q1 companies had an average return on equity which was 67% higher than non-responders. The CDP reports that these Q1 companies are consistently better-managed than the S&P 500 average, with greater likelihood of good governance, better reporting and management of risks, greater chance to realise important opportunities, and significantly greater engagement with the value chain (suppliers, partners and customers) (Fox et al., 2014). While this does not establish a causal relationship between disclosure and performance, this does
suggests that disclosure of carbon emissions is associated with good overall company management, and therefore strong investment potential. This is one example of how economic opportunities can be a powerful driver for CSR activity. Interface has been a member of the Carbon Disclosure Project since 2011, and its reports are publicly available.

Overall, the neo-classical perspective presents several considerations for CSR activities. The neo-classical perspective is currently one of the dominant models of economic and organisational theory. Under the neo-classical perspective, discretionary CSR activities with no clear business benefit (such as unfocused philanthropy) are considered to be immoral. Thus, negative externalities such as environmental degradation are not addressed unless regulation is designed to “force” such externalities to become internal costs (Rennings, 1998). Despite this, there are some conceptualisations of self-regulating CSR which are congruent with the neo-classical perspective, such as the idea of enlightened self-interest, where CSR activities are performed in order to reap the benefits of reputational gains and marketplace goodwill. Ecological modernisation theory (Mol and Sonnenfeld, 2000) also has some alignment with the neo-classical approach, providing a route to sustainability which harnesses market forces.

2.7 **Enlightened Self-Interest**

Taking a more moderate view compared to the neo-classical perspective, Lantos (2001) concurs with Friedman that businesses should not engage in discretionary altruism. However, Lantos goes on to say that there are other, economic reasons for which a company may wish to engage in CSR activities, and that well-marketed, strategic CSR can be good for both business and for society (Lantos, 2001). This kind of investment activity could be considered as distinct from philanthropy, and is more accurately described as “enlightened self-interest”; activity driven by economic incentives in addition to (or even instead of) a sense of moral obligation (Keim, 1978). This is consistent with the concept of “impact investing” – philanthropic investment into social and environmental causes which have a measurable positive impact on the investing company. While it is true that unfocused philanthropy offers no clear return on investment, there is evidence that well-managed strategic philanthropy can, in some
instances, result in a significant measureable positive return on investment. Returns come about by inspiring greater employee morale, by stimulating market growth, or by improving the firm’s public image through reputational gains (Porter and Kramer, 2002). As discussed in Section 2.3.7, Porter and Van der Linde (1995) suggested that well-designed environmental regulation can lead to competitive advantage, through similar pathways.

2.8 Stakeholder Theory

A well developed conceptualisation which can be usefully applied to describe CSR is stakeholder theory. This is a concept used to describe many aspects of firm management (Freeman, 1984). Freeman created stakeholder theory with *Strategic management: A stakeholder approach* (Freeman, 1984). The author presented an alternative view to the contemporary, individualistic, agency-based models of companies (e.g., Jensen and Meckling, 1976), and proposes that effective firm management is about balancing the needs of one’s stakeholders. Stakeholders are defined as individuals or groups whose actions can influence the company and/or groups or individuals upon which the company’s actions have an influence. For a company manager this might include employees, customers, suppliers, governments, NGOs and the general public. Freeman argued that rather than pursuing individual utility and maximising shareholder value, businesses will gain a strategic advantage when they tend to the concerns of a wider range of stakeholders instead of focusing only their economic stakeholders (shareholders and investors). This perspective leads to an outcome for CSR which is similar to that of the social license; that the company is better served to identify and respond to the needs of its customers, employees and wider society (i.e. manage its reputation), and that there are competitive advantages in adopting this approach.

2.9 For-Benefit Enterprises

An interesting model which has emerged recently is the concept of a “for-benefit enterprise”, sometimes termed the “fourth sector” (Sabeti, 2011). The precise definition of “for-benefit” varies between countries and jurisdictions, but broadly, it describes an
enterprise with the dual purpose of generating profit and social benefit simultaneously (Reiser, 2012). Various different legal frameworks have independently arisen in Belgium, the UK, the USA and elsewhere internationally since the 1990s (Doeringer, 2010). These frameworks enable the creation of a new kind of legal entity; the “for-benefit” enterprise. Examples of this kind of organisation include social enterprises, community interest companies (CICs in the UK), Société à Finalité Sociale (SFS, in Belgium), low-profit limited liability companies (L3Cs), benefit corporations, social purpose corporations (SPCs) and many more variations (Doeringer, 2010). The for-benefit model blurs the boundaries between the public and private sectors by combining social and environmental causes with for-profit approaches to business. With a social cause at the core of the organisation’s stated purpose, the for-benefit enterprise is freed from the responsibility of creating wealth for shareholders. Yet, (unlike a not-for-profit), it is still focused on profitability, and is able to issue shares to raise capital. Structurally, this makes for-benefit enterprises well suited to directly address social needs compared with for-profit publicly traded organisations.

Addressing societal needs under the for-profit model frames and justifies CSR activities, whose activities fall under the close scrutiny of shareholders and potential investors. However, despite these promising attributes, there are barriers to the success of the for-benefit model. First, for-benefit enterprises are currently a small, emerging sector and are unproven at scale. Given the importance of prices in driving consumer behaviour, this raises concerns about the competitiveness of for-benefit enterprises in a world where negative externalities (such as pollution and social costs) are not accounted for in the price of products and services. Second, there are many challenges facing larger firms which wish to become for-benefit corporations. For example, the process of becoming a certified “B-Corp” (a recognised, branded framework for assisting companies in becoming a for-benefit corporation) is exceptionally challenging, requiring extensive reporting and tracing of a company’s supply chain. Larger firms like Unilever have noted the difficulty in meeting the requirements as a large organisation with a multinational presence (Confino, 2015). Given the urgency and scale of climate change, substantial increases in the scale and extent of for-benefit enterprises would be needed in order for these to have any significant disruptive impact on the global macroeconomic system.
2.10 **Reporting Systems**

While reporting and management of environmental issues are separate activities, they are heavily interconnected. Reporting is a vital transparency mechanism, and enables companies to be held accountable for their social and environmental performance. Corporate responsibility reporting is now a common practice in large companies across the globe. In a recent industry survey of 4,100 large companies, it was found that more than 70% of the sample practiced corporate sustainability reporting (KPMG, 2013). The survey authors suggested that the overwhelming majority of companies now recognise the value in reporting on their corporate responsibility.

The most well-recognised reporting framework is G4, the fourth iteration of a standard created by the Global Reporting Initiative (GRI; Von Hippel, 2005). Its purpose is to create a “trusted and credible framework for sustainability reporting” (pg 2), which promotes transparency and accountability within organisations towards the goal of sustainable development (Von Hippel, 2005). The GRI is an international organisation which aims to help organisations and governments to report on their sustainability issues. The GRI guidelines adopt the *Brundtland Commission* definition of sustainable development, and include guidance on social, environmental and economic issues such as climate change, human rights, corruption and others. The G3 version of the standard introduced the requirement of assessing “materiality” in order for an organisation to determine its own appropriate sustainability indicators and impacts. The G4 standard develops this concept further with the expansion of the “boundary” over which these impacts are assessed – including those which are outside of the organisation (GRI, 2015). The GRI standards are popular among major corporations, with 82% of the world’s largest 250 firms making reference to GRI standards in their corporate responsibility reports (KPMG, 2013).

2.11 **Innovation**

2.11.1 **Defining Innovation**

Innovation is a process by which ideas are usefully exploited (Trott, 1998; Bessant and Tidd, 2007). The topic of innovation is of interest to a wide range of audiences spanning
academia, management and policy makers (Adams et al., 2015). Discussion of modern innovation processes begins with the work of Joseph Schumpeter. He implicitly described the innovative process with his concept of creative destruction in his well known examination of capitalism, socialism and democracy (Schumpeter, 1942). The author argued that entrepreneurial activity drove a cycle of continued obsolescence and improvement of products, processes and technology. This practice of “creative destruction”, where incumbent companies’ value is destroyed as new products and services enter into the marketplace, has come to be synonymous with the well-recognised processes of innovation and disruption which are popularly associated with high-tech companies and start-ups. Later in the 20th century, more explicit descriptions of innovation were introduced. Like CSR, there is no universally accepted definition for innovation, nor is there a universal methodology for approaching it. One popular definition for innovation is given by the Oslo Manual, which describes four types of innovation: product, process, marketing and organisational (Mortensen and Bloch, 2005). Taking one as an example, product innovation is defined as “a good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics” (pg 47). However, this definition opens up new questions, such as “how significant?” and “improved in the eyes of whom?”

One useful conceptual model of the overarching innovative process was recently developed through a study of the literature (Baregheh et al., 2009). The authors studied 60 definitions of innovation found within the literature across various disciplines. They then constructed a multi-disciplinary definition of innovation (pg 1334): “Innovation is the multi-stage process whereby organisations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace” (Baregheh et al., 2009). Similarities can be seen with the definition of Mortensen and Bloch (2005), though this definition articulates new concepts such as the stipulation of a multi-stage process, and the use of the “marketplace” which implies a competitive or economic motivation. Others may argue that innovation can take place in any kind of organisation including non-competitive areas such as schools, hospitals and civil services in the UK, for example. Bessant and Tidd (2007) defined innovation as “the process of translating ideas into useful – and used
new products, processes or services” (pg 29). Bessant and Tidd also distinguish between four different innovation dimensions – product, process, position and paradigm – and two different types – incremental and radical innovation. Incremental innovation typically involves a steady series of changes, each of which result in an improvement, but which do not change the fundamental nature of the output or process ("do what we do, better"). On the other hand, radical innovation results in a “significant” change to the output (“do what we do differently”; Bessant and Tidd, 2007). Incremental innovation tends to be associated with improvements to existing products or services. It tends to carry lower risks and costs compared with radical innovation, and can be more predictably managed and developed by an organisation. These factors make incremental innovation far more common in practice than the more radical forms (Leifer, 2000). However, radical innovation is crucial to companies in maintaining their competitiveness and keeping up with the constantly changing process of creative destruction. Leifer (2000) developed a formal definition for “radical” innovation in partnership with industry representatives. They define radical innovation as having one or more of the following attributes:

- Entirely new performance features;
- Immediate improvement in existing features by a factor of 5 or more compared with the previous alternative;
- Immediate reduction in cost of 30% or more compared with the previous alternative.

On the other hand, Geels (2002) notes that radical new technologies need to be protected in niches from normal market forces, since they typically have low technical performance and are cumbersome and expensive – at least during the early stages of development. The author evokes the example of military innovations such as digital computers, jet engines and radar, which emerged from a protective “niche”, shielded from the market by virtue of their innovative context (Geels, 2002).

When considering the imperative to deliver sustainable development, and particularly when considering the significant improvements that must be made across the global economic system in order to address climate change, it becomes clear that a marked increase in radical innovation will be required – across all sectors (Machiba, 2010).
Simply working to improve what is already being done with incremental improvements and efficiency will not be enough to meet the needs of future growth, prosperity and sustainability (Dearing, 2000). This draws a parallel with ecological modernisation (EM) and its critics, who argue that EM is a concept of incremental efficiency improvement, lacking radical changes required to address the challenges of climate change (Blühdorn, 2001; York and Rosa, 2003; Baker, 2007; Bailey et al., 2011).

2.11.2 Sustainability-Oriented Innovation

This thesis focuses on a particular form of innovation: sustainability-oriented innovation (SOI). Broadly, SOI is innovation which is focused specifically on the creation of social, environmental and economic benefits. It is one of the primary ways in which businesses and organisations adapt and change in order to undertake sustainable development. SOI is likely to be far more “radical” than conventional innovation (Adams et al., 2012). Despite the unmistakable importance of SOI in relation to sustainable development, SOI has received relatively little research focus compared with the extensive body of knowledge relating to conventional innovation. A review of the SOI literature by Adams et al. (2015) determined that the majority of the existing body of knowledge on SOI lacked references to established definitions of sustainability, was not grounded in practitioner work, and conflated SOI with a variety of subjects such as CSR, eco-innovation, green-innovation, and others. This finds agreement with (Bansal et al., 2012), who add that bridging the gap between research and practice in this area is very challenging, as it necessarily involves multiple disciplines and stakeholders and is usually not achievable without a multidisciplinary research team.

What distinguishes SOI from conventional innovation? Adams et al. (2015) argue that the definition of SOI intrinsically includes a sustainability aim rather than a commercial aim. In order to achieve this, the authors argue that the innovating organisation must have a shift of philosophy and values towards socially responsible goals which are aligned with its business model. Jay and Gerard (2015) argue that the core need of innovation in this area is to find a way to balance seemingly contradictory and/or competing aims of economic growth, addressing social challenges and achieving sustainability.
This immediately raises the question of how to reconcile SOI with the dominant neo-classical worldview, where the economic priority is viewed as an organisation’s overriding responsibility, as discussed by Friedman (1970) and others. Adams et al. write: “Sustainability-oriented innovation (SOI) involves making intentional changes to an organisation’s philosophy and values, as well as to its products, processes or practices, to serve the specific purpose of creating and realising social and environmental value in addition to economic returns” (pg 1, Adams et al., 2015). This definition incorporates the “triple bottom line” conceptualisation of corporate sustainability, as introduced by Elkington (1997). Dearing (2000) noted the strong link between the goals of innovation and sustainable development; both aim to use change in order to improve the way in which human needs are met. There is also a tension here. Innovation is sometimes portrayed as the “antagonist” of sustainable development, since innovation is so often associated with increasing patterns of consumption, technological development and environmental degradation (Porter and Van der Linde, 1995; Berkhout and Green, 2002). However, Bessant and Tidd (2007) and Jay and Gerard (2015) note that innovation is fundamental in delivering the changes which are needed in order to reach sustainability. This corresponds with the earlier discussion of the urgent need for more rapid and radical change – particularly regarding the low penetration of renewable within the global energy system (BP, 2015) and the need for a greater contribution from the private sector to decarbonisation (UNFCCC, 2015b).

Dearing (2000) noted that sustainable development presents a dilemma for innovation which “can only be resolved by finding new approaches” (pg 104). Despite the stated importance of sustainability-oriented innovation, and despite the availability of substantial economic opportunities which companies like Interface highlight, there is a notable lack of research which focuses on the practice of sustainability-oriented innovation (Bansal et al., 2012; Adams et al., 2015; Jay and Gerard, 2015). Additionally, in their systematic review of the literature, Adams et al. (2012) noted an “imbalance” in the quality of the literature, which lacked high-quality studies where sustainable goals had been addressed. The majority (78%) of reviewed studies focused on purely economic and environmental goals, with 12% focusing on “triple bottom line” aspects, and only 10% focusing on social outcomes. This thesis develops the nascent field of SOI
by analysing practice-focused case evidence from Interface. This case material is explored in Chapter 7.

2.12 Employee Engagement

2.12.1 Overview

The concept of employee engagement has emerged in the past 20 years as a distinct area of academic study (Saks, 2006; Lockwood, 2007; Kular et al., 2008). Simply put, “engagement” in this context is the emotional, psychological and behavioural response which an individual has towards the organisation (Kahn, 1990; Wollard and Shuck, 2011). This conceptualisation finds agreement with other explorations of engagement. Schaufeli et al. (2002) defined engagement as a “positive, fulfilling, work-related state of mind”. Rothbard (2001) suggested that individual’s engagement in multiple roles (at work or at home) is composed of attention and absorption; two psychological components. A common thread among all of these descriptions is that engagement is a positive, beneficial and tangible effect which is rewarding both for the individual and which can have positive impacts on the organisation. Frank et al. (2004) defined engagement from a more practical perspective as the level of discretionary effort that employees put into their work. However, while eminently more measurable than a “state of mind”, this definition obscures the underlying processes and factors which contribute to engagement. The term “employee engagement” can also relate to the reciprocal attitude of the organisation towards its employees; particularly how well it connects with, understands and values its employees. In this work, “employee engagement” relates broadly to the relationship between the employee and the organisation, considering both directions.

2.12.2 What does Good Engagement look like?

Discussion of employee engagement within the literature ranges between high quality, peer-reviewed studies and meta analyses (e.g., Robinson et al., 2004; Saks, 2006) to less rigorous “guide” articles produced by consultancies (a quick internet search can produce hundreds of examples of these). More specific definitions for what employee engagement actually looks like can be found in various forms within the literature. Robinson et al. (2004) conducted a large scale attitude survey (n. = 10,024) to explore
engagement in the UK National Health Service, and then suggested a list of behaviours exhibited by engaged employees. The authors wrote that engaged employees are those who have belief in the organisation; have a desire to work to make things better; have an appreciation of the wider business context and the “bigger picture”; are respectful and helpful towards other colleagues; and are willing to keep up-to-date with developments in the field. Kahn (1990) described engaged workers as being “emotionally present” at work. Robinson et al. (2004) also provided a definition of “engagement”. Taking an abbreviated version of the Robinson et al. (2004) definition (pg ix), employee engagement is defined here as “a positive attitude held by the employee towards the organisation and its values”. This definition focuses on the individual employee’s attitude, as opposed to their actions and activities. It does not include mention of the actions or attitudes of the wider organisation (i.e., it focuses on individual-level engagement rather than firm-level engagement). Kahn (1990) also framed the discussion of engagement around the individual, discussing the psychological conditions which underpin engagement.

2.12.3 Rewards of Engagement

It is easy to appreciate why there is a substantial interest in the subject. Good engagement of the workforce is empirically linked with positive financial outcomes for the company (Saks, 2006). This can come from improved productivity, reduced staff turnover, and an improved relationship between employees and customers, such as was demonstrated at retail firm Sears, Roebuck and Co. (Rucci et al., 1998). Well-engaged employees are more likely to strive for excellence in their work and to contribute additional and discretionary effort to the organisation (Robinson et al., 2004). Others have noted that greater levels of engagement can translate directly into bottom line gains, with a 20% improved performance and 87% greater retention among engaged employees compared with disengaged employees (Corporate Leadership Council, 2004; Lockwood, 2007). Conversely, disengaged employees are typically those who feel disillusioned, burnt-out or even actively seeking to move away from the organisation. The “engagement gap” (disengagement or lack of engagement) has been associated with lower rates of productivity, and higher rates of staff turnover, and financial costs (Bates, 2004; BlessingWhite, 2013). When working to create a more socially and environmentally sustainable organisation, as is the case in an organisation which is
undertaking processes of ecological modernisation, the importance of radical change has been raised (Machiba, 2010). The support and delivery of such an organisational change must be reliant to some extent upon the cooperation and involvement (and engagement) of its workforce.

High levels of employee engagement can strongly support the management of change programmes; particularly radical structural and programmatic changes such as mergers and acquisitions (Cartwright and Holmes, 2006). In a similar vein, employee engagement is an important contributor to sustainability. Highly engaged employees will have increased tolerance to the changes that sustainability programmes can bring; they will help to ensure that behaviour change activities become embedded (Savitz, 2013); and they will drive sustainability-oriented innovation (Bansal, 2003). At the same time, an effective environmental programme can align with employee’s individual values and provide employees with a greater sense of purpose; driving increased engagement and thus further improving sustainable performance in a “virtuous circle” of reciprocal engagement. Indeed, Holbeche and Springett (2004) argue that high levels of engagement can only be achieved in workplaces where there is a shared sense of destiny and purpose that connects people at an emotional level and raises their personal aspiration.

2.12.4 Antecedents of Engagement

Wollard and Shuck (2011) examined the employee engagement literature in detail, and identified evidence of two distinct sets of antecedents for employee engagement: individual-level, and firm-level. At the individual level, certain factors were associated with greater engagement levels. These are conceptually well-aligned with the work of Kahn (1990) and Robinson et al. (2004). The individual-level antecedents included specific internal traits like an employee’s dedication, vigour, work-life balance, core self evaluation and levels of corporate citizenship. They also found external factors based around the individual, such as the opportunity to be involved in meaningful work, level of support given by the organisation, and congruence between the values of the individual and the organisation (i.e. match between individual and organisational goals or core mission). In non-profit organisations, where the values and mission are of particular importance, there appears to be a strong correlation with higher levels of
engagement, at least in relation to the cause (Word et al., 2011; Crawford, 2013).
However, while individuals may be strongly engaged with the cause of an organisation, it does not necessarily follow that the individual will also be engaged with the organisation itself – indeed, many highly engaged individuals may also be frustrated at their organisation. They could be at risk of “burn-out” due to heavy workloads and lack of support, and they may be considering leaving their organisation in order to serve their values more effectively (Word et al., 2011). Saks (2006) drew a distinction between organisation engagement and job engagement; the former being an affinity for the organisation, its goals and its mission or purpose, while the latter represented psychological attachment to a particular task in their role as a member of the organisation, the who of which were considered to be distinct forms of engagement with different drivers and implications.

At the firm-level, Wollard and Shuck (2011) note that organisation can support engagement by creating an authentic corporate culture, by setting clear expectations, by undertaking CSR activity, and by having desirable job characteristics which fit well with the employees. They can also promote a positive and supportive working environment; use rewards correctly, set expectations and challenging tasks, and promote a safe working environment. The organisational-level antecedents revolve around meeting the needs of the working individuals Wollard and Shuck (2011). While one might expect financial incentives (i.e. salary, commissions, bonuses, etc) to drive engagement, a causal link has not been established. Robinson et al. (2004) found that a worker’s pay is a contributing factor towards an overall sense of being valued and involved (along with more important factors such as their direct management, training and career development). In turn, these senses of being valued and involved are drivers of engagement.

2.12.5 Strategies for Increasing Engagement

In order for an organisation to maximise engagement levels and reap the rewards of a highly engaged workforce (and avoid the costs of poor engagement), the organisation must be proactive in managing and maintaining this relationship with its employees. One way which the organisation can achieve this is by having an inspiring mission and undertaking activities which resonate with its employees. CSR programmes have the
ability to inspire and build engagement with employees (Ipsos MORI, 2006). This may include an environmental mission or social mission which inspires employees to contribute in their day-to-day work (Ipsos MORI, 2006; Epstein and Buhovac, 2014), although this notion is not always supported with empirical evidence (Wollard and Shuck, 2011). It is clear that further empirical work is needed to explore the extent to which an inspiring mission can drive engagement, either directly (by increasing employee’s organisational engagement as they feel captivated by the activities of the organisation), or indirectly by creating a culture and working environment which are conducive to high levels of job engagement (Saks, 2006).

Relating to the previous discussion of Interface’s environmental mission, the current work presents an opportunity to extend the existing body of work relating to employee engagement, particularly in relation to the research question: What are the important aspects of employee engagement with respect to sustainability in the context of an ecologically-modernising organisation? Interface claims to have an embedded sustainability culture. The company has explicitly included employee engagement as part of its environmental mission since its inception (Anderson, 1998). Engagement of the workforce is of crucial importance to an organisation which is undergoing a large-scale change, particularly when the change relates to the environment (Buzzelli, 1999). Chapter 6 of this thesis examines the interaction of employee engagement with the company’s environmental programme.

2.13 Discussion

2.13.1 Corporate Social Responsibility and Sustainability

A number of drivers for corporate social responsibility (CSR) have been elucidated in this review. Broadly, they can be characterised as either “push” or “pull” factors. “Push” factors tend to introduce a risk or threat to the business, which must be managed through CSR activity. Specifically, these drivers include any moral obligations (as proposed by Bowen, 1953), legal and regulatory limits (Carroll, 1991), and reputational risk management. Reputational risk management is further described as either through balancing stakeholder needs (Freeman, 1984) or by acknowledging the social license and operating within socially acceptable limits (Gunningham et al., 2004). CSR also
presents “pull” factors: potential economic opportunities which a firm can pursue through CSR activity. These drivers include marketing opportunities, potential for reputation improvement, increased employee engagement, stimulation of the marketplace, attracting high quality talent and mobilising innovative activity. Some drivers can be characterised as either “push” or “pull” factors, depending on the context. For example, within stakeholder management, a company may undertake careful stakeholder management of a particular consumer group in order to manage a risk of reputational damage, but also may consider the same group of stakeholders to be a vital source of innovation for new product design. This review finds broad agreement with another similar assessment of the field by Bansal et al. (2012). Bansal’s review determined four broad categories of drivers for environmentally-related CSR activities: legislation (or regulation), pressure from stakeholders, economic opportunities, and ethical motives; the latter of which is driven by the values of the company’s leadership.

2.13.2 Ecological Modernisation, Innovation and Engagement

The theory of ecological modernisation (EM) was described and explored in some detail. The major criticisms were presented and discussed, and some open questions relating to the cultural, social and sectoral dynamics were raised (Section 2.3.3). This review highlights that there is still a lack of understanding surrounding how to encourage wider uptake of the principles of EM, and how EM operates in practice at the organisational and individual level. In practical terms, there remains an action gap between what is needed for sustainability and what is being done by private organisations. The gap exists despite calls upon the private sector from the UN (UNFCCC, 2015b) and others to contribute to addressing sustainability, despite a rising trend of the use of corporate sustainability reporting frameworks (such as GRI 4), and despite a substantial body of scientific work spanning decades examining the related subjects of corporate sustainability, innovation and engagement. In response to the questions raised here, Chapters 4, 5, 6 and 7 explore the case of Interface and in doing so, this work contributes evidence of the operational dynamics at play in an EM-organisation.

While the bodies of literature explored in this review were individually strong and becoming well-established, a gap exists in the joining-together of these bodies of work.
in order to provide a working, organisation-level model for sustainability in practice (Sharma, 2002; Bansal et al., 2012; Jay and Gerard, 2015). This review goes some way to identifying these links, for example, by noting the parallels between the arguments for more radical forms of innovation to address sustainability (Machiba, 2010), and the criticisms of EM for lacking disruptive potential and instead being very “gradual” in terms of innovation, favouring existing business models and technologies over new ones (York and Rosa, 2003). The review also noted parallels and synergies between the concepts of employee engagement and EM, and a potential “virtuous circle” whereby employees’ engagement within an organisation is increased by strong environmental performance of that organisation, and this in turn drives greater innovation and organisational commitment, leading to further improvements in environmental performance, and so on (Bansal, 2003; Holbeche and Springett, 2004; Savitz, 2013).

There exist a large number of studies which claim to examine EM cases in practice (Coffey and Marston, 2013), but these studies tended to report about “weak” or “utilitarian” forms of EM (Christoff, 1996; Andersen and Massa, 2000). The lack of “strong” cases is echoed in the literature on sustainability-oriented innovation, as explored by Adams et al. (2012), who found numerous empirical examples of operational optimisation (analogous to “weak” EM), but none of the aspirational system building category. An open questions remains as to whether such an organisation even exists (Adams et al., 2012). Chapter 5 of this thesis explores whether Interface should be considered an example of the “strong” form of ecological modernisation, providing a valuable contribution to progress the debate about the possibility and validity of the system building strategy. Chapter 7 lends further evidence in the examination of sustainability-oriented innovation at Interface, focusing on a key example project.
3 Methods

3.1 Introduction

This chapter presents the research strategy, approach, methods and techniques for the research. This includes the data collection and their analyses. It is important to be clear about the design and methods of any research project. Not only does this demonstrate academic rigour and provide a basis for confidence in the results of the research, but it also provides others with a route for critical analysis of the research and replication if necessary. Furthermore, discussing and writing down the research methods and their justification is a useful exercise for the researcher, and offers an opportunity to refine or revise the research approach (National Research Council, 2002).

This thesis presents qualitative social research which fits most clearly into the broad field of corporate sustainability. The research strategy adopted for this work is grounded theory, which emphasises the creation and development of explanatory theory based on an iterative cycle of data collection, analysis, theory building, theoretical sampling and data collection until eventually a point of “saturation” occurs; the point at which further collected data confirms the developed theory, rather than extending or contradicting it (Strauss and Corbin, 1994; Saunders et al., 2009). The qualitative case study research design and methodology, which included semistructured interviews, document analysis and observational data, is discussed below.

3.2 Research Strategy

This thesis adopted a descriptive and analytical case study approach, guided by the literature, in order to examine the case organisation, Interface. The case study method was selected for its suitability to address the research topic. A general strength of the case study research methodology is that it provides a rich contextual analysis of the unit of study, at a level of qualitative detail which cannot be replicated using quantitative or experimental methodologies (Yin, 2009). This qualitative approach is useful for answering “how” and “why” questions (Yin, 2009), and is therefore appropriate to the
questions presented in the introductory chapter, (Section 1.5). Three main aspects of the organisation, Interface, were examined in detail for this case. This research draws upon the findings of these focus areas and also incorporates secondary data to draw conclusions about the wider organisation. The areas of focus were:

- In relation to research question R1, the implementation of Mission Zero; the strategic and operational management and implementation of the company’s environmental programme.
- In relation to research question R2, the employees of Interface, including unskilled workers, managers, engineering and technical teams as well as personnel from the administrative and sales side of the business.
- In relation to research question R3, the co-innovation process; a global process within Interface designed to accelerate and systematise innovation projects within the company.

3.2.1 **Grounded Theory**

Fundamentally, grounded theory (GT) is a research methodology. A few definitions and versions of grounded theory exist (Strauss and Corbin, 1994; Glaser and Strauss, 1998; Corbin and Strauss, 2008). The common components of grounded theory are summarised below (Sbaraini et al., 2011):

- Open approach throughout the study: using deductive reasoning by default (drawing conclusions from observations), starting broadly and becoming narrower throughout the study.
- Analyse as you go along: begin analysing data as it is collected in order to refine the approach and undertake theoretical sampling.
- Coding: categorise and organise qualitative data during analysis to identify patterns. Revise codes often and consolidate or split them as appropriate.
- Memos and Diagrams: record thinking, track progression of ideas and develop theory.
- Theoretical sampling: purposefully testing ideas and theories as analysis develops, often returning to the field as appropriate.
Theoretical saturation: the point at which further collected data confirms the developed theory, rather than extending or contradicting it.

Theory building: results are expressed as a set of concepts and/or theories which explain the data in as parsimonious a manner as possible.

These aspects make grounded theory an excellent fit for this project, which is exploratory in nature, and seeks to examine a broad research “theme” rather than testing specific research questions. There is no overarching “hypothesis testing” in grounded theory, although researchers are encouraged to undertake theoretical sampling in order to explore ideas and potential theories as their research develops. Another good reason to adopt the grounded theory method for this work was that it enabled the researcher to capitalise on the embedded access and relationships that is a result of the embedded nature of the EngD doctoral training itself. It enabled the researcher to maintain a dialogue with the interviewees, and allowed repeated returns to ask clarifying questions. Being embedded also gave the researcher far greater legitimacy in the eyes of the interviewees and those being observed, which helped to reduce the effects of the observer effect which can otherwise undermine the findings of researchers in the social sciences (Sykes, 1978). Finally, grounded theory was a good choice to support the creation of explanatory theory. The research question theme focused on asking “How is ecological modernisation operationalised at the organisational level?” Addressing this with grounded theory was a way to ensure that the particular findings of the case were explained through theory in a manner which could be shared with others and further developed with other cases.

Some authors criticise the use of grounded theory as a research method. The recommendation of Glaser and Strauss (1998) is to avoid preconceived ideas by starting data collection with an open mind, avoiding falling into the trap of simply testing the ideas of the researcher from the beginning. However, this brings up the question: how can the researcher avoid unconsciously applying a preconceived bias? As noted by Allan (2003), the coding process is inherently subject to the biases of the researchers, and any single piece of data can be coded in an infinite number of ways. This limits the possibility for the work to be reliably objective or replicable, which may lead some to question the validity of grounded theory as a scientific research method (Elliott and
Despite these shortcomings, it was considered that grounded theory would be the best approach to addressing the research topic, and that by ensuring awareness of these criticisms, the researcher should be able to navigate common pitfalls such as bias and motivated reasoning (Allan, 2003; Elliott and Higgins, 2012).

### 3.2.2 Case Study

This project makes use of a case study research strategy, which complements the grounded theory method by providing a systematic process for collection of the research data. As recommended by Yin (2009), the case study method is good at supporting “how” and “why” questions, such as those posed in this work. Again, the access of the researcher to the case organisation was considered to be a benefit to the choice of this research strategy.

It is important to recognise that a single-entity case study has limited application for wider generalisation. Instead, results are qualitative and provide detailed insight and lessons which can be useful to infer or explain other similar, parallel events (King et al., 1994). Caution must be taken to safeguard the reliability and validity of the case study by studying from diverse perspectives, by presenting and discussing alternative explanations for phenomena, and by grounding the research findings in theory and other relevant comparative data (Yin, 2009). In this project, data was collected from multiple sites in the company’s European division in order to limit the impact of local anomalies and to draw from multiple sources, in accordance with Yin’s principles of data collection, helping ensure rigour (Yin, 2009).

Throughout the analysis of the case material, cross-references were made to the available literature and documentation surrounding Interface’s competitors, such as shareholder reports, corporate reports, financial statements, keynote talks, academic studies, etc. This provided further opportunities for pattern matching, as well as checks on the validity of emerging theories and ideas as the research progressed.

### 3.2.3 Interviews

A large proportion of the case material was collected through interviews; in-person, on a webcam, or over the telephone. In order to retain the ability to redirect the
conversation and probe or expand upon particular ideas as they emerged, all interviews were conducted using the semi-structured technique (Gilbert, 2001). This type of interview also enables the researcher to adapt to the interviewee’s level of understanding and to change the order of questioning to match the natural flow of the conversation (Gilbert, 2001).

A challenge of semi-structured interviews is the interviewer effect (Gilbert, 2001). This includes the influence of manners, customs, and other interpersonal effects which could influence the willingness of the participant. It also includes what the researcher says during the interview. An interviewer may ask a question in a particular way, which could strongly influence the response. The most egregious example of this is the leading question, e.g., “Did that make you feel very angry?” or “you must have been furious about that” (Ritchie et al., 2013). Care was taken during this project to reflect on the recorded interviews and identify opportunities to improve the interview technique.

Twenty-eight interviews were recorded using a digital recorder which was borrowed from Interface, and all interview conversations were manually transcribed. The transcription process was labour intensive, but formed an important part of the immersion in the data and contributed to the analysis. By manually transcribing the interviews (rather than paying for an external transcription service), the researcher was able to ensure that company jargon was correctly identified, and that colloquial turns of phrase were understood. Crucially, transcribing allowed for clarifying “visual” explanation notes to be added from memory during the transcription process, e.g., in order to explain certain points where an interviewee points or makes a hand gesture.

### 3.2.4 Observational data

Observations were made throughout this project in the form of “field notes”. These began as lengthy notes with admittedly poor research rigour during the early stages (scrappy notes, thoughts and half-remembered discussions collected into a running electronic document). Data collection rigour improved as the research developed, and towards the end of the research, notes were succinct and frequently referred to one another. Observational data notes were critical for establishing whether concepts had reached “saturation”, and for planning theoretical sampling. Certain key sets of field
notes and documents were added to the qualitative research programme, Dedoose 5.2.1, to be organised and coded among interview data.

Some of the most important observation interactions were during the various “Mission Zero” team meetings. The researcher was a regular attendee at three of these teams, one of which was founded by the researcher during this project. Rough notes were taken during the meetings and were supplemented with post-hoc observations and clarifying note taking.

Early in the development of this research, a dialogue was opened with the European Sustainability Director, whose responsibilities were to oversee sustainability activity in the Europe, Middle-East and North Africa (EMEA) region of the business. Throughout the course of the research, the opportunity was taken to work alongside this individual, to observe them in their role, and to informally discuss the themes of this research.

3.2.5 Ethics

In any research involving interaction with humans, there should first be a careful consideration of ethics. When performing qualitative research, ethics can be particularly pertinent since there is a greater freedom of action within the research (Gilbert, 2001; Saunders et al., 2009). This research involved handling some sensitive data. Data such as interview recordings and transcriptions were treated with care in accordance with the principles of good data management – sensitive documents and files were kept in a secure environment at all times with no access except by the researcher. A secure cloud service was used to store sensitive digital information. This not only ensured that access to the files would be restricted, but it helped to ensure that only one copy was ever made of each file, avoiding the risks of a misplaced USB stick or similar. Other ethical considerations and precautions taken are listed below:

- When interviewing members of the production team, it was always agreed with the shift manager beforehand that the scheduled interview time was safe to remove a member of staff from the production team. Leaving lone operators was avoided.
Union: Most of the production staff were members of the worker’s union, Unite, and any interviews to be conducted on union staff members required the union to be informed beforehand. The company’s union officer was informed during the planning stage of the first set of interviews for this research. A short presentation on the need for the social research interviews was given to members of the site team at Shelf prior to the first round of interviews in 2011, during which the union rep was in attendance. No problems were encountered in gaining access to union members during this research. (It is considered that part of this “ease of access” was a result of the researcher being embedded in the engineering team, which gave regular opportunities to interact with employees during site walks, which built trust).

Basic confidentiality was preserved throughout the research process. The confidentiality of each interviewee’s data was explained in person to each interviewee, and each interviewee was asked to read and sign an agreement providing their permission to publish their words.

Some interviewees and participants are identifiable by their job titles. Each of these individuals has agreed to this.

As recommended by Gilbert (2001), interviewees were offered a copy of their transcription following its completion, to check for correctness. None of the interviewees who received their transcripts made any modifications. (This may have been a result of the fact that the transcriptions took 1-2 months to complete following the interviews, which likely decreased the chances that an interviewee felt they could challenge the written transcript based on their memory).

Interviewees were given the opportunity to “off the record” during the interview, during which the recording was paused until they were happy to resume recording. “Off the record” comments are not discussed in this work.

3.2.6 Register of Interviews

Table 3-1 provides a summary of the interview data collected during this research. Interviews are labelled for referencing in the thesis. Table 3-2 shows non-interview data which was collected to support the case.
<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
<th>Type</th>
<th>Year</th>
<th>Location</th>
</tr>
</thead>
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<td>I_SH_01</td>
<td>Production team operator</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SH_02</td>
<td>Production team operator</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
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<td>I_SH_03</td>
<td>Senior technical manager</td>
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<td>Jan-11</td>
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<tr>
<td>I_SH_04</td>
<td>Design and marketing team member</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
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</tr>
<tr>
<td>I_SH_05</td>
<td>Marketing team member</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
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</tr>
<tr>
<td>I_SH_06</td>
<td>Product research and development</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
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</tr>
<tr>
<td>I_SH_07</td>
<td>Purchasing manager</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
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</tr>
<tr>
<td>I_SH_08</td>
<td>Storeroom operator</td>
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<td>Jan-11</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SH_09</td>
<td>Design director</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SH_10</td>
<td>Customer services manager</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
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<td>I_SH_11</td>
<td>Maintenance team member</td>
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<td>Jan-11</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SH_12</td>
<td>Customer services team leader</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SH_13</td>
<td>Site caretaker</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SH_14</td>
<td>Production planning team member</td>
<td>In-person, semi-structured interview</td>
<td>Jan-11</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SIA_1</td>
<td>Former Interface employee</td>
<td>Telephone, semi-structured interview</td>
<td>May-14</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SIA_2</td>
<td>Former Interface employee</td>
<td>Telephone, semi-structured interview</td>
<td>May-14</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_SIA_3</td>
<td>Former Interface employee</td>
<td>Telephone, semi-structured interview</td>
<td>May-14</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_COI_1</td>
<td>Co-innovation team member</td>
<td>In-person, semi-structured interview</td>
<td>Oct-14</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_COI_2</td>
<td>Co-innovation team member</td>
<td>Telephone, semi-structured interview</td>
<td>Jan-15</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_COI_3</td>
<td>Co-innovation team member</td>
<td>Telephone, semi-structured interview</td>
<td>Oct-14</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_COI_4</td>
<td>Co-innovation team leader</td>
<td>Telephone, semi-structured interview</td>
<td>May-14</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_COI_5</td>
<td>Chief innovation officer</td>
<td>Telephone, semi-structured interview</td>
<td>Aug-14</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_ESD_1</td>
<td>European sustainability director</td>
<td>Telephone, semi-structured interview</td>
<td>Feb-12</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_ESD_2</td>
<td>European sustainability director</td>
<td>In-person, semi-structured interview</td>
<td>Jan-13</td>
<td>Shelf, UK</td>
</tr>
<tr>
<td>I_DRE_1</td>
<td>Director of restorative enterprise</td>
<td>Telephone, semi-structured interview</td>
<td>Apr-15</td>
<td>Halifax, UK</td>
</tr>
<tr>
<td>I_CAV_1</td>
<td>Human resources manager</td>
<td>In-person, semi-structured interview</td>
<td>Jul-15</td>
<td>Craigavon, UK</td>
</tr>
<tr>
<td>I_CAV_2</td>
<td>Continuous improvement manager</td>
<td>In-person, semi-structured interview</td>
<td>Jul-15</td>
<td>Craigavon, UK</td>
</tr>
<tr>
<td>I_CAV_3</td>
<td>Health, Safety and Environment</td>
<td>In-person, semi-structured interview</td>
<td>Jul-15</td>
<td>Craigavon, UK</td>
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</tbody>
</table>

Table 3-1 - Register of Interviews
### Table 3-2 - Register of non-interview data and secondary sources

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Description of record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface Documents</td>
<td>“Next Ascent” and “Global Innovation” reports</td>
</tr>
<tr>
<td></td>
<td>Internal sustainability data and other statistics</td>
</tr>
<tr>
<td></td>
<td>Financial Reports (Form 10-K)</td>
</tr>
<tr>
<td></td>
<td>Data from the company website (previous years’ data was viewed on a web archive)</td>
</tr>
<tr>
<td></td>
<td>External-facing promotional videos including blogs</td>
</tr>
<tr>
<td></td>
<td>Internal presentations</td>
</tr>
<tr>
<td></td>
<td>Internal videos</td>
</tr>
<tr>
<td></td>
<td>Authorised-access content on the company’s social business software, “Loop”</td>
</tr>
<tr>
<td></td>
<td>Emails and internal memos</td>
</tr>
<tr>
<td></td>
<td>HR information requests</td>
</tr>
<tr>
<td></td>
<td>Press releases</td>
</tr>
<tr>
<td></td>
<td>Marketing material</td>
</tr>
<tr>
<td></td>
<td>Notable Observations and field notes</td>
</tr>
<tr>
<td></td>
<td>“Scherpenzeel to Zero” team meetings</td>
</tr>
<tr>
<td></td>
<td>“Craigavon to Zero” team meetings</td>
</tr>
<tr>
<td></td>
<td>“Green Energy Team” meetings (Shelf)</td>
</tr>
<tr>
<td></td>
<td>General duties – projects, emails,</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>External Documents</td>
</tr>
<tr>
<td></td>
<td>Publicly available competitor information</td>
</tr>
<tr>
<td></td>
<td>Financial Reports (Form 10-K)</td>
</tr>
<tr>
<td></td>
<td>Corporate Social Responsibility Reports</td>
</tr>
<tr>
<td></td>
<td>Conference recordings and speeches</td>
</tr>
</tbody>
</table>

#### 3.2.7 Use of Edited Quotes

In some cases, the “raw” transcription contains colloquialisms, turns of phrase and in-references which make little sense to anyone other than the researcher and the interviewee. When such sections are used for quotes in the thesis, minor edits have been made in order to make the quote more readable. While the edited version is different from the original, this process is done with consideration of the risk of reinterpreting the quotation or changing the meaning. Edited quotes were only used for quotations in the thesis, and did not form part of the analysis. An example is provided below:

Before Edit:

> “May...maybe they feel like they’ve educated us enough with regards on ‘shop floor what we should and shouldn’t...what we er...what we’ve been made aware of to do to cut down on waste and energy, and...as far as I’m concerned, we do that because we’re also in a QUEST bonus, which er is based on that.”

"May...maybe they feel like they’ve educated us enough with regards on ‘shop floor what we should and shouldn’t...what we er...what we’ve been made aware of to do to cut down on waste and energy, and...as far as I’m concerned, we do that because we’re also in a QUEST bonus, which er is based on that.”
After Edit:

“Maybe they feel like they’ve educated us enough on the shop floor regarding what we should and shouldn’t… we’ve been made aware of [what] to do to cut down on waste and energy. As far as I’m concerned, we do that because we’re also in a QUEST bonus, which is based on that.”

3.3 Scope of research

The principal focus of this work is on European operations, which included the manufacturing sites at Shelf, UK, Craigavon, UK and Scherpenzeel, Netherlands. In addition to the interview and observation data collected at these sites, consideration of the wider global context has been incorporated through analysis of documents as summarised in Table 3-2.

3.4 Analysis and coding

Qualitative groupings (codes) were developed during the textual analysis, and were applied to text excerpts using qualitative analysis software Dedoose 5.2.1. In accordance with the grounded theory approach, as the research progressed, the codes were reviewed and consolidated to develop ideas and explanations, and to prompt theoretical sampling (Glaser and Strauss, 1998). Analysis was done in a typical fashion for qualitative research; categorising and grouping codes through an iterative, pattern-matching process (Saunders et al., 2009; Yin, 2009), and then analysing and building explanatory theory from the data and its contexts.

The Dedoose software platform was useful in enabling this activity. It provided automated tools to collate, merge and display qualitative codings to text (such as a transcription). This software was also useful because of its secure, cloud-based storage and browser access, which allowed the researcher to analyse the data from any computer with an internet connection, and eliminated the need to produce copies of the data which reduced the risks of data loss and of sensitive information being shared.
3.5 Presentation of Findings

The findings are presented in three core chapters addressing the research questions. These chapters are informed by a “context” chapter (4) which provides the company background and other contextual information. In each of the core chapters (5, 6 and 7), there is an introduction followed by presentation, analysis and discussion of the case material.
4 Case Context: Global Carpet Manufacturing Company, Interface

4.1 Introduction

This thesis explores the case of Interface, a global manufacturing company. In support of this, the current chapter presents the relevant background of the case material which provides context for the case discussion, and underpins the analysis and discussion in the following chapters. A general introduction to the company is provided, including a brief overview of its products and its operating sites. Following this, the company’s sustainability journey is summarised, including a history of the formation of the company's aggressive environmental goals. Some of the important in-house terms, such as Mission Zero and co-innovation, are discussed.

4.2 Data Collection

The case presented in this chapter has been compiled from data collected throughout the research project in a combination of document analyses (including company financial records, audited reports, internal documents, and results of enquiries made to the human resources function), observational research and interview data. Some of the information about the history of the company was derived from founder Ray Anderson’s work (Anderson, 1998; Anderson, 2009). Such sources must be treated with care as they are not peer-reviewed and represent a singular perspective. Where possible, the facts and assertions in Anderson’s work have been discussed with others in the company or explored in company documents for verification. An incidental benefit of the company’s fame and recognition for this project was that there is a relatively substantive body of academic literature which discusses Interface, and this has been referenced where appropriate, adding further triangulation to enrich the study and to ensure that the evidence presented in this chapter is as reliable as possible.
4.3 The Case: Interface

4.3.1 Company Background

Interface is the world’s largest manufacturer and marketer of modular carpet in terms of market share (Interface, 2014b). The company undertakes the manufacture, installation, sales, marketing and development of its products. At the beginning of 2015, Interface employed 3245 people across seven manufacturing sites in Europe, North America, Australia and Asia. The company also retains the services of approximately 178 temporary staff.

<table>
<thead>
<tr>
<th>Americas</th>
<th>Europe, Middle East and Africa (EMEA)</th>
<th>Middle East</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Atlanta, Georgia*</td>
<td>Almaty, Kazakhstan</td>
<td>Abu Dhabi, United Arab Emirates</td>
</tr>
<tr>
<td>Boston, Massachusetts</td>
<td>Athens, Greece</td>
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<td>Barcelona, Spain</td>
<td>Dubai, United Arab Emirates</td>
</tr>
<tr>
<td>Dallas, Texas</td>
<td>Belgrade, Serbia &amp; Montenegro</td>
<td>Emirates</td>
</tr>
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<td>Bratislava, Slovakia</td>
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<td>LaGrange Georgia*</td>
<td>Bucharest, Romania</td>
<td>Doha, Qatar</td>
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<td>West Point, Georgia*</td>
<td>Budapest, Hungary</td>
<td>Kuwait City, Kuwait</td>
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<td>Copenhagen, Denmark</td>
<td>Manama, Bahrain</td>
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<td>Craigavon, Northern Ireland*</td>
<td>Riyadh, Saudi Arabia</td>
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<td>Canada</td>
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<tr>
<td>Belleville, Ontario</td>
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<td>Toronto, Ontario</td>
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<td>Vancouver, British</td>
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<td>Columbia</td>
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<td>Ho Chi Minh City, Vietnam</td>
<td>New Delhi, India</td>
<td>Surry Hills, New South Wales</td>
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<td>Seoul, South Korea</td>
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<td>Shanghai, Greater China</td>
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<td>Singapore, Singapore</td>
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<td>Taicang, Greater China*</td>
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<td>Taiwan, Greater China</td>
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<tr>
<td>Tokyo, Japan</td>
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</tr>
</tbody>
</table>

*Manufacturing sites; **European Headquarters; ***Global Headquarters

Table 4-1 - List of Interface’s Operating Locations
In 2015, the company has had annual sales of approximately $1bn worldwide, with an operating income of $113M. In addition to the seven manufacturing sites, the company has 47 showrooms located at major cities across the world, as well as a presence in numerous other locations. A complete list of the company’s operating locations, sorted into global regional groups, is presented in Table 4-1.

4.3.2 Company Products

Interfaces’ primary products are modular carpet tiles. In 1973, Interface was the first company to popularise the concept of “modular carpet” or carpet tiles. These are carpets which are cut into regular shapes, typically 500x500mm squares. Carpet tiles have several advantages over broadloom (the traditional whole sheet of carpet). Primarily, carpet tiles are used for convenience. Their square format and regular packaging allows for simpler installation, transport, storage and handling compared with rolls of broadloom carpet. This lowers the cost to install, reconfigure, change and maintain the carpet. Carpet tiles take less time to install than broadloom carpet, produce less installation waste, and do not require glue or underlay. They offer a greater degree of freedom over visual styles. This includes customised designs, variable thicknesses, swappable colours and customised logos. Different coloured tiles can be laid to create zones on the floor. Another major advantage of carpet tiles is their easy replacement. In the case of wear, spillages or burns, a single tile can be removed and replaced with relative ease compared to cutting and repairing or replacing a larger carpet. Finally, carpet tiles can be more easily reused compared with broadloom options. These advantages have helped enable carpet tiles to move from a niche product towards a more mainstream choice, particularly in commercial office environments, in education, and in hospitality. In the mature commercial office market, carpet tiles currently represent approximately 30% of the soft flooring industry (a category which also includes broadloom and carpet rolls), of which Interface produces the largest share. Interface’s carpet tiles use a synthetic nylon fibre. This offers a highly durable product compared with other commonly used fibres such as wool or polyester. The nylon content of the carpet fibre means that the production cost is lower compared with non-nylon alternatives, such as wool which has high processing costs. Furthermore, nylon fibre has a comparatively lower environmental impact than wool; wool carpets and
mixed nylon/wool blended carpets can have a cradle-to-gate global warming potential (GWP) at least three times greater than that of similar products made from nylon (Hensler, 2014). Interface also produces a custom-designed adhesive sticker for installing carpet tiles, and a proprietary antimicrobial chemical compound. Interface manufactures and sells a steel raised floor product which is designed to be installed with carpet tiles and facilitates access to cabling and other under-floor services.

Carpet products are in direct competition with other forms of floor coverings. Specifiers of flooring must consider the advantages and disadvantages of carpets against other options. Carpeted surfaces offer different physical properties compared with other flooring options such as linoleum, vinyl, hardwood, laminate or ceramic tile. Primarily, carpeted surfaces provide increased physical and thermal comfort, improved indoor air quality, and significantly greater sound absorption compared with harder surfaces such as laminate. Carpeted surfaces also have a lower thermal conductivity than hard surfaces, acting as additional thermal insulation which can reduce space heating demand. On the other hand, carpets are more difficult and costly to keep clean. Carpets are more likely to be damaged by spills, and are more quickly worn out than hard surfaces. Finally, carpets have a greater surface friction than the hard surfaces, which make them more or less desirable depending on the intended use of the installation environment.

Interface’s products are marketed as luxury items, and are priced accordingly. A typical unit sells for at least double that of competing low-budget options. Compared with similar premium carpet tile products from other suppliers, Interface’s products command an additional premium of approximately 15%. The company’s ability to sell at this premium has been attributed to a combination of the company’s brand, sales approach, design, marketing and reputation for sustainability leadership (Interface, 2014b). The company operates primarily through businesses-to-business sales with a large, commission-based sales force of approximately 650 employees globally. The products are marketed towards designers, architects and procurement personnel. Most of the company’s business is with commercial offices, although the company has been working in recent years to lessen its dependence on this mature segment by diversifying their end user markets. At the time of writing, more than 50% of the
company’s business is within the mature office segment, with education and hospitality markets being identified as offering the largest opportunities for non-office growth.

4.3.3 **Company Sites**

Interface is a global company with operations in many countries as shown in Table 4-1. The focus of this study is on the company’s European division (Interface Europe), which comprised three facilities: Shelf, Halifax; Craigavon, Northern Ireland; and Scherpenzeel, Netherlands, which are briefly summarised here. The primary data and observations were collected in Interface Europe, with some data (telephone interviews and various documents) collected from the other regions in order to improve triangulation (Yin, 2009) and to explore regional differences.

**Shelf, Halifax, West Yorkshire**
The site at Shelf, Halifax was the company’s UK Headquarters. Previously, the site was a traditional West Yorkshire broadloom carpet mill called Firth carpets. In a period of rapid growth through acquisition, Interface purchased the company outright in the mid-to late 1990s (Anderson, 1998). Given the near-200 year history of Firth carpets, the existing site buildings were very old. The company’s main offices were located in a grade II listed building dating to 1855. Up until 2012, the site included significant production and warehousing operations, as well as accommodating many other services and teams. In 2012, the company shut down production, research, engineering and warehousing operations at the site which left the customer services, concept design, marketing and sales, IT, logistics and maintenance teams. The production and warehousing capacities were consolidated between the two remaining European facilities in the Northern Ireland and the Netherlands. The researcher was based at an office on this site during this project.

**Craigavon, County Armagh, Northern Ireland**
The company’s site in Craigavon consisted of manufacturing and warehousing operations. It was a smaller site than the other European facilities, and at the time of study, it undertook only part of the manufacturing process (tufting) rather than full end-to-end production of carpet tiles. The site was one of the first to be acquired by Interface in the 1970s, marking the company’s entry into the European marketplace.
Scherpenzeel, Gelderland, Netherlands
In the Netherlands, Interface acquired large carpet tile facility from Heuga in 1987, which has since served as the company’s largest European manufacturing site and the company’s European Headquarters. The site teams accommodated include customer services, concept design, finance, human resources, IT, research, engineering and maintenance, logistics, marketing and sales.

4.3.4 Summary of European Company Context and Workforce
Between the three manufacturing sites in Europe, there were many similarities. From an engineering and production management perspective, the company had been going through a period of “harmonisation” for more than five years, which had resulted in a string of projects to make products more consistent with one another throughout the European region. Compared with the products, the natures of the workforces throughout the European region were much more varied. As is explored in Chapter 6 of this thesis, engagement among employees had a prominent influence on the success (or lack of success) of the company’s environmental activities. While much of the story of Interface is about positive engagement and the company's successes, there were also less positive aspects of the company's relationship with its employees.

4.3.5 Corporate and Senior Management
At the top level, Interface had a rather typical corporate structure for a global company of its size. It is a publicly listed company with stockholders, a board of directors, a chief executive, chief operating officer based in the USA headquarters. Beneath these were several departmental vice presidents and several divisional and subsidiary presidents who had responsibility for running the business at a regional level.

The executive board maintained overall control of major strategic decisions such as whether to enter into a new market, whether to open or acquire a new facility or whether to make major reorganisations to the company structure. Local site directors were given full autonomy to make appointments, invest in new equipment and manage production operations. At the level of the seven manufacturing sites, the company sites “felt” more like a franchise or subsidiary than part of a single, contiguous organisation. This was highlighted by significant divergence among the company’s manufacturing
sites in terms of their structure, and their approach to production and other functions such as human resources, administrative support and sales. This may have been the result of the company’s strategy of expansion through acquisition. Each of the company’s European sites had previously been operating as a carpet production facility, and many employees from these original businesses were still employed by Interface, in some cases doing the same jobs.

4.3.6 Human Resources and Organisational Development

During the period of study, human resources emerged as a topic of interest and concern among employees and senior management. At the individual level, several interviewees commented that there was a lack of opportunities to progress within the company. This may have been a result of a relatively static workforce and a lengthy period of slow or negative growth within the business over the past decade. The average length of operational service in Interface Europe was approximately 13.5 years with an average annual turnover of 9%. In the company’s UK operations, approximately 20% of employees had service records of 20 years or more, and there were many individuals at the Shelf site with more than 30 years’ service. As a result of the flexibility and variability between sites, role definition lacked clarity in many areas of the business, such as middle-management, research, marketing, design and engineering. One consequence of this was that it appeared to create “organisational slack”; extra availability of resources within the company to perform nonstandard tasks such as working on side-projects (Herold et al., 2006). The core business activities (production and customer services) were more closely controlled in a top-down style, and had less slack. Systematic organisational development and employee management was generally lacking at the company. There was no formalised in-role training for most positions, nor were there any structured career development plans. The lack of clear role definitions or clear development paths created opportunities and flexibility, but also had negative consequences. Many interviewees commented that they felt disengaged and underappreciated in their roles. This corroborated previous evidence of overall engagement scores for the company (as measured in 2006-2009 using the Gallup Q12 framework), which indicated that overall employee engagement levels at Interface were below mean values (in comparison with similar companies measured within the Gallup Q12 framework). At the senior level, the global CEO acknowledged during an address to
the UK workforce in 2013 that the company had significant deficiencies in the area of organisational development, and that this was had been identified as an area for increased focus in the near future.

The company operated a “FastForward to 2020” scheme, led and facilitated by the European Sustainability Director. The scheme offered any interested employee the opportunity to attend a training workshop and learn about the challenges of sustainability, with a goal of creating local “ambassadors” throughout the business who would help to advocate for the Mission Zero goals to other colleagues, and be a potential source of innovation. While the potential of linking this scheme with a salary increase or bonus was discussed, the company fell short of offering this or linking the scheme to career development. This scheme, while seeming to offer the opportunity for career development, was more reliant on the concept of “slack” and discretionary effort in order to attract members, and suffered from a lack of interest and irregular meetings.

4.3.7 Shop Floor Staff at Interface

Unskilled factory operators (identifying themselves as “shop floor staff”) in Interface were the most numerous of the company’s employees, and represented just under 50% of the total workforce in terms of headcount (approximately 1600 employees globally, including temporary workers). Shop floor staff worked only in the manufacturing and warehouse operations. The company did not directly employ any drivers for transport of goods or materials off-site; transport was provided for the company by local third parties. The main responsibilities of Interface’s unskilled labour workforce were to prepare and operate the carpet production lines in accordance with the production planning schedule and standard procedures, to monitor the quality of the product during these processes, to organise and move products and materials around the shop floor, and to keep the workplace clean and clear of hazards.

In the UK, more than 90% of shop floor staff were local residents living within 10 miles of the factory location. The situation was believed to be the same at other sites although a formal assessment had not been carried out. Among shop floor staff in Europe, the gender ratio was approximately 90% male. The gender ratio among employees in other regions was believed to be similar across all of Interface’s global manufacturing sites,
although gender data for other regions was not made available for this research. One director commented “carpet manufacturing is traditionally a male-dominated industry”, citing 22.5% female employees among European employees (including shop floor and non-shop floor staff). Comparing with the UK labour market, this figure is slightly below the typical ratio for manufacturing generally, where female employees account for approximately 25%, a ratio which has stable for the past 20 years. For comparison, across all sectors, approximately 47% of UK employees were female in 2016, slightly up from 46% 20 years ago (determined from an assessment of UK employment data obtained from the Office for National Statistics, 2016).

In the UK, approximately 74% of the shop floor staff members were represented by Unite the Union, while in the Netherlands this ratio was much lower at 15%. There had been a history of tension between the company and the worker unions in the UK, particularly at the Northern Ireland site where a protracted pay dispute and threat of industrial action was reported in the local news. In a response to the industrial action, the company divert plans for £1.2m worth of investment in new machinery to the Scherpenzeel facility in the Netherlands instead of Craigavon, citing concerns about the risk of interrupted production caused by industrial action. This move appeared to further escalate tensions between the company and its workforce. These tensions provide important contextual background for this study’s exploration of employee engagement (Chapter 6), but further discussion of the tensions is beyond the scope of this work. In Shelf, Halifax, the company’s decision to end production and warehousing resulted in the loss of 115 jobs. Again, this was reported in the local news. The closure of the production at Shelf in 2012 appeared to create an atmosphere of uncertainty over the remaining employees at the site, who voiced concerns about the potential for the rest of the site to be closed down.

Long service records were common at the company. The consequence of an average career length of 13.5 years was that many of the company’s employees had seen the full development of Mission Zero from its early beginnings in 1994 to the present day. A core aspect of the role of the shop floor staff was to monitor levels of waste, minimise energy use, and to look for opportunities to save these during their other duties. Consequently,
goals 1 and 3 of Mission Zero, which focused on waste and energy, were the goals with the most direct relevance to shop floor staff.

4.3.8 **Co-innovation Team**

An important aspect of this case, which formed much of the basis for assessing the company’s strategic approach to sustainability and innovation, was the co-innovation team. The co-innovation team was responsible for finding, assessing, prioritising and funding innovation projects in Interface. It was formally appointed in 2011 by the company’s senior leadership, although its members had been operating in a similar, unofficial form since at least 2008. The team sought to accelerate the company’s progress towards its Mission Zero goals by promoting radical innovation. The co-innovation team’s chosen approach was to formalise the company’s innovation process in order to support and accelerate what it referred to as “collaborative breakthroughs” and “game-changing” ideas. Initially, the focus was on projects with strong economic and environmental aspects, although the chief co-innovation officer (who led the team) commented that a further priority was also placed on projects which could address social goals, such as FairWorks and Net-Works, described in Chapter 7.

The members of the co-innovation team explained that relationships were the key to getting things done for nearly all SOI projects, particularly when encouraging employees to undertake discretionary activities beyond typical working practice, such as coming up with new ideas, identifying resource needs, or reviewing established processes and products. The co-innovation team’s utilisation of organisational slack for innovative activity demonstrated one of the benefits of a high-slash environment for innovation.

4.3.9 **Internal Entrepreneurship**

The majority of innovation projects at Interface were driven by entrepreneurial activity rather than by managed approaches. In other words, SOIs were proposed and delivered by project leaders who identified an opportunity which could contribute to the Mission Zero goals. These project leaders acted as internal entrepreneurs, undertaking the necessary background work to define each project, making use of organisational slack, and seeking financial approval in an ad-hoc manner. The company’s relationship-based culture and high levels of autonomy enabled this kind of activity. Some employee’s roles
appeared to be entirely based around entrepreneurship. One such entrepreneur was the company’s European Sustainability Director, who was adept at working across internal and external boundaries, identifying market opportunities and making use of organisational slack. This individual was instrumental during the initial phases of the Net-Works project (described in Chapter 7). They have also actively lobbied for an EU ban on carpet waste in landfill. Overall, employees were encouraged to seek out and develop their own innovation projects independently and then present them for assessment and up-scaling. While this approach has had some successes, it is questionable as to whether it has been the most appropriate form of management to address the Mission Zero objectives within the promised timeframe, particularly given its reliance on organisational slack and employee engagement, both of which were found to be variable within the company.

4.3.10 Company Sustainability Programme

Compared with other flooring options, carpet is a highly energy and material-intensive floor-covering product in terms of resource cost per year of use. It is composed of petroleum-based fibres with high-embodied energy, and with a relatively short expected lifespan compared with other floor coverings (such as stone and hardwood). Based on life-cycle analysis of Interface’s core product range, the principal environmental impacts of Interface’s products arise from the production stage, which encompasses raw materials extraction, all aspects of manufacture, and packaging of the finished product (Hensler, 2014). Of these activities, the most significant environmental impacts come from the raw materials, and primary among these is the nylon yarn material, which alone accounts for approximately 60% of the overall carbon footprint of the whole product life (based on consideration of whole-life global warming potential; Hensler, 2014).

Interface considers sustainability to be part of its core strategy. Despite being a company whose products are inherently resource intensive, and whose supply chain relies on fossil-derived petroleum products such as nylon and bitumen, Interface has been consistently named by experts as an example of sustainable business practices for more than a decade (GlobeScan and SustainAbility, 2015). As part of its voluntary carbon disclosure reporting activity with the carbon disclosure project, the company
has articulated the manner in which one core aspect of sustainability – climate change mitigation – has an influence on the company’s corporate strategy. Summarising, the company claims that climate change is of long term strategic importance. It recognises that working to address climate change is linked to benefits of positive reputation in the business community, positive recognition of their environmental achievements in the marketplace, a more secure and stable supply chain, and access to superior raw materials and technologies (Interface, 2014a). The company’s longstanding commitment to a radical environmental programme makes it an interesting subject for case research.

Among other goals, the company is committed to zero greenhouse gas emissions, zero waste to landfill, and 100% renewable energy by 2020. While similar commitments are frequently made among more progressive members of the global manufacturing business community nowadays (see, e.g., Nestlé, 2016; Unilever, 2016), Interface is noted for its aggressive, early adoption of this commitment, which is described in detail in its first sustainability report (Interface, 1997). Indeed, Interface is famous for its longstanding proactive and radical approach to reducing its environmental impact. The start of the company’s journey began more than 20 years ago, and is well described by CEO Anderson and others (Anderson, 1998; Anderson, 2009; Elkington, 2012). The historical development of sustainability at Interface is briefly summarised here for context.

4.3.11 Early Development of Environmentalism at Interface

In the early 1990s, amid rapid acceleration of company profits, Anderson noted an increasing number of his customers began to ask his sales teams “what is your company doing for the environment?” to which the reply at the time was “we are compliant with legal requirements” (Anderson, 1998). Anderson states that the emergence of this question from the customer base was the starting point for sustainability at Interface. He claims to have viewed the question as embarrassing and awkward for his sales teams, manufacturing teams and research teams to deal with because they didn’t have a good response to the question. Prior to this point, the company’s primary focus on “environmental” activities had been on how their products can contribute to better indoor air quality (IAQ), acoustics and thermal comfort. Anderson studied some of the
popular literature of the sustainability movement at the time, including in particular The Ecology of Commerce (Hawken, 1994). This work, which deals with the environmental impacts of industrialisation, argues that industry has a moral duty to lead in the establishment of an economic system which is accountable and which addresses environmental impacts, reversing the trends of species loss, increasing carbon emissions and the creation of environmentally impactful waste products. Hawken lays out a proposed new business model in which material cycles are closed (as in nature), and in which businesses move away from the creation of products and towards concepts like servicisation (manufacturers and retailers offering the function of a product through a lease or license, while maintaining ownership of the physical products). Anderson claims to have been moved by the moral message within The Ecology of Commerce; a feeling which Anderson describes as a “spear in the chest”. Anderson states that he continued to educate himself on sustainability and environmentalism in the early 1990s, reading many of the key books from the time under the broad headings of industrial ecology and which could be said to form the nascent industrial ecology movement (Carson, 1962; Meadows et al., 1992; Daly et al., 1994; Romm, 1994). Reading these works prompted Anderson to consider how his company could start to address environmental issues through the principles of industrial ecology. Anderson also claims that he became increasingly concerned about his personal legacy in relation to the environmental movement, and wrote “Once I understood what Rachel Carson started, I felt morally obligated to help advance her legacy” (Anderson, 1998).

From 1994 to 1996, Anderson assembled a team of mentors and advisors, starting with architect-turned-environmental-consultant, John Picard, who apparently had reacted similarly to the work of Hawken. Picard and Anderson discussed ways in which Interface could contribute to the industrial ecology agenda. Anderson credits Picard with the ideation of the Evergreen Lease (Anderson, 1998); Interface’s product-as-a-service carpet leasing offering (described in more detail elsewhere in this thesis). Picard and Anderson gradually formed a task force which led an assessment of Interface’s environmental performance. It was a team of sustainability experts, academics, writers, consultants and thought leaders who Anderson referred to as the Eco Dream Team. The
members of the *Eco Dream Team* and their relevant expertise are presented in Table 4-3.

The *Eco Dream Team* is notable for its rather unusual composition in comparison with what one might expect in a typical consulting group of this kind. Rather than going to a professional management consultancy service such as McKinsey & Company or Boston Consulting Group, CEO Ray Anderson worked with consultant Picard to hand-pick this group of thought leaders, some of whom were considered to be at the heart of the “radical green” movement of the mid 1990s. As recalled by *Eco Dream team* member Janine Benyus,

> “[Anderson] brought in a conscience. He didn’t bring in “yes” people — he brought in the crazies, the court jesters who would tell the truth. Everyone else in the room was squirming, because we brought up really hard things.”

(Makower, 2012)

The unconventional, “un-corporate” composition of the *Eco Dream Team* supports Anderson’s claim that he was driven by a desire to address sustainability in a sincere, comprehensive and holistic manner (Anderson, 1998) rather than to seek the advice of management consultants who might have helped him to develop a more “utilitarian” sustainability programme.

### 4.3.12 EcoSense and Mission Zero

In 1994, shortly after Anderson had decided to address the company’s environmental issues, Interface became one of the first publicly traded companies in the world to publicly commit to a radical sustainability programme (Interface, 1997). The company announced an ambitious target of zero environmental impact by the year 2000 (although the year for achieving this target was later revised to 2020 as the scale of the challenge became clear (Interface, 1997). Interface’s environmental programme was initially referred to as “EcoSense”, but following a rebranding in 2006, it was changed to “Mission Zero”. *Mission Zero* sets out seven aspects of sustainability within the business which must each be addressed in order to eliminate the company’s environmental footprint (referred to by Anderson and Interface colleagues as “the seven fronts of mount sustainability”, evoking the metaphor of a mountain to describe the challenging
task of achieving zero environmental impact). The seven fronts are presented in Table 4-2 (Anderson, 1998).

<table>
<thead>
<tr>
<th>Mission Zero Goals</th>
<th>Description of Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Eliminate Waste</td>
<td>Eliminating waste in all forms – material waste, wasted time and wasted effort</td>
</tr>
<tr>
<td>2. Benign Emissions</td>
<td>Eliminating waste streams that have negative or toxic effects on natural systems.</td>
</tr>
<tr>
<td>4. Closing the Loop</td>
<td>Redesigning processes and products so that all resources used can be recovered at end of life and reused, closing the technical or natural loop (Braungart and McDonough, 2000).</td>
</tr>
<tr>
<td>5. Resource Efficient Transportation</td>
<td>Transporting people and with minimal waste and emissions. This includes consideration of plant location, logistics and commuting.</td>
</tr>
<tr>
<td>6. Sensitising Stakeholders</td>
<td>Creating a community within and around Interface that understands the functioning of natural systems and our impact on them (originally called “sensitivity hook-up” during 1996-2000).</td>
</tr>
<tr>
<td>7. Redesign Commerce</td>
<td>Redesigning commerce to focus on the delivery of service and value instead of material. Encouraging external organisations to create policies and market incentives.</td>
</tr>
</tbody>
</table>

Table 4-2 - Mission Zero goals and Interface’s descriptions

4.3.13 Discussion of the Mission Zero Goals

Goals 1, 2, 3 and 5 are, in a sense, the ultimate goals for any kind of eco-efficiency measures. They focus on the total reduction of tangible, measureable impacts such as waste material and watts of energy. A link can be seen in the articulation of these goals and the work of Robèrt and Anderson (2002), whose framework for strategic sustainable development discusses the need to address sources of unsustainability. Robèrt’s framework seems to have been influential in the development of these goals. It is possible that the framing of all of these goals around a concept of “zero” derives from the concept of eliminating unsustainability at an organisational scale, although insufficient evidence was collected on this matter to determine whether this was the case.

In the period 1994 – 2014, significant progress was made towards goals 1, 2, 3 and 5. There were a variety of innovation activities which focused on cutting waste, reducing reliance on fossil-derived energy, and reducing greenhouse gas emissions. The methods
employed by the company to achieve these savings included modifying the operating paths of forklift trucks on the factory floor and designing novel processing techniques for reducing production waste during the carpet-cutting process, among many other innovations. Small-scale waste reduction and energy saving innovations of this kind have been the source of the vast majority of the company’s financial savings within Mission Zero, and formed the basis for the company’s claim of a “cumulative total of $480M in savings and avoided costs since 1994” (Interface, 2013). In 1997, Interface released its first “Sustainability Report” (Interface, 1997). It was among the first corporate sustainability reports of this kind to be produced.

There is a qualitative difference between the more “operational” goals discussed above and the remaining Mission Zero goals (4, 6 and 7). These goals articulate the company’s aim to build around itself an economic system which was circular rather than linear – as Anderson writes:

“Linear must go; cyclical must replace it. Cyclical is nature’s way. In nature, there is no waste; one organism’s waste is another’s food. Bill McDonough has been saying it for years: “Waste equals food.” For our industrial process, so dependent on petrochemical, man-made raw materials, this means technical food” to be reincarnated by recycling into the product’s next life cycle, and the next.”

(Anderson, 1998)

Here, Anderson articulates the core ideas of the circular economy and industrial ecology (Andersen, 2007) (readers should note here the distinction between Andersen, professor of environmental policy, and Anderson, founder of Interface). In particular, the goal of “closing the loop” was articulated specifically in terms of “closing the natural or technical loop”, mirroring the language of McDonough and Braungart (2002) and Stahel (2008), whose work over the years on material flows could be said to have laid the conceptual groundwork for the modern vision of the circular economy (Andersen, 2007). Walter Stahel was present during the formation of these goals (discussed below, see Table 4-3), and it is likely that he played a role in developing and articulating this goal. Goal 6, sensitising stakeholders, was a recognition of the important role that stakeholder management would play in the achievement of these goals (Freeman,
The goal specifically mentions stakeholders “within and around” Interface, recognising the importance of engaging its own employees in addition to considering customers, investors and other external stakeholders. These goals were approached through R&D activities and various standalone innovation projects, a few examples of which are described here. In 2001, the company used the principles of biomimicry (Benyus, 1997) to develop a non-directional carpet tile design with beneficial material-saving properties as well as strong aesthetics (Nelson, 2009). While biomimicry as a design tool is not inherently “more sustainable”, this innovation allowed carpet fitters to reduce waste and cuttings by allowing any tile to be placed in any position on the floor. The randomised design appears to have catalysed a shift towards random, non-directional tiles in the wider carpet tile industry. In 2007, Interface made noteworthy progress towards goal 4 of Mission Zero when it introduced the first product lines which contained post-consumer recycled nylon. Interface utilised a novel process developed in partnership with supplier Universal Fibres (Nelson, 2009). In 2013, Interface unveiled Net-Works, a socially-oriented recycling programme, and one of the few innovation activities which directly contributed to goal 7 (and, to a lesser extent, goals 1, 4 and 6). A different example of an innovation which could be described as “redesigning commerce” was Interface’s decision in 2014 to invest in a start-up company which provided a new source of anaerobic digestion (AD) project in the Netherlands. The AD project produced a renewable substitute for natural gas using waste from the food industry. Interface purchased the AD gas to replace its own consumption of fossil gas, enabling it to declare the Netherlands factory “off the grid” in 2014, for using 100% renewable energy sources (Elkington, 2014). Without Interface’s investment and commitment to purchase the gas, the third party supplier would not have been able to start up their enterprise. Interface’s goal to get “off the grid” motivated this symbiotic exchange and enabled them to secure a competitive price, but also to benefit from the positive marketing aspects of being able to declare its first “zero energy” factory.

While the environmental programme began in response to a desire to “do the right thing” as Anderson claims, the company’s managers soon realised that there were substantial opportunities in the programme. Savings made through reduction of waste material and energy soon added up to millions of dollars. In addition to the direct
savings, Interface found that there were opportunities in the marketplace to reward their environmental activities through increased sales and reputational gains. The company has received notable coverage for its environmental activity over the past two decades. Some of the company’s innovations have been described in the academic literature (Blue et al., 1999; Olivia and Quinn, 2003; Chan-Lizardo et al., 2011; Lampikoski, 2012; Von Stamm et al., 2014). This strategy proved to be particularly effective for Interface, as their customers – primarily the architecture and design communities – were more sensitive to environmental issues than many other sectors, and thus much more likely to differentiate Interface’s carpets from similar products based on environmentally-friendly characteristics (Hensler, 2014).

<table>
<thead>
<tr>
<th>Member Name</th>
<th>Relevant Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ray Anderson</td>
<td>CEO and Founder of Interface Inc.</td>
</tr>
<tr>
<td>William Browning</td>
<td>Architect and founder of the Rocky Mountain Institute (RMI) Green Development Services</td>
</tr>
<tr>
<td>Robert Fox</td>
<td>Architect and sustainable design consultant</td>
</tr>
<tr>
<td>Paul Hawken</td>
<td>Author of The Ecology of Commerce (1994)</td>
</tr>
<tr>
<td>Amory Lovins</td>
<td>Scientist, cofounder and CEO of the RMI</td>
</tr>
<tr>
<td>L. Hunter Lovins</td>
<td>Author and cofounder of the RMI</td>
</tr>
<tr>
<td>John Picard</td>
<td>Energy and technology consultant</td>
</tr>
<tr>
<td>Johnathon Porritt</td>
<td>BBC columnist and founder of Forum for the Future, a sustainability-focused NGO</td>
</tr>
<tr>
<td>Daniel Quinn</td>
<td>Turner Prize winning author best known for his book Ishmael (Quinn, 1992)</td>
</tr>
<tr>
<td>Walter Stahel</td>
<td>Architect and economist, writer of the Performance Economy (2008)</td>
</tr>
</tbody>
</table>

Table 4-3 - Members of the Eco Dream Team

4.3.14 Reflection on the Mission Zero Goals

Reflecting on the Mission Zero goals after more than 20 years, it is noteworthy that they have remained in place, almost completely unchanged (aside from a minor rewording to goal 6) since 1994. This may imply that the goals were well designed, comprehensive, and sufficiently challenging to drive action. It could also imply that the company are unwilling to adjust them. Most other companies create environmental programmes with a shorter time-scale, lower ambition, and rolling targets which are revised periodically. Interface and Anderson elected to carefully develop a set of ambitious goals (with extensive support from thought leadership through the Eco Dream Team), and then has stuck with them ever since. This characteristic of longevity, combined with the company’s public commitment to them (embedding the message in the public
consciousness), gave the Mission Zero goals an almost unquestionable status. For Interface to revise its goals at this point would seem almost unthinkable; they could risk losing their social license to operate. This made the company’s commitment to the goals a decidedly risky position for the company to be in given the scale of the challenge and the short time remaining to complete them. Indeed, the Chief Innovation Officer commented that the goals could be a curse as well as a boon – adding that the prominence of the goals in the company’s strategic mindset had led to some loss of focus on other important goals for the company, such as growth or survival beyond 2020.

4.3.15 Progress of Mission Zero

Based on the evidence gathered during this research, Interface appears to have progressed gradually towards its stated goals of zero environmental impact since the launch of these goals in 1994. However, this statement does not capture the fluctuating path which this improvement has taken, nor does it convey the significant gap which still remains to be closed in the few years between now and 2020. Figure 4-1 shows the company’s global progress towards eliminating its direct emissions – including all impacts of its manufacturing operations and offices, but excluding its showrooms. The progress is impressive, showing a total reduction in direct GHG emissions of approximately 92% since 1996. Figure 4-2 shows the same data as Figure 4-1, but overlaid with the company’s figures for its cradle-to-gate GHG emissions, which include all emissions from raw material extraction, processing and manufacturing operations (Hensler, 2014). While the absolute reduction in this value is greater, the percentage reduction since the start of life-cycle measurements (2008) is somewhat less impressive, at 31%. This illustrates one of the challenges the company faced.

Communication of the company’s progress on Mission Zero was made more complex by the large number of different values being tracked, varying emission scopes, and varying baseline years. Further discussion of this aspect can be found in Chapter 5.
4.3.16 Extra-Organisational Context and Regulatory Environment

Flooring Industry and Customers

Interface accounts for a significant proportion of the global carpet tile market, with a share of approximately 30%. The company exerts a powerful gravitational influence on its surrounding industry, customers and supply chain. Interface is recognised as the
pioneer of sustainable business practices in the carpet and flooring industry. CEO Anderson was credited by Shaw Floors (a lead competitor) for catalysing change in the industry (Larson, 2007). Interface’s public commitment to sustainability in the 1990s created a kind of arms race in the flooring industry, which has caused many other major companies in the space, such as Mohawk, Milliken, Desso and Shaw to adopt similar stances on sustainability. Interface’s primary customers were the design and architecture community; a base which Interface has found to be especially sensitive to sustainability issues (Hensler, 2014).

The flooring industry is heavily saturated. Interface competes with at least 25 other major flooring companies globally, with most providing similar carpet-tile products as well as non-woven flooring options such as laminate, hardwood, vinyl, cork, urethane and others. As a mature industry with long-standing manufacturing techniques, the level of differentiation in carpet products from one manufacturer to another is relatively small. Manufacturers in this industry have long been jostling to promote the unique qualities of their products – on tangible aspects such as colour, acoustics, thermal properties, comfort, durability and thickness, as well as intangible aspects such as “British made”, the mark of a particular quality brand, or even “how to make a woman happy”.

**Regulatory Environment**

The company exists in a relatively permissive (though unsupportive) regulatory environment with respect to its environmental activities. Since Interface has been proactive in addressing its environmental impact since the mid 1990s, the company has tended to be well ahead of environment-related regulations. The company has benefitted marginally from the avoidance of some charges, such as the climate change levy (CCL) in the UK for electricity and natural gas usage, or the energy tax and sustainable energy surcharge in the Netherlands. However, it is worth noting that, at the time of writing, the savings made through avoidance of these costs did not cover difference in cost between fossil-derived energy sources and levy-exempt sources such as biogas, wind and solar. The company has seen a much greater benefit from avoidance of landfill tax in the UK and the Netherlands.
In 1996, Interface’s UK manufacturing facility in Shelf, Halifax became the first carpet manufacturing facility in the world to receive ISO14001 certification. However, at the time of this research, the certification had lapsed and had not been renewed. In discussions about this subject, it was felt by the site leadership teams in the UK and the Netherlands that compliance with standards such as ISO14001 were an unnecessary cost which Interface did not benefit from. They preferred to discuss and communicate sustainability in their own way, and they considered that Interface was already well-exceeding the minimum expectations of the ISO14001 standard anyway. In 2013, this position became problematic, as the UK arm of Interface Europe was required to participate in mandatory greenhouse gas (GHG) reporting, in line with amendments to the Companies Act 2006. The company needed to undertake additional effort in order to make its existing “EcoMetrics” data collection compliant for reporting under this scheme, and a consultant was brought in to assist the company in this. This raised a renewed internal discussion about the value of ISO14001 certification, and even a discussion of the possibility of ISO50001 or EMAS certification for the European operations, both of which the company had previously considered itself to be “well beyond”. Of note, the rationale for whether to adopt these management systems revolved around the potential added marketing value of being able to claim compliance with these standards to their customers. There was no discussion seen about the potential benefits from the implementation of these standards, such as increased accountability, the ability to compare performance across competitors, and a systematic approach to reporting. This example highlights an interesting aspect of Interface’s position as a leader. The company’s leadership seemed to bring with it a sense of complacency about the need to adopt commonly used standards, since the company considered itself well above-compliance. Indeed, the potential adoption by Interface of standards such as ISO50001 or EMAS could be viewed by an external observer as a regressive move, perhaps undermining the company’s reputation for being well above-compliance in this domain. This also raises questions about the implementation of mandatory greenhouse gas emissions reporting by DEFRA and the UK government. The guidance seems to have written without much consideration for those organisations which are already above-compliance using alternative systems other than ISO14001 or similar, leaving organisations such as Interface with little option but to use consultants to support them to rapidly adopt one of the recognised reporting standards.
In the United States, Interface has played an active role at the national policy level, shaping the regulatory environment. Ray Anderson co-chaired the President’s Council for Sustainable Development from 1997-1999, which was responsible for advising president Clinton on sustainable development by building consensus on policy, demonstrating implementation of policy, promoting the concept of sustainable development, and evaluating and reporting on progress towards sustainable development in America (Clinton Administration, 1997). These points underlined the notion that Interface’s environmental goals were self-imposed rather than being driven by regulation.

4.4 Discussion

Interface is a mature, global manufacturing company which makes carpet products, with a heterogeneous workforce and a radical sustainability programme, Mission Zero, which began in 1994 through a decision taken by CEO Anderson. It is a comprehensive and well-articulated environmental programme, developed with the support of some leading environmental thinkers, and which draws upon established concepts of sustainability such as cradle to cradle, circular economy, FSSD and industrial ecology. The company exists in a mature manufacturing industry which is heavily saturated, and highly competitive with little differentiation between products. The company has been active at the policy level, with its Anderson co-chairing the President’s Council on Sustainable Development in 1997-1999.

This chapter showed that Interface began its sustainability journey following a change of heart by the CEO, who had been moved by reading The Ecology of Commerce (Hawken, 1994). That book, and others written around the same time such as Beyond the Limits (Meadows et al., 1992), Cannibals with Forks (Elkington, 1997) and The Natural Step (Robèrt, 1997) were part of an influential social movement promoting corporate sustainability in the 1990s. This social movement was the catalyst for Anderson’s shift in mindset and consequently Interface’s action. Thus, in this case, the driver of EM in the organisation was social awareness of the problem, informed by science and public discourse. These, in turn, translated to a changed mindset in
Anderson of Interface – not a regulatory response, as might be envisioned by EM theorists when thinking at the macro-sociological level.

Examination of the human aspects of the organisation revealed some interesting dynamics in relation to the workforce and sustainability. The company prides itself in the long-term loyalty and engagement of staff, exemplified by the high number of long service records among employees. In places, the workforce is highly unionised and largely male, with a slightly higher proportion of male employees than average UK manufacturing firms. At the same time, the company is undergoing rapid change, harmonising processes, consolidating production sites, and demonstrating a desire to modernise. This includes helping staff to become more innovative through activities such as co-innovation. The company’s employees are central to the successful achievement of the Mission Zero goals (Table 4-2). It is employees’ behaviour which must change in order to implement the operational actions of Mission Zero, such as reducing waste and emissions. Similarly, changes must occur in the actions of those employees who engage with customers, produce marketing material and attend conferences in order to promote the company’s sustainability activities externally. In recognition of their importance, the company’s employees are also referred to directly in goal 6, “sensitising stakeholders” (“creating a community within”, see Table 4-2). To take this line of enquiry further, Chapter 6 explores the theme of employees and engagement in more detail in relation to research question R2.

### 4.5 Chapter Summary

This chapter has provided a summary of the case organisation, Interface and relevant contexts. It has described the company background, products, sites, organisational structure and culture, as well as providing an exploration of the company’s sustainability programme; its history, development and current progress. This chapter has laid out the necessary contexts which will be referred to during discussion in the rest of the case material, which follows in the next three chapters addressing each of the three research themes.
5 Theme 1: Ecological Modernisation at Interface

5.1 Introduction

This chapter addresses the first of the research themes, considering the question R1: *What are the important aspects in implementation of an ecological modernisation strategy at the level of an individual organisation?* First, this chapter explores the realities – positive and negative – of operating a mature organisation with a strategy which aligns with the EM perspective. The chapter discusses whether Interface may be considered as an exemplar of the EM strategy in a “strong” form, where pursuit of environmental reform has clear economic benefits as well as sustainability ones (Christoff, 1996). This is done in the style of a debate, with arguments presented “for” and “against” presenting alternative perspectives. It is concluded that neither the “strong” nor the “weak” labels are sufficient to describe Interface, as the company showed evidence of behaviour in both categories.

While EM is typically considered and discussed at the political, societal and macro-economic level, this thesis argues that there is value in applying EM theory for organisational-level analysis. Interface can be viewed as an agent operating within national and global EM systems, and its actions included ones which affected that wider system, through its supply chain, its employees, customers, competitors in the flooring industry and in the wider sector. It even influenced government and policy through political activities. The case illustrates the phenomenon of “bottom-up” EM, emerging from the market rather than being driven by policy from local or national governments. While the EM taking place within Interface may not be entirely labelled as “strong” (as this chapter discusses), it is very encouraging to consider the potential impacts on sustainability if similar, EM-aligned practices could emerge from other organisations and industries in a similar position without the need for government intervention.
5.2 Data Collection

The most important pieces of evidence contributing to this chapter are a series of seven interviews held with specific sustainability leaders at various levels within the company. The interviewees were the European Sustainability Director [I_ESD_2], the director of restorative enterprise [I_DRE_1], the director and assistant directors of global co-innovation [I_COI_4], [I_COI_5] and other members of the global co-innovation team [I_COI_1], [I_COI_2], [I_COI_3]. This evidence is supported and corroborated by observational data collected during live meetings and interactions which occurred throughout the course of the research and were captured in field notes. Finally, the research of this chapter is supplemented with analyses of relevant documents, internal and external. This includes observation and participation on Loop, the company’s social business software platform, as well as internal email memos, financial report filings, online articles and videos produced by the company and its staff, and printed internal documentation such as the company’s report of its “innovation summit”.

5.3 The Case: Activities of an Ecological Moderniser

5.3.1 Overview

This section follows presents and analyses some of the particular features and challenges of the company’s position as an ecological moderniser, including communicating and public engagement, managing its position as an industry leader, and the company’s approach to reporting.

5.3.2 Being an Industry Leader and Influencer

During the 1990s, Ray Anderson and Interface pioneered the move towards environmental sustainability in the flooring industry; a fact which even Interface’s competitors have acknowledged (Larson, 2007). Interface has since enjoyed a reputation as a leader, pioneer and radical innovator among its peers in the area of sustainability (McDonough, 2007; GlobeScan and SustainAbility, 2015). The company is held in high regard by prominent sustainability thought leaders such as John Elkington, who described the company as one of the founders of modern sustainable business practices (Elkington, 2012). Interface is also recognised frequently within the academic
sustainability literature as a sustainability leader (Johansen, 1998; Dubose, 2000), a disruptive innovator (Senge et al., 2001; Lampikoski, 2012; Belkhir, 2015), and a case example of “doing well by doing good” (Watson, 2011; Elkington, 2012). For more than 15 years, Interface has been named among the top ten leaders of sustainable business in polls of sustainability professionals (GlobeScan and SustainAbility, 2015). In 2014, Interface was named top among “green leaders” in a survey by Floor Focus, a leading flooring industry publication. These awards reinforce the notion that Interface is recognised among its peers as the leader on sustainability in the flooring industry.

Further, the company was influential within the policy sphere, particularly in the USA where founder Anderson was chair of the Clinton administration’s Sustainable Development Council, and where other Interface employees held important strategic roles in sector bodies such as the US Green Building Council.

However, as Interface’s sales teams discovered, most customers could not tell the difference between Interface and its competitors. When communicating its environmental credentials with its customers, the distinction between Interface and its competitors was difficult for most customers to discern. 20 years after the initiation of the company’s sustainability activities, the rest of the industry has now adopted some form of environmental statement or policy. Following Interface’s example, they are now reaping the benefits of a sensitised marketplace. Interface finds itself surrounded by a field of competitors with impressive-sounding green credentials, nearly all of which claim to have a sustainability programme which is comparable to Interface’s. One example of this is Desso, a major Dutch carpet manufacturing company which has adopted a “cradle to cradle” product certification programme – a concept popularised by McDonough and Braungart (2002). Desso seeks to obtain cradle to cradle certification for all of its products by the year 2020 (Desso, 2015), a goal which echoes the promises of Interface’s Mission Zero goals to close the loop and eliminate waste by 2020 (Table 4-2). Similarly, leading competitor Milliken aims to reduce its environmental emissions and resource consumption by 20% in time for 2020 versus a baseline year of 2010 (Milliken, 2016). In 2009, Forbo Flooring Systems started a programme to reduce its division’s environmental impact by 25% by the end of 2015, versus the baseline year of 2009 (Forbo, 2016). Similar claims and pledges can be found on the websites of leading competitors Mohawk, Shaw, and others. Interface had
previously enjoyed a relatively uncontested status among customers as the only company which was serious about sustainability. Now, it struggles to differentiate itself from customers who cannot distinguish between the sustainability credentials of Interface and other leading competitors. A member of the co-innovation team commented that customers had begun asking them to justify how Interface’s sustainability credentials compared with competitors:

“It’s harder and harder to get customers to believe that we’re leaders. They look at our website and [the websites of competitors such as] Desso, Forbo, and they can’t tell the difference...It’s hard to explain we were first when the other company can say something almost the same and [the customer] has no way of knowing”

[I_CO1_1]

The European Sustainability Director referred to the flooring industry’s current culture of environmental claims and counter-claims as a “beauty contest”, and has argued for greater product transparency and universal adoption of an industry-standardised environmental product declaration (EDP) so that customers can make an informed choice about whose product has the most appealing sustainability characteristics. In support of this, Interface launched a marketing campaign in 2011 called *Let’s be Clear* aimed at customers which claims to “tell the truth about carpet tiles, green claims and sustainability...to help cut through the ‘greenwash’”. The *Let’s be Clear* campaign included a brochure which explained the basics life cycle analysis and carpet recycling, and gave examples of technologies and innovation which Interface had deployed to reduce their environmental impact. Like many activities of this kind, it was not possible to determine how effective the messaging or education material was. At 35 pages, it seemed unlikely that the average consumer would be willing to absorb all of the information contained in it.

The constant struggle to remain recognised as a leader by its customers was a recognised problem in the company. This attempt to educate customers about true and false claims was the latest in a long line of activities aimed at re-opening the gap between Interface and its competitors. Another avenue of attack was in the regulatory arena. Interface was active in lobbying for a ban on carpet waste at landfill sites.
throughout Europe. The European Sustainability Director theorised that an escalating tax on carpet landfill would create the necessary price gradient to create demand for service models such as Interface’s *Evergreen Services Agreement*, which was still unpopular (although the reasons for this unpopularity were not clearly related to the cost). Interestingly, this showed another avenue by which the company was influencing the wider macro-economic system. By lobbying for reforms to landfill taxes, the company could affect the whole carpet industry. Since Interface was already well-positioned to address carpet waste and minimise landfill of carpet material, it was in the rational interest of the company to lobby for such a ban. This is an interesting case of an “inversion” of the Porter hypothesis (Porter and Van der Linde, 1995), where a desire for competitive advantage can be the driver for regulation, rather than the other way around.

5.3.3 Communicating Progress Externally

External communication of environmental progress was a prominent aspect of Interface’s external engagement and marketing approach. Interface maintained a high level of engagement with professional sustainability stakeholders (such as those working in academia, consultancy, or in sustainability and corporate social responsibility roles in their organisations). Teams of experienced speakers from the European division of Interface’s business were active in attending business and academic events focusing on subjects such as corporate sustainability, the circular economy and green construction. A similar level of activity was present in the company’s North American operations, although the level of public engagement activity in the Asia-Pacific (APAC) region was found to be considerably lower. Interface employees typically provided keynote speeches or were invited as panel members at numerous corporate sustainability events throughout Europe. In 2015-16, this involved more than 30 events, including the *Congres Circulaire Economie* in Rotterdam, the Netherlands, *Le big bang des possible* in Angers France, the *2015 Sustainability Leadership Forum organised by GSK*, London, UK, *Corporate Sustainability in Practice*, Cambridge University, UK, *Ethical Business Summit*, London UK, *European Forum on Eco-innovation*, Barcelona, *B-Corp Celebrate the Changemakers*, Amsterdam, the Netherlands, and *Forum Ö*, Annual Conference Swiss Business Council for Sustainable Development, Zurich, Switzerland. The typical approach for presentations was to begin with a brief
description of the company and its history with sustainability (i.e. Ray Anderson’s decision to make the company more sustainable in the 1990s and the development of the Mission Zero campaign). Speakers then typically discussed one or more topics from a set of recurring themes. These can be categorised as follows:

- The Business Case for Mission Zero: A summary of progress to date on Mission Zero and the financial savings which have been generated by this activity compared with the investment made (“the business case for sustainability”)
- Net-Works: Description of the Net-Works project and its social, environmental and economic impact
- Transparency: The importance of full product transparency through measures such as third-party verified environmental product declarations (EPDs) - in particular this line was taken by the European Sustainability Director, who published a book on this subject (Arratia, 2012).
- Biomimicry: The way that sustainability has influenced the company’s product designs. This typically includes a discussion of some of the company’s most successful biomimicry innovations; Tac-Tiles (glue-free installation) and Entropy (randomised tile design)

One of the most striking things about Interface was the extent to which it was recognised as a pioneer and leader of sustainable business practice among professions in the area of corporate sustainability. For a modestly-sized multinational company, Interface had exceptional recognition among attendees at conferences (this was observed during attendance the 6th International Conference on Corporate Sustainability and Responsibility, Berlin, 2014). These communication activities acted as an integral aspect of the operation of the company’s business model. The company’s frequent attendance and appearance at public engagement events such as those listed above is considered to have contributed strongly to the company’s continued perception by others as a leader. Several benefits of these events were discussed with interviewees and are presented below:
- Marketing: The exposure of the company in such a positive light at prominent sustainability-related events was believed to be a powerful aspect of the company's overall marketing [I_ESD_2].

- Sales tool: Related to the marketing aspect, public engagement activities provided additional material for the company's sales teams to "story-tell" about Interface's active role as a leader in sustainability in order to help differentiate the company from its competitors [I_ESD_2].

- Innovation: Attendance at these events by employees enabled the company to maintain constant interaction with the foremost thinking and relevant debates in sustainability, which fed directly into their innovation activities. Indeed, the key innovation Net-Works (discussed in a later chapter) was developed through partnerships and collaborations which stemmed from these interaction activities [I_COI_2],[I_COI_3].

- Positive feedback and engagement: Interface's employees who frequently attended public engagement events, such as the European sustainability director, the UK sustainability manager and the chief innovation officer indicated that participation in these kinds of events gave them positive emotional feelings about their involvement with Interface. One interviewee commented that they felt that they were listened to and respected at these events because of the reputation that Interface enjoyed in the sustainability community [I_COI_2].

- Reputation management and "staying in the game": Public engagement activities appeared to reaffirm Interface's reputation as a leader in the area of sustainability, and lent legitimacy to their claim of being at the forefront of corporate sustainability and pioneers of sustainability. In turn, this led to further invitations and opportunities for public engagement such that a handful of employees in the EMEA region attended at least 30 sustainability events in 2015-16.

- Sensitising Stakeholders: As stated in the Mission Zero goals (Table 4-2), goal 6 is "sensitising stakeholders". While there were no written-down rules about what "sensitising stakeholders" actually meant or what kind of activities could contribute to it, public engagement activities were considered by the European Sustainability Director to make a contribution to this aim. Reinforcing this, employees seeking to attend such events could justify their time and expenses by
making use of this argument, and the company was eager to support employees in such activities [I_ESD_2].

5.3.4 Sustainability and Financial Reporting

Under the neo-classical perspective, one might expect Interface's shareholders to be put off by the company's aggressive commitment to its challenging environmental goals and its radical, often failure-prone innovation activity (see Chapter 7 for more discussion of this aspect). However, Interface has found a way to "sell" its sustainable mission to its shareholders by presenting it as a source of financial savings, of differentiating competitive advantage, and of other secondary benefits. These characteristics were carefully articulated as being among the company's strengths in its financial reports to shareholders. This is the only mention of "sustainability" or "Mission Zero" within the company's financial report. While the statements about sustainability (below) may appear at first to be relatively underwhelming, what Interface has done here is to justify the company's sustainability activity in terms of the market position and financial returns it offers (Interface, 2014b):

"Recognised Global Leadership in Ecological Sustainability: Our long-standing goal and commitment to be ecologically "sustainable" — that is, the point at which we are no longer a net "taker" from the earth and do no harm to the biosphere — have emerged as a competitive strength for our business and remain a strategic initiative. It includes Mission Zero®, our global branding initiative, which represents our mission to eliminate any negative impact our companies may have on the environment by the year 2020. Our acknowledged leadership position and expertise in this area resonate deeply with many of our customers and prospects around the globe, and provide us with a differentiating advantage in competing for business among architects, designers and end users of our products, who often make purchase decisions based on "green" factors. The 2014 Floor Focus survey, which named our Interface business the top among "Green Leaders" and gave us the top honors for "Green Kudos", found that 76% of the designers surveyed consider sustainability an added benefit and 19% consider it a "make or break" issue when deciding what products to recommend or purchase."

(Interface, 2014b)

By justifying its environmental activity in these terms (as a source of competitive advantage), the company has given itself the freedom to pursue activities which meet
these goals without fear of shareholders suing. As the company’s competitors develop their own sustainability efforts and encroach on Interface’s competitive advantage, Interface has the responsibility to “out-do” its competitors in sustainability in order to ensure the company’s differentiating advantage is maintained. The above statement in the financial report was therefore a prerequisite for the “space” required for the company to innovate, and to deliver radical projects such as *Net-Works* (for further discussion of *Net-Works*, see Chapter 7).

5.3.5 **Challenges of Consistency**

The company’s *Let’s be Clear* initiative was one example of a larger trend observed in Interface’s marketing and communication material: a lack of consistency. Other instances of this inconsistency were the range of statistics which the company communicated about their progress to date. During this research project, several announcements about Interface’s overall progress were communicated on the company website, in emails from the CEO office, during communications from global environmental teams and during presentations from regional leadership teams. In 2016, these included:

- GHG emissions in Interface Europe down by 95% compared with a 2007 baseline;
- Cradle-to-Gate Product Carbon Footprint across global operations down by 31% compared with a 2008 baseline;
- Energy use per unit of finished product down by 45% across global operations compared with a 1996 baseline;
- Energy use in Interface Europe down by 25% compared with a 1996 baseline;
- Waste in Interface Europe reduced by 21% compared with a 2007 baseline;
- Zero waste to landfill in Interface Europe since 2014;
- Waste to landfill from global manufacturing sites down by 91% compared with a 1996 baseline.

The wide variety of baseline years, types of metrics and scopes of measurement make it difficult to interpret the true progress of the company towards its goals. An added complication was the difficulty associated with succinctly communicating the
company’s sustainability activities during a sales pitch. Comparing with the Cradle to Cradle programme of competitor Desso, the director for restorative enterprise noted that the Cradle to Cradle message is a much simpler, easier narrative to explain to a customer than the complex seven-goal model which Interface uses. The director went on to discuss the fact that Interface’s early dominance on sustainability among its industry peers had cultivated a degree of complacency in the company, which was now undermining its ability to differentiate itself from competitors:

“And the trick is that can create a big blind spot. If you continue to have an attitude of, you know, “we’re the best, we invented it”, I think we’re starting to see...places where, you know...our customers don’t know the difference.”

5.3.6 Business Case for Sustainability Activity

The economic viability of Interface’s sustainability activity was clearly articulated by the company. The business case for expenditure on sustainability activities were based on two principles: direct savings through avoided costs, and indirect benefits through reputational impacts in areas such as marketing, goodwill and engagement with customers and employees. The progress which the company made towards meeting its aggressive sustainability goals appeared to have been paved with financial rewards, such as a cumulative saving of more than $480M through reduced waste and avoided material and energy costs (Interface, 2013). In terms of indirect benefits, the senior vice president of sustainability articulated these in a discussion about the progress of Mission Zero on the company’s blog. The benefits of Mission Zero included new opportunities for innovation and an increase in engagement among employees:

“The first thing that is really amazing to see is how [Mission Zero] drove innovation at Interface; how asking our people to think differently really brought a wealth of new ideas to the company. New ideas about products, new ideas about how we make carpet, and how we make changes, and new ways to use energy that we never would have uncovered if we weren’t focused on sustainability. The second huge benefit has been the impact that it’s had on our people. The amount of enthusiasm that they feel for sustainability and the connection to this sense of a higher purpose has really kept our people working at Interface, has helped them uncover new ideas, and has really
contributed to an enthusiastic, motivated group of people who are going to help us get to 2020." *(Interface, 2010)*

(*"Getting to 2020" is company jargon for “achieving the stated goals of Mission Zero by the year 2020.”) The main points in these statements (Mission Zero drove innovation, savings, enthusiasm and engagement) are consistent with other observed messaging, such as the company’s global leadership team updates as well as regional and local management communications. These ideas were also found to be reflected in the founder’s books (Anderson, 1998; 2009), in the company’s public engagement activities, in the messages of its annual financial reporting (Form 10-K), and discussed internally among employees on the company’s social business software platform, Loop. Of course, the dependability of these statements must be considered carefully, since the company has a clear stake in promoting its environmental achievements and presenting these in a positive light to stakeholder groups which include potential customers and investors. However, given the balance of evidence looked at for this research, it is considered that the sentiments contained in these messages are a genuine reflection of the company’s evaluation of its own performance and success.

5.3.7 Measurement and Reporting

Like its marketing efforts on sustainability, formal environmental reporting at Interface was also surprisingly inconsistent. Interface kept a curated record of its progress towards reducing carbon emissions, as well as the level of recycled and bio-based material in its products, and other sustainability performance indicators. Interface referred to these records and indicators as “EcoMetrics”. The EcoMetrics were developed in consultation with the Eco Dream Team (see Table 4-3) during the early years of the company’s commitment to sustainability (Anderson, 1998). The EcoMetrics data was compliant with the greenhouse gas protocol corporate reporting standard, and the company made voluntary reports to the carbon disclosure project (CDP; Interface, 2013). However, at the time of writing, the company did not publish detailed accounts of its environmental progress, opting instead to provide a brief summary of overall GHG intensity of its products, and a running tally on its website of values such as the proportion of its energy which was derived from renewable sources.
In 1997, Interface produced what it claimed to be the world’s first corporate sustainability reports for a publicly listed company (Interface, 1997). Printed on 100% recycled paper and in full colour, A4 format, the report is noteworthy for several reasons. Its tone is one of contrition and remorse rather than being celebratory of achievements, as might be expected of typical corporate sustainability reports that might be seen today (e.g., Nestlé, 2016; Unilever, 2016). The report recognises Interface’s own role in creating environmental problems such as climate change and acid rain, and presents the moral case for action, in line with the arguments of Daly et al. (1994) and Hawken (1994) whose influence on this document is clear:

“Industry moves, mines, extracts, shovels, burns, wastes, pumps and disposes of four million pounds of material in order to provide one average, middle-class American family their needs for a year. Although this figure may sound high to some, others argue that this has made America great: the capacity to move mountains of material with a resultant lifestyle that is the envy of the world. That may have been true once, but today just the opposite is true: the rate of material throughput is endangering our prosperity, not enhancing it. At Interface, we recognise that we are part of the problem.” (Interface, 1997)

The 1997 report also appears to aim at inspiring others to take up the cause of sustainability; “For us, sustainability is not the veritable low-hanging fruit of recycling or changing light bulbs, although those are certainly important steps. What we call the next industrial revolution is a momentous shift in how we see the world, how we operate within it, what systems will prevail and which will not.” (Interface, 1997, pg. 6). The report sets out the company’s environmental vision, the size of the challenge ahead, and the company’s progress towards its goals, supported by data which is then related in more explicable terms such as “The energy saving alone from recycling a million pounds of polyester is equivalent to 4,000 barrels of oil”. It explains that the adopted underlying environmental framework is the Natural Step (Framework for Strategic Sustainable Development; FSSD; Robèrt et al., 1997).

Despite being an early adopter of corporate sustainability reporting with its 1997 report, Interface did not produce further annual sustainability reports, preferring instead to communicate its progress through the company website and through direct
engagement with customers and other stakeholders. While the EcoMetrics data provided a summary of the company's progress, the company did not produce a formal corporate report which was compliant with standards such as GRI 4.0 (global reporting initiative) for sustainability reporting. For a company of Interface's size, and particularly for a company which markets itself as a sustainable leader, this seemed unusual. Nearly all of the other companies listed among the 2015 Sustainability Leaders (GlobeScan and SustainAbility, 2015) produced detailed annual corporate social responsibility reports which were GRI 4.0 compliant. A question about this point emerged from an employee on the Loop social business software platform during the research project work, and some of the company's senior sustainability directors joined the online discussion. They pointed out that the GRI 4.0 reporting standards did not adequately serve Interface's needs. "CSR reports", as they referred to them, were described as overly complex, incomprehensible to the average reader, expensive to produce, and carried a risk of being viewed as “spin” and “box ticking”, while distracting from what another of the directors termed “real progress towards sustainability”. While reporting such as GRI 4.0 is not a legal requirement, this topic echoes the earlier discussion in Section 4.3.16 regarding the implementation of mandatory greenhouse emissions reporting, and the consequent need for Interface to adopt "basic" standards such as ISO14001 in order to jump through regulatory hoops which do not seem to easily accommodate organisations such as Interface which are “above compliance” according to their own measures.

5.3.8 Influencing Suppliers

Another aspect of Interface’s environmental strategy was its role in transforming its supply chain. Greiner et al. (2006) presented Interface as a case example of a company which contributed to transforming the chemical economy from 1995-2006. The authors describe how Interface imposed a stern proprietary screening protocol on its suppliers. The protocol involved an approval process which required chemical vendors to eliminate and/or substitute all toxic materials for benign alternatives in accordance with the latest science and environmental information – going beyond the “antiquated” regulations at the time (Greiner et al., 2006). The case describes the ripple effect that Interface’s protocol had upon the supply chain vendors, who found themselves persuaded to move away from a reactive approach to customer needs for chemistry and
instead proactively reforming their products and processes. Suppliers sought to eliminate undesirable or toxic components in order to avoid missing future opportunities in a market which they may have perceived to be increasingly concerned about environmental impacts. This account indicates the potential for an influential customer such as Interface to leverage significant changes to the environmental performance of its supply chain; a sign of wider-system-level EM being instigated by a single actor within a network. The result is improved environmental performance not only for Interface, but also the suppliers themselves and others making use of these suppliers.

5.4 Discussion

The case evidence presented in this chapter provides rich contextual account of some of the realities of ecological modernisation at the level of the organisation. In some instances, the evidence shows the strengths of the approach taken by Interface. Other examples highlight the challenges and shortcomings of their approach. One thing that is clear from this case is that Interface lies somewhere on the spectrum of EM between the “weak” form described by Huber (1985) and the “strong” form proposed by Christoff (1996) and Mol and Sonnenfeld (2000). The question becomes: where on this spectrum does the company lie? The following sections present the evidence in the form of a debate, weighing the various pieces of data in support of competing explanatory theories. Following this, the chapter discusses EM and Interface; considering in particular the social dimensions of EM and their interaction with the company and the wider macro-economic system in which it exists.

5.4.1 Interface as a “Strong” Ecological Moderniser

This section presents the argument that Interface meets the description of a “strong” ecological moderniser, whose actions align with the principles of EM as proposed by Mol and Sonnenfeld (2000), Christoff (1996) and others. Interface is a publicly-listed company that has been governed for 20 years by comprehensive and well-articulated sustainability goals, with commitment from top management and the board, buy-in from shareholders, and with some promising progress to date (see Section 4.3.15). From the outset, the company’s sustainability programme Mission Zero has sought not
only to eliminate the company’s direct impact, but to extend beyond its own operations and to address system-level barriers to sustainability, enshrined in the company’s strategy as the sixth and seventh goals of their sustainability programme (“sensitise stakeholders” and “redesign commerce”, Table 4-2). This aligns with the theoretical principles of EM suggested by Mol and Sonnenfeld (2000), who argue that EM is about transforming of core social institutions of modernity (science and technology, production and consumption, politics and governance, and the market). The goal to redesign commerce seeks to do this, stated as “Redesigning commerce to focus on the delivery of service and value instead of material. Encouraging external organisations to create policies and market incentives” (see Table 4-2). The company was shown to be a leader and influencer of others in the same industry, and even the company’s competitors have acknowledged the strength of the company’s influence on the wider sector Larson (2007). This positions Interface as a “carrier of reform” (Mol and Sonnenfeld, 2000). Interface’s commitment to societal transformation is further supported by the existence of Interface’s radical innovation projects, such as Net-Works, its involvement at the political level such as Anderson’s role as Chair of the President’s Council on Sustainable Development, and by its adoption of concepts such as cradle-to-cradle (McDonough and Braungart, 2002) and circular economy (Andersen, 2007) into its strategy. Note that, while some of these activities may have had other motivations for being pursued, this does not preclude them from forming part of the EM behaviour.

The classification of Interface as undertaking “strong” ecological modernisation is supported by the literature focusing on Interface. It was suggested by Stubbs and Cocklin (2008), who discussed Interface in their analysis of how EM organisations undertake sustainability. They contrast their conceptualisation of EM from both neo-classical and deep ecology worldviews, suggesting a centre position which was equivalent to “strong” EM. While these authors focused primarily on the Australian operations of the company, their findings were consistent with observations made during this research of the company’s strategic and operational approaches to sustainability in Europe.
5.4.2 Interface as a “Weak” Ecological Moderniser

Huber (1985) presented EM as a process of environmental reform driven by economically-viable technological innovation, a form now referred to by some EM scholars as “weak” EM (Mol and Sonnenfeld, 2000). It is certainly true that Interface has undertaken substantial amounts of incremental technological innovation which could be termed “eco-innovation” in pursuit of its Mission Zero goals, and the vast majority of the “$480M in cumulative savings” has been accrued through such eco-efficiency measures. These savings are significant, and one could argue that they may have been pursued even without the environmental driving force of Mission Zero, simply through the application of lean manufacturing principles and quality control. In a counterfactual alternative scenario where the Mission Zero campaign had not been created, the highly effective QUEST scheme may still have been introduced to address waste in the same way that it does today, as a purely money-saving activity. This weakens the argument that the environmental angle of Mission Zero is important to its success, or that the motivation of its actions are anything other than common sense for a modern manufacturing firm.

Aside from Net-Works, Interface has had relatively little success in its attempts at radical innovation stretching beyond mere “eco-innovation” (see Chapter 7 for a discussion of these). The company’s approach to achieving its Mission Zero goals was characterised by a large number of incremental changes and small-scale improvements, such as improving thermal efficiency of piping, or replacing a specific carpet-making process with a less wasteful version. However, in response to these arguments, Interface also went much further than picking the economically attractive “low hanging fruit” with its eco-efficiency projects, demonstrated by its decision to invest in a third-party start up company to provide the Netherlands factory with biogas. This was not directly driven by pursuit of economic goals, since it was complex, time consuming and cost-neutral.

In some cases the company was shown to be “blind to issues of social justice”, particularly in relation to its employees (Gouldson and Murphy, 1997). The company lacked proper career development for employees; it had lower-than-average employee engagement scores (measured by Gallup; see Section 4.3.6), and numerous tensions existed between the managers and the shop floor staff at both of the UK sites, which was
Further exacerbated in 2012 by consolidation of one of the manufacturing sites resulting in 115 redundancies. The Craigavon site staff experienced some degree of neglect from the company. The staff at that site did not have a dedicated member of human resources for 13 years, despite repeated requests for such a resource to support more than 180 members of staff (including 55 temporary agency workers on zero-hours contracts) [I_CAV_1]. Highly unequal gender balances, high union membership among the shop floor staff, and a lack of transparency in communication from the company to its employees were confounding problems at the site [I_CAV_1]. Somewhat countering this, though, the company did make improvements at the Craigavon site during 2015, and many of these concerns were addressed through a series of interventions and engagement activities, including the creation of a regular worker’s forum where all employees could voice concerns and openly discuss working arrangements [I_CAV_2]. Further discussion of employee engagement can be found in Chapter 6.

5.4.3 Interface as Practicing Enlightened Self-Interest

Another possible framing of the evidence in this chapter is to consider Interface’s actions as enlightened-self interest (Lantos, 2001; see also Section 2.7); governed by the same principles as the neo-classical perspective, but with the knowledge and capability to earn extra returns for shareholders through careful investment in “net-profitable” environmental activities. In the undertaking of sustainability activities, Interface reaped benefits such as improved reputation, customer loyalty and employee commitment, and so the motivation for these acts need not have been environmental – the actions already justified themselves otherwise. Interface had even demonstrated that action on radical environmental activities such as Net-Works could produce a positive return on investment, suggesting that even this project could have been undertaken purely in the pursuit of competitive advantage. However, Anderson rebuked this perspective. Expressing his own position in a keynote at a 2005 development conference, the company founder reframed company profits as a means to achieve other goals rather than an end in itself:

“For those who think business exists to make a profit, I suggest they think again. Business makes a profit to exist. Surely it must exist for some higher, nobler purpose than that.”

(Anderson, 2005)
Though perhaps overstated somewhat to suit the audience, Anderson’s view with this statement is more reflective of a social entrepreneur or the owner of a non-profit than of a neo-classical economist (Dees, 1998; Handy, 2002). The idea that a company can have a purpose other than to make a profit is similar to the concept of the for-benefit enterprise, discussed in Section 2.9. However, despite his oratory, Anderson’s company remains a publicly listed one, with shareholders to which it must be accountable. This was discussed with Interface’s director of restorative enterprise [I_DRE_1]. This individual noted that the company is still subject to the features of a neo-classical economic system:

“...if the investors could show that we were making decisions that were contrary to maximising their investment dollars, they could sue us.”

[I_DRE_1]

The idea of Interface becoming a for-benefit organisation (following the model of companies such as Ben & Jerry’s) was also discussed during this interview. The director explained that Interface is attempting to do something different from the for-benefit movement. Rather than asking shareholders to accept lower profits, the director pointed out that the advantage of remaining as a publicly listed company, governed by neo-classical economic principles, was that it sent a more powerful message when the company succeeded. The sentiment, echoed often by Anderson in his speeches, was along the lines of: “if a publicly listed carpet company can make sustainability pay for itself, anyone can”.

“I think that the original assumption has been that we want to be set up like any other company. That it can be done in a sort of Wall Street-focused, traditional, for-profit public company format.”

[I_DRE_1]

It can be difficult to escape the attribution of environmental activities to enlightened self-interest, since even purely philanthropic acts may be considered cynically as a tool to manage reputation. A similar line may be taken to argue that there can be no truly selfless act, since the act will inevitably benefit the giver in some way, even if it is only in
reputational gains. However, to label all environmental activity as enlightened self-interest is reductive. Organisations which manage to profit from their environmental activity must be celebrated within the EM view, since ultimately they have managed to “reform” a powerful motivation – profit – towards achieving the goal of sustainability. In fact, the above quote shows that members of the company are aware of the challenge of making sustainability work in a neo-classical environment, and so choose to avoid routes such as becoming a for-benefit enterprise in favour of demonstrating a new, viable business model. This system-influencing behaviour is consistent with the company’s goal to “redesign commerce”, and also aligns well with the principles of EM. However, the arguments here seem mainly to further support the conclusion that Interface is performing “strong” EM, or at least “mixed” EM; with good performance in efficiency and innovation balanced by weaker social aspects (discussed below).

5.4.4 Interface as a Mixture of “Strong” and “Weak” Ecological Modernisation

The ideas discussed in the above sections suggest many elements of the “strong” form of ecological modernisation at Interface (Christoff, 1996), in which transformations that address environmental and social concerns are aligned with the company’s economic goals. At the same time, there were aspects of the case which indicated that Interface still operated in accordance with a neo-classical worldview, and that it performed poorly on the social dimension of sustainability in relation to its employees.

Interface seemed to be a case where neither the “weak” nor the “strong” EM labels are sufficient to describe the reality. A distinct possibility is that the company is exhibiting features of both types; and therefore it falls somewhere in between the two. Adams et al. (2012), in their review of the sustainability-oriented innovation literature and cases, placed Interface in a “middle ground” position. They classified Interface as undergoing organisational transformation. This term refers to a transitional phase between the operational optimisers, for which innovation is entirely focused on eco-efficiency; and radical systems builders, which seek to become increasingly sustainable rather than less unsustainable. Organisational transformers are characterised by “a fundamental shift in mindset and purpose from ‘doing less harm’ to creating shared value and delivering wider benefits for society: ‘doing good by doing new things’” (pg 11, Adams et al., 2015). Based
on the balance of the evidence presented and discussed, it appears that the most credible argument is that Interface is undertaking a mixture of weak and strong EM. The company is closer to strong than weak EM, exhibiting substantial efficiency, innovation and influencing behaviours, but is held back by its poor performance on the social dimensions of EM. Arguably, if the company does not address the challenges relating to the social dimensions of EM, it could be significantly limiting for the company’s status as a leader and pioneer – for a number of reasons. These reasons include possible effects on turnover, retention, attracting talent and employee engagement within the organisation. Findings about the importance of tending to social concerns are consistent with other theories within management theory and corporate social responsibility, such as the balanced scorecard (Kaplan and Norton, 1996) and the triple bottom line (Elkington, 1997). Employee engagement at Interface and its intersection with EM is explored in more detail in Chapter 0.

5.5 Chapter Summary

This chapter discussed the extent to which Interface could be called a “strong” or “weak” ecological moderniser, and found that the company exhibited actions associated with both types, being best described as a mixture with both strong and weak aspects exhibited. Interface’s activities as an ecological moderniser were discussed. The company was revealed to have strengths in efficiency and innovation, but weaknesses on the social dimension when it came to engagement and support of its employees and the interaction with the environmental mission. Examining the company’s EM strategy and governance gave rise to several interesting discoveries relating to the implementation of EM at the organisational level:

- By adopting an aggressive environmental strategy, the company claims to have benefitted internally from improved innovation activity, increased employee engagement and direct financial savings, together forming a “business case” for sustainability at the company;
- In creating a complex, comprehensive sustainability programme, the company failed to communicate clearly to stakeholders about its progress and efforts, undermining its environmental competitive advantage when compared with “simpler” claims from competitors;
• By considering itself to be so far ahead of the industry in sustainability, Interface rejected reporting frameworks such as the GRI 4.0, describing it as costly, incomprehensible “spin”;

• By transforming the flooring industry marketplace, Interface found itself surrounded by competitors who were adopting similar-sounding approaches to sustainability and reaping the benefits. This undermined the market differentiating impact of Interface’s sustainability activities, but had a positive effect on the environmental impact of the industry as a whole by forcing competitors to become more “green”;

• By systematically attending conferences and events, discussing sustainability at public engagement activities, and carefully managing its reputation, the company maintained its recognition as a leader while also creating innovation and collaboration opportunities;

• By imposing a “non-toxic” protocol on its chemical suppliers, the company catalysed changes to the practices of suppliers. Improvements in the sustainability aspects of suppliers accrued up the supply chain, benefitting Interface, too;

• It became increasingly difficult to make progress towards sustainable goals, affecting the rate of return on investment as well as affecting reports on progress. A plateauing effect in progress towards Mission Zero was observed between 2007-2012 (Figure 4-1), as the “low hanging fruit” activities had been exploited. This hinted at a temporal dimension of EM – discussed further in Chapter 8.
6 Theme 2: Employee Engagement and Ecological Modernisation at Interface

6.1 Introduction

This chapter centres on the theme of employee engagement with sustainability, and considers the research question R2: What are the interactions between employee engagement and sustainability in the context of an ecologically-modernising organisation? In the analysis of Interface, employee engagement is a vital idea to explore. Interface is active in celebrating its employee’s engagement with sustainability, and the company claims that the sustainability programme Mission Zero itself is a driver of engagement (see quote from Senior Vice President of Sustainability, Section 5.3.6). As discussed in the review of the literature, engagement is a recognised contributing factor to organisational performance (Saks, 2006), and is particularly important in driving internal innovation activity and tolerating the associated changes (Bansal, 2003; Savitz, 2013). Engagement also clearly aligns with the need to embed behaviour change, which is critical to improving sustainability, through encouraging more efficient use of energy and materials, by promoting the adoption of sustainable alternatives to intensive products and services, and creating a culture of positive sustainability awareness among workers. In most cases, such behaviour requires discretionary effort which, in turn is suggested as a measure of employee engagement Frank et al. (2004).

At its core, EM is a social theory, involving reform in social institutions (government, companies, wider society) which then drive technical research, innovations and projects. Fundamentally, the sustainable reformation of our major societal institutions in EM is driven by social and political awareness of the need to act, and it must be supported by a suitable social and political context in order to take place (Gouldson and Murphy, 1997; Bailey et al., 2011). The social dimensions of EM also underpin innovation, by creating the supportive social and organisational environment for practices to be challenged, and for ideas to be shared, developed, tested and adopted. This chapter places particular emphasis on some of the most prominent social dimensions of EM – dynamics relating to employees. Employees (in a general sense) are
a very significant piece of the social fabric. Taking the UK as an example, according to the 2016 labour force survey (Office for National Statistics, 2016), the proportion of people aged 16 to 64 who are in work is approximately 74%. This represents an enormous potential cohort through which significant social change could be driven, given the correct conditions and incentives. If the claims are to be believed that Interface’s employees are inspired by its environmental mission, then this is evidence of powerful intangible benefits of Mission Zero. It strengthens the case for other companies and organisations to adopt similarly aggressive environmental policies. Indeed, a study by consultants Lavery and Pennell (2014) suggested that if all of the European manufacturing sector adopted similar environmental approaches to Interface, there could be an increase in average profit for these firms of around 9%, as well as the creation of 168,000 new skilled jobs in energy efficiency and renewable energy (and a reduction in overall GHG emissions of 14.6% across Europe as a whole). Positive employee engagement with sustainability also suggests a further pathway for the “double dividend” of the Porter hypothesis (the notion that well-designed environmental measures can improve competitive advantage rather than reducing profit; Porter and Van der Linde, 1995). It is therefore vital to explore employee engagement at Interface in order to understand the extent to which employees are actually engaged with the environmental mission, and to learn lessons for creating workplace environments and cultures which favour sustainability.

This chapter examines Interface’s approach to employee engagement, and considers the interactions between engagement, EM, innovation and sustainability. In this analysis of engagement at Interface, a pattern-matching analytical approach is taken, resulting in several conceptual groupings of case materials. Several narratives are presented and discussed. First, the company’s QUEST scheme is described and analysed. Case findings are then presented, focusing on different levels and aspects of employee engagement with sustainability, ranging from the least engaged to the most engaged. The final section includes discussion and theory building relating back to the research question R2.
6.2 Data Collection

The primary sources of data for this chapter are summarised as follows:

- A series of fourteen semi-structured interviews conducted with members of staff at the Shelf site (See Table 3-1);
- Three semi-structured interviews with former employees of Interface (See Table 3-1);
- Discussions and observational data from operational, engineering, production management and strategic team meetings collected at the company’s three European sites;
- Documents collected for archival review and textual analysis;
- Transcripts of the company’s video series, I Am Mission Zero.

The I Am Mission Zero videos were between 5 and 20 minutes long, and showed a series of interview with employees at each of the company’s global manufacturing sites. The series had been organised by the company’s vice president of sustainability to showcase the company’s most engaged individuals. While these videos did not offer any insight into the disengaged or non-engaged employees, it was considered useful supplementary data to provide corroboration and triangulation when discussing the “engaged” employees. Data from these various locations, perspectives and sources were collected over the duration of the research project. The selection of fourteen interviewees at the Shelf site for this piece of research was done using a semi-randomised process. A staff list was obtained from the human resources team, and this was then sorted into three broad groups:

- Shop floor workers;
- Technical staff and production management;
- Administrative, sales and marketing staff.

These three groups were selected based on the researcher’s understanding of the site operations, in order to get a balance of different roles and working environments. At Shelf, these three groups were spatially separated, with shop floor workers on the
factory floor, technical staff and production management in the adjoining offices, and administrative, sales and marketing staff based in an office block at the other side of the Shelf site. From these three groups, five interviewees were selected at random using a spreadsheet with a random number generator. Interviewees were contacted via email (copying to their line manager) which included:

- A brief explanation of the purpose of the interview;
- The fact that they had been selected at random;
- Reassurance that this would be kept confidential and would not be shown to anyone else;
- Their right to decline at any time without explanation;
- The expectations of anonymity and privacy during the interview;
- The maximum duration (30 minutes).

Of the 15 interviewees that were approached, all 15 agreed to participate, although 1 was sick on the appointed day and this individual decided not to rearrange. A page of questions and prompts was brought in to each interview which was used to guide the questioning and keep the conversation on track. The interview data collected and analysed for this chapter included a range of different responses and attitudes towards the company, sustainability and Mission Zero. A simple analytical framework was used to examine the data. Using as a guide the DEFRA (2007) framework showing segregated environmental attitudes, the interview data were sorted for analysis into three broad groups depending on their exhibited attitudes: Engaged, Disengaged, and Other. “Engaged” employees were those clearly identifiable as “positive greens” or “concerned consumers” DEFRA (2007). Disengaged interviewees were those identifiable as “stalled starters” or “honestly disengaged”. The “other” category included those interviewees who were not clearly identifiable as either engaged or disengaged. The sorted groups were then analysed separately to explore the various aspects of engagement at Interface.

As an aside, the positioning of the researcher within the case organisation afforded an exceptional level of access to the material used to build the case. Rather than attending the organisation as an outside researcher and undertaking a series of interviews or
focus groups and then returning to a university, this research benefited from the ability to arrange interviews ad-hoc. The EngD model provided the opportunity to attend internal events and to observe meetings as they arose naturally, to revisit discussions and clarify points with individuals, and to build relationships and legitimacy within the company. This last aspect was considered to be critical in minimising the observer effect (Sykes, 1978), as it enabled trust to be built between the interviewer and the interviewee. It is considered that the presentation of the research to other employees as a member of the UK engineering team, as well as the participatory approach taken during observation, helped greatly in enabling honest exchanges during interviews and observations. The researcher was treated as a legitimate colleague, team member and employee.

6.3 The Case: Engagement of Employees with Mission Zero

6.3.1 Overview

Mission Zero was pervasive within Interface, appearing in many different forms. Every single Interface employee encountered during this research had heard of Mission Zero, and further, every employee was at least aware that it was some kind of an environmental programme. During interviews, several different perspectives on Mission Zero emerged. While nearly every employee seemed to be aware of Mission Zero in a broad sense, there were different interpretations of what Mission Zero actually was. There was also variability in employee’s level of engagement with Mission Zero. The following sections present positive and negative examples of such engagement found in the case.

6.3.2 Quality Using Employee’s Suggestions and Teamwork (QUEST)

For shop floor employees, the most direct way that they interacted with the Mission Zero goals was through Quality Using Employee’s Suggestions and Teamwork (QUEST). This was a financially-incentivised waste, water and energy saving effort. Employees were encouraged to look for opportunities to reduce waste in an ad-hoc manner, and to record their progress regularly. Materials, energy and water were carefully monitored by operators in order to minimise waste where possible through proactive management and behaviour change. This included actions such as:
• Turning off machines when not in use;
• Keeping external doors closed;
• Fully using up the end of a roll of material before starting a new one;
• Cutting lengths of materials like fibreglass and nylon yarn as accurately as possible;
• Recycling cardboard and repurposing damaged or scrap cardboard for other shop-floor uses (such as using damaged or broken cardboard boxes for cleaning up);
• Segregating process waste such as nylon yarn or carpet edge trimmings into various recycling streams.

QUEST was a way of sharing responsibility collectively among all operatives and aimed to encourage a collaborative atmosphere at each site rather than a competitive one. Production teams were set an annual reduction target of 10% compared with the previous year, and an equal bonus was paid to all employees each month in accordance with how well they were meeting this goal. Employees could earn a meaningful supplement to their income from the QUEST scheme, and many employees had come to rely on this as a steady source of additional income. QUEST was among the first initiatives to be put in place at the company following the launch of sustainability at the company in 1994, and has remained in place since that time. QUEST required frequent intervention from skilled technical teams, who provided guidance for operatives and helped to identify systematic sources of waste which may not have been obvious to operatives during day-to-day activities. Some examples of activities or savings resulting from these interactions included:

• Rearranging equipment and storage areas to minimise forklift truck driving distances;
• Optimising maintenance procedures to reduce machine down-time (apparently a major source of waste);
• Creation of a specialised measurement equipment to measure yarn material more accurately;
• Tweaking of the production machines to reduce the rate of wear on certain parts;
• Design of a special “scuffer” machine which roughened up the smooth surface of used cardboard cores to enable them to be reused rather than recycled.

All around the company’s production sites, there were posters and wall displays charting the company’s progress towards its sustainability goals. In the lobby of the Craigavon manufacturing site, a large framed wall display held a kind of “carpet mosaic” composed of custom-printed carpet tiles with text on them describing a snapshot of the company’s waste saving statistics and other environmental achievements. Across the company, waste and energy usage statistics were tracked throughout the year, and weekly graphs were printed for employees to monitor progress. In the lobby of the Scherpenzeel site, a large digital display gave live readouts of the number of kilowatt hours (kWh) which had been generated from solar panels on that site. Global communications were made regularly from the head offices. Update emails from the CEO were circulated on a monthly basis, which covered a range of topics about the company’s performance and strategic goals, and typically mentioned progress towards Mission Zero, highlighting stories of success or reaffirming the importance of Mission Zero to the company.

QUEST was enormously successful for Interface. According to founder and CEO Anderson, the QUEST scheme represented the base of “Mt. Sustainability”, providing a steady baseline of energy savings and waste reduction each year which could be translated directly to the company’s bottom-line. It has been the driver of the claimed “$480M in cumulative savings” which the company cites frequently in promotion of its sustainability accomplishments. The success of the QUEST scheme provided Anderson with compelling evidence that focusing on waste and energy savings could translate into a direct financial reward (Anderson, 1998).

6.3.3 Effectiveness of Performance-linked bonus QUEST at Craigavon Site

During 2015, a serendipitous “natural experiment” arose in relation to QUEST and engagement which appeared to demonstrate the importance of linking the financial payments of the QUEST scheme to the real behavioural performance of the workers. At the Craigavon production site, staff changes meant that the QUEST bonus calculation system was left temporarily unmonitored. The bonus was paid out at 100% rate,
regardless of the worker's performance. It remained this way for approximately 24 months, with the QUEST bonus being paid in full each month regardless of waste saving performance. During this time, the site's waste performance indicators worsened significantly. In 2015, Interface re-implemented the performance-linked payment mechanism which meant that the bonus was once more based on the amount of waste and energy saved during each period. The first bonus payment after re-implementation of performance-linked payment was the lowest ever paid out. This result acted as a measure of the “drift” in performance during the time in which the bonus had been set at 100%. Once the calculation system was re-implemented, the shop floor staff responded strongly, and the subsequent bonus payment after re-implementation was paid in full; indeed, the staff exceeded the target by a significant margin. This “natural experiment” suggests that the discretionary effort exerted by the employees to achieve their QUEST goals was dependent upon the presence of the financial incentive. In a similar vein, it seems that the Mission Zero and QUEST schemes did not particularly “inspire” colleagues to change their behaviour alone – the financial payments were necessary to motivate the behaviour. A conclusion that can be drawn from this case is that the QUEST scheme and associated financial incentive was effective for this particular group, but that if the monetary payment is not linked to performance, the incentive to achieve good levels of performance is lost. Thus, while QUEST underpins many employees' understanding of Mission Zero, QUEST did not appear to be sufficiently inspiring to motivate behaviour changes. An alternative interpretation is that employees were affected by the lack of recognition, reporting and progress tracking associated with the QUEST scheme, all of which were absent during the 24-month period. However, this still supports the conclusion that Mission Zero and QUEST were not, on their own, sufficient to inspire discretionary behaviour.

6.3.4 Discussion of QUEST and Findings from Other Studies

In terms of engagement, QUEST may be viewed in two ways. On the one hand, it is something which all of the shop floor staff recognise and are involved with, making it a highly visible sustainability activity and a potentially inspiring driver for greater employee engagement. On the other hand, QUEST does not require engagement to succeed. The presence of a financial incentive means there are other reasons for focusing on waste and energy savings, and there is no need for awareness of Mission
Zero or the wider relevance of the QUEST activities in their contribution to goals 1 and 3.

In a previous study of Interface and its employee's contributions to sustainability, Rosenberg (2009) described the role that employee participation played in the achievement of Interface’s sustainability goals. Rosenberg explained that some of the day-to-day reductions in waste and energy consumption on the factory floor emerged from systematic systems of suggestions, teamwork and cooperative problem solving by the entire work force (it is considered that Rosenberg is describing the QUEST scheme here, although this term is not explicitly mentioned in the work). Rosenberg (2009) attributed the success of Interface’s environmental performance to the power of employee-led initiatives. In an earlier study, Dubose (2000) also describes Interface’s QUEST reward scheme. They note the high level of effectiveness of the QUEST scheme at Interface, and note that “a well-designed incentive program can motivate employees to implement sustainability practices”. Dubose also notes the role of leadership, use of consultants and employee training, each of which contributed to the company's successful results. The success of the company’s environmental performance clearly relied on other factors beyond QUEST, such as Anderson’s leadership, and the ability of the company to market its environmental efforts effectively to a receptive customer base (Hensler, 2014). Supporting this, Nord and Fuller (2009) explored questions of corporate social responsibility and change, using Interface and CEO Ray Anderson as an illustrative case for director-led environmental reform. The authors suggested that the approach which Interface had taken in order to develop their organisational change and CSR programme has been driven from a top-down perspective; that Interface’s strategic management of corporate sustainability is led from the top of the company ladder rather than activities emerging from bottom-up activity. Each of these studies diverged in their descriptions of the primary drivers of environmental performance at the company (Dubose, 2000; Nord and Fuller, 2009; Rosenberg, 2009). This perhaps demonstrates the challenge of establishing clear drivers of environmental performance in large organisations such as Interface. The current work builds upon these author’s contributions by exploring multiple aspects – employees, governance and innovation – and their interactions within the organisation.
6.3.5 **Disengaged Employees: Barriers to Engagement with Mission Zero**

There were some employees who simply appeared disinterested or actively disengaged with *Mission Zero*. Employees cited a range of reasons for not feeling engaged or interested with the programme. Some were simply unaware of what *Mission Zero* was. Some were sceptical of the science behind global warming and climate change, which led them to regard the *Mission Zero* programme as a waste of time. Others had become less engaged over time as they had felt that their efforts were not being suitably rewarded. One individual felt that there should be a greater financial reward for suggestions or actions which led to substantial financial savings. Many simply felt that *Mission Zero* was not part of their role, or that it required extra work which they were not paid for, or they did not feel that they could make a meaningful contribution within their role. The attitudes of these individuals appeared to be consistent with the “honestly disengaged” and “stalled starters” environmental attitudes (DEFRA, 2007).

Despite this, members of the disengaged group from the shop floor were still ready to talk about QUEST, describing it as bonus scheme and articulating their contribution to it. One production team employee at the Shelf site (who had been with the company for more than 16 years) commented on their understanding of what *Mission Zero* was:

*Interviewee:* “Well it’s about cutting waste...to landfill.”

*Researcher:* “So, I mean, what do you think the overall goals of Mission Zero are?”

*Interviewee:* “Well it’s to eliminate all...well, negativity...it’s waste isn’t it? it’s to eliminate all waste...all waste, yeah”

[I_SH_01]

At first, this indicates a lack of distinction between *Mission Zero* and waste management (and with no awareness demonstrated regarding the other six goals in Table 4-2, for example). However, the interviewee went on to explain that they also considered energy conservation to be a natural part of the waste management process. They had an understanding of appropriate energy saving behaviours such as closing external doors (saving heat) and turning off equipment which was not in use. Thus, while they may not call it “*Mission Zero*”, this individual (and others like them) could be said to be unconsciously addressing goals 1 and 3 of *Mission Zero*, without necessarily needing to feel engaged or inspired – or even to understand it beyond the concept of reducing
waste. This example underlined the importance of embedding sustainability concepts (such as waste management) into standard operating practices, and creating incentive systems like QUEST to ensure that these activities are part of business-as-usual. Ideally, there should also be room for those who would like to contribute and be engaged with the programme to do so, such as enabling employees to share innovative waste-saving ideas.

6.3.6 Lack of Training

The topic of sustainability training was discussed with each interviewed employee. It was clear that no training in sustainability had been provided, other than the shop floor teams who were given the necessary understanding to participate in QUEST. It was surprising to learn that one individual had never received sustainability training during his 30 year career:

"Researcher: Have you received any training for sustainable...erm, for like recognising sustainable savings or energy savings, or anything like that?
Interviewee: No.
Researcher: I mean, have you been taught specifically how to...to save waste?
Interviewee: Well, I...er [pause] I can't remember seeing anything on that one...erm, you come it to the factory, you learn your job, and other than showing you your job, and showing you the way that they do it... [trails off]"

[I_SH_02]

The lack of training among employees was an unexpected finding, given the company's reputation for sustainability, waste saving measures and so on. After following up on this point in discussion with a manager, it was revealed that there was a “FastForward to 2020” scheme available on a voluntary basis, which provided employees with sustainability training and tools to support innovation. However, for a shop floor staff member to attend, this would have required significant effort, travel, and approval of the shift manager. To the knowledge of the shop floor interviewees, none of the shop floor staff at Shelf had ever taken up this offer.
6.3.7 Perceived Link with Cost Cutting Measures

Some individuals voiced concerns about the perceived link between efficiency savings and the potential for cost cutting measures such as reduction in headcount. Indeed, during the period 1996 – 2015, the total workforce headcount reduced from 7300 to approximately 3250, a reduction of 55%, while maintaining a stable revenue of approximately $1Bn per annum. This reduction in headcount is discussed in the company’s Form 10-K reports, and it is attributed to a range of factors including “restructuring” and selling off subsidiaries, but automation and efficient manufacturing techniques certainly have had an impact on headcount. As one interviewee commented:

“You used to have 15, 20 people working a [production] line in shifts, but now it’s just one bloke with a button”

[I_SH_13]

While the efforts of Mission Zero and QUEST were focused on reducing waste and energy usage, some among the shop floor teams may have been apprehensive about the company’s aggressive pursuit of efficiency. One interviewee raised the point that an easy way to reduce the company’s transportation costs would be to consolidate all European operations under one roof [I_SH_02]. Unfortunately, one year later, this actually happened to the Shelf facility – all production capacity was consolidated to the facility in the Netherlands. While the motivation of this activity was financial rather than for Mission Zero, it is worth noting that the elimination of the Shelf production operations contributed to a very large step towards reducing the company’s energy demand in its European operations compared with a 1996 baseline. It is possible that one factor in the decision to close the Shelf production facility was this contribution towards the company’s Mission Zero goals, with which the company had been struggling to make progress for several years (indeed, the trend from 2008-2011 in European operations was of slightly increasing overall GHG emissions per unit of production). Figure 4-1 shows a dramatic drop in the company’s consolidated GHG emissions between year-end figures for 2012 and 2013, coinciding with the closure of this facility. This highlighted another potentially negative impact of the Mission Zero programme, which contributed to concern and disengagement with the programme at the company’s other sites.
6.3.8 **Inactive Recycling Machines**

Further causes for disengagement were discussed by other interviewees. The Shelf site had a “cool green” carpet recycling machine which formed a vital part of the company’s material recovery and recycling process. However, the machine had a number of technical problems which prevented it from running for more than 30 minutes continuously without overheating. As a result, it had been turned off for over a year. The presence of this machine on the shop floor was picked on by one interviewee:

> “They go on about “closing the loop” for, you know, making things go round and round again, a lot of it’s not realistic, you know, they just say these things because it sounds good, it’s a good idea, it’s a good plan...but they’ve got a [Cool Green] machine down there, and it’ll never run in a million years. It’ll run for a certain period of time, but it won’t for long...it’s not designed to do what it’s got to do.”

[I_SH_08]

6.3.9 **Lack of Incentives**

Another individual also discussed the lack of incentives to participate. In the past, they had made an effort to participate in a “green team” (a volunteer site meeting in which participants discuss ideas to save money, waste and energy). However, interest among them and their colleagues had faded once it became clear that there was no opportunity to share in the savings generated by their ideas. This was also echoed by other employees:

> “we used to have a business improvement team meeting, and we all sat round a table, and we all came up with ideas, and a lot of these ideas have saved the company...£100,000 pounds annually, and nobody has had any reward, and then people get demoralised and say “no, I’m not attending”, because we feel that somewhere along that line, somebody were being rewarded for all of them ideas that we were putting forward. Like, at some companies they’ll have a suggestion box, put a suggestion in, they look at it, if they think it’s, er, a good one then they’ll implement it, and give you a payment as an incentive.”

[I_SH_02]
“It’s great to save energy for the company, and we all like to do our bit, but it would be nice to save energy and find that you got something out of it as well, you know, the company is saving thousands and thousands of pounds, and they can’t give us pay rises, can’t give us bonuses and all the rest of it...it’s a bit bad”

[I_SH_11]

It is unclear where this “dividend” concept may have originated. It has never been a policy at Interface. It is possible that the interviewees were “lobbying” the researcher here in the hope of receiving additional benefits; which would be evidence that an interviewer effect has biased the discussion in this case (Gilbert, 2001).

It became clear during the consideration of disengaged employees that, while Interface performs very well on environmental measures, its performance in the social dimension in relation to its employees was quite poor. This study focused on Shelf, but similar concerns about the Craigavon workforce was also expressed [I_CAV_2]. Training was lacking, HR resources were minimal, there was no career development path, and there was tension between the highly unionised shop floor employees and other staff. This raised the question of whether paying more attention to employee morale and development could pay dividends in other areas, such as sustainability.

6.3.10 Engaged Employees: Characteristics of Engaged Employees

Engaged employees at Interface were characterised by a strong understanding of the company’s Mission Zero goals; an understanding of what the purpose of Mission Zero was for the company, an appreciation for what their own role in Mission Zero was, and a general interest in contributing to it. In response to being asked whether they cared about sustainability, one engaged interviewee commented “I’ve got a family” [I_SH_03], explaining that they understood the need to address climate change in the interest of protecting the rights of future generations – in this case, members of their own family. Other engaged employees had a strategic understanding of Mission Zero; they appeared to be strongly engaged with the goals and had made efforts to learn about Anderson’s vision in various ways such as reading his books (Anderson, 1998; Anderson, 2009). According to Bansal (2003), the clear advantage of having “engaged” employees from Interface’s perspective is that they would likely be more willing to contribute
discretionary effort, more likely to produce ideas and innovations, and more likely to take actions which contribute the organisational goals.

6.3.11 Inspiring Action at Home

Analysing Interface’s video series “I Am Mission Zero”, several engaged employees are shown commenting that Mission Zero had influenced how they managed their waste at home through activities such as recycling and turning off lights. For a few individuals, Mission Zero was a source of inspiration to undertake more involved recycling and waste reducing projects at their homes or in their communities. One individual had taken home several items of scrap (a decommissioned storage tank and a metal door) in order to build a system to harvest his own rainwater. Another individual took the principles of low energy lighting that he had seen installed at his factory, and replicated the system at his home, a bungalow which he was building himself. Yet another had collected used oil cans from the workplace which he cut using a jig-saw to fashion them into feed dispensers for chickens which he kept privately. There were numerous examples of this kind of behaviour. Many employees demonstrated clear passion, pride and ownership over their “patch” of the factory or production process. One operative, who was responsible for collecting and sorting waste material at one of the factories, commented:

“If you look out at the yard, I think, this is Mission Zero...where it actually happens. All the material that comes out of the factory, it’s my job to keep it clean...to put it into the correct bins”.

[I_SH_13]

These examples clearly showed the potential power of the company’s mission to inspire action at work and at home. Other “engaged” employees agreed that they cared about environmental action, but that they had not been influenced by the company – they were already interested in environmental projects before joining the company. Several of these “engaged” individuals mentioned Ray Anderson, noting that they had felt inspired by him and had read Anderson’s books.
6.3.12 **Voluntary Contributions and Personal Development**

At the Craigavon manufacturing site, two individuals from among the shop floor team volunteered to join in regular meetings of a similar “Mission Zero” team”. Commenting about these individuals, their supervisor (who also ran the green team meetings) said that they appeared to be sincerely engaged with the environmental mission, and had joined the team on their own accord in order to contribute their ideas as well as to understand the challenges of sustainability and learn to about how they could support the implementation of lean manufacturing and QUEST activities at the site [I_CAV_2]. This highlighted the potential mutual benefit from these individuals’ involvement in the Mission Zero team: the individuals benefit from an opportunity for personal development, and the company benefits from their commitment, ideas and advocacy for Mission Zero in their roles on the factory floor.

6.3.13 **Mission Zero in the DNA**

Several employees noted that they felt Mission Zero was “bred into them” or “in their DNA”; suggesting that they had learned enough about concepts like waste saving and energy efficiency that they think about and do them naturally, without the need for prompting or other incentives. An excellent demonstration of this was observed following the closure of the Shelf site in 2012. Three individuals, from the Shelf production team, all of whom worked together, had left Interface at the time of the closure and had each now joined the same company, an abrasive surfaces manufacturer in a nearby town. The three were known to be highly engaged with Mission Zero during their time at Interface. 18 months later, the opportunity was taken to conduct a telephone interview with each of these individuals, to establish the extent to which they still felt that Mission Zero was influencing their activities at their new employer. The interviews revealed that this was indeed the case, and furthermore, that their expertise and knowledge of the principles of Mission Zero had influenced their decision-making at the new company:

“I mean I am not consciously doing it, but I am sure it is ingrained in there in the decisions I make. I’ve got that in mind as well so, for instance, I’ve eh, buying a new boiler or a new piece of equipment, at the moment it’s just economic justification I look at, but I
know we should be looking at environmental impact and justification as well, so it gets done, even though its unnecessary to do it... But yes I do still use the principals”

A second interviewee described their first impression of the new company’s manufacturing plant and compared it with a past-recalled version of Interface. Their experience of the improvements at Interface enabled them to visualise potential improvements at the new workplace, so that they could plan to bring this factory “up to a level of where Interface were”:

“I came to see it to have a look round...they’re very, very much like Interface was 30 years ago... the way, the working practises, the, the way they operate, the way they manage... eh, ... so I, I saw a great opportunity to, to bring the company up to a level of where I would say Interface were. You know and, and I found the challenge of looking at what we’ve got here and where we could be.”

They described the planned installation of a new “closed loop” discharge system based on principles and ideas imported from their time at Interface:

“Like I say, going back 20-odd years of Interface, obviously the lessons we learnt we’re starting to...import things into here, like...variable speed compressors to save energy. The projects I’m looking at are very much looking at sustainability, environmental side, energy side. For example, I’m looking at a new spray booth...at the moment [we] discharge all our waste into a settlement tank and then that’s into, into the local sewers... it’s absolutely, the money that can be saved...so, I’m looking at a closed loop system where nothing, really... goes off site”

The interviewees discussed working together and going through the lessons that had been learned in their previous roles at Interface, and that by applying the principles that they had learned during the implementation of Mission Zero engineering projects, they were quickly saving their new employer thousands of pounds. Relating this example to the concept of EM and environmental reform, a version of environmental
transformation is clearly taking place. By transferring the knowledge and principles learned at Interface to another company, Interface’s former employees have arguably had a much greater impact on reducing environmental harms than if they had stayed at Interface. This raises interesting questions about the potential environmental and social impacts of knowledge transfer from ecological moderniser organisations such as Interface to other organisations which could benefit from Interface employee’s knowledge and experience of addressing environmental impacts. This could be pursued more formally through mechanisms such as secondments or apprenticeships.

6.3.14 Sensemaking and Change Agents

Another study which examined a small sub-set of Interface’s most-engaged employees was undertaken by van der Heijden et al. (2012). This well-grounded work presents longitudinal case evidence collected over a ten-year period from 2000-2010 at Interface’s Dutch facility in Scherpenzeel, Holland. The authors adopt a “sensemaking” conceptual framework to examine the role played by internal change agents in driving Mission Zero. Sensemaking is the process by which social interaction between people in an organisation shape the interpretations made by those individuals (Weick, 1995). The study examined the use of language, terminology and cognitive framing by interviewing a handful of Interface employees who were identified by the authors as change agents. These change agents were described as those individuals with the responsibility for managing and implementing an organisational change agenda – in this case, Interface’s Mission Zero goals. Interestingly, the study found that in the early years of the study, the subjects were enthusiastic and highly engaged period at the beginning of the study (from 2000-2004), which coincides with Interface’s launch of the rebranded Mission Zero sustainability programme. After 2004, the study identified a lull in the progress of the goals and in the mindsets of the subjects, which the authors characterise as descendant sensemaking. Van den Heijden et al. found that the process of embedding change within the change agents was a gradual and unpredictable process. The study also suggested that the initial stimuli received in 2000 resulted in a brief flurry of activity around sustainability, but that ultimately, effective effort and embedding only occurred once the studied individuals were able to make contextualised sense of the company’s wider sustainability context.
The findings of Van den Heijden seem to suggest that employees must be able to understand and articulate the company's values before they are able to make an effective contribution to them. Conversely, this would suggest that employees who do not understand the Mission Zero goals would not be effective in managing complex processes such as change management. For the rest of the workforce, a deep understanding of Mission Zero is not necessary for effective contributions to be made. Most of the shop floor employees interviewed for the current research had a relatively minimal understanding of Mission Zero, and yet the majority of the company's environmental gains and financial success was a result of the deployment of continuous improvement strategies and innovations carried out at the shop floor level.

6.4 Discussion

6.4.1 Engagement and Employees: Drivers of Environmental Performance at Interface

Interface is a company which claims to do well on employee engagement, particularly in relation to Mission Zero. However, while some positive effects were observed, there was little evidence found to directly support the claims by Interface (e.g. Section 5.3.6) of high levels of engagement throughout the Interface workforce, inspired by Mission Zero. Indeed, the data collected for this research suggested mixed levels of engagement among employees, and some cases of poor engagement, mistrust and lack of understanding. This is also corroborated by the results of the Gallup survey presented in Chapter 4, which found that the company's employees were slightly below average in terms of engagement compared with relevant peer organisations (see Section 4.3.6).

The subject of employees and their role within Interface has been discussed by several authors (Dubose, 2000; Nord and Fuller, 2009; Rosenberg, 2009; van der Heijden et al., 2012). The findings of this chapter were seen to be broadly in agreement other studies, which generally praise for the company's high engagement levels and its inherent synergy with Mission Zero. While there was no clear single driver of environmental performance at Interface, there were some factors in common among these studies, and through a combination of these, plus the current research, an overall picture of the social dimensions of EM and employee engagement at Interface can be developed. One
of the most important driving factors for Interface has been Anderson’s leadership. With the CEO firmly committed to a sustainable path, the company was fully mobilised to deliver this objective. Employees were inspired by Anderson’s leadership. This helped to stimulate action and create a culture of positive environmental activity which extended beyond the boundaries of the company to individuals’ private lives, as well as to other companies where former Interface employees now worked. Other contributing factors which drove positive interactions between the environmental mission and employees were the potential for personal development, a desire to contribute ideas, and the opportunity to be involved in the innovation process relating to Mission Zero. Hourly-paid employees showed willingness to volunteer their time in order to participate in extra-curricular environmental activities at Interface.

Hurdles to environmental performance were also highlighted. The limited sustainability training for most employees was potentially a barrier to greater participation and innovation for sustainability among employees, and many of the interviewed employees may have benefited from an improved understanding of sustainability (and their potential contribution to it). There also seemed to be a communications challenge associated with things like inactive recycling machines (and the message this sends), the need to manage expectations of direct incentives for ideas, and the concern that waste and energy-saving activities might be related to redundancies. It is possible that the company could address these concerns and improve engagement by proactively communicating with staff about these aspects. In a step towards this, at least one site (Craigavon) had implemented a worker’s forum within the past year, where these kinds of issues could be raised and discussed openly [I_CAV_2].

Analysing the QUEST scheme provided several notable findings. First, it was clear that the scheme was highly effective at reducing waste and energy use – the approach of leveraging a cooperative spirit and encouraging a sense of shared responsibility seemed to have had very strong results. On the other hand, the case of missed payments at Craigavon seemed to show the importance of properly incentivising this kind of activity by linking the performance with a scaling financial bonus – particularly where such activity requires workers to continuously undertake additional work compared with the minimum needed to produce the products. Finally, although there were some
exceptions, the QUEST scheme did not generally seem to require shop floor employees to engage with the ideas of Mission Zero or sustainability to be successful – a basic training in waste management was all that was needed.

6.4.2 Social Dimensions of EM at Interface

This chapter discussed several aspects which related to some of the social dimensions of EM, particularly employees, which are shown to be a critical factor affecting the delivery of EM within the organisation. Employees acted as both a carrier and as a barrier for Mission Zero, with various incentives such as QUEST able to deliver significant results through employees suggestions and continuous effort, while other activities (such as a lack of clear communication and a lack of formal training in sustainability) potentially undermined progress and seemed to turn attitudes against the company among some of the least engaged employees. The instance of knowledge transfer occurring where former employees moved to a new company and applied lessons learned at Interface uncovered a previously unconsidered pathway for the reforming influence that Interface has beyond the company boundaries through former employees. These findings complements the findings of the previous chapter, which noted dynamics relating to other social elements of EM such as the company’s relationship with its supply chain, customers and other companies in the same sector.

6.5 Chapter Summary

This chapter presented descriptive case narratives which explored the concept of employee engagement and its relation to sustainability at Interface. The data collection and analysis process was briefly summed up, and the QUEST scheme, which was a key way for employees to interact with Mission Zero, was described in particular detail. Case narratives described attributes and aspects of disengaged and engaged employees, finally drawing upon the literature to compare findings with other authors who have investigated Interface.

• Employees were shown to be a critically important part of the EM organisation, both as a carriers and as potential barriers to reform, and consequently they must be managed appropriately;
• It was found that, when the QUEST bonus payment was temporarily decoupled from performance, the QUEST performance drifted, showing the importance of tying the financial reward to the real performance for this particular group of workers;

• Despite claims of high engagement with Mission Zero, Interface was revealed to have some shortcomings in relation to its employees which again highlight the importance of careful management of employee engagement, potentially through effective communication and management of expectations to ensure employees are well-informed;

• Highly engaged employees were shown to have taken the concept of Mission Zero beyond the boundaries of the company, such as inspiring recycling activities at home, and through knowledge transfer which occurred when former employees joined another company and applied the principles of Mission Zero in their new work environment. This suggested a previously unconsidered pathway for EM reform beyond the boundaries of the company – through its employees.
7 Theme 3: Sustainability-Oriented Innovation at Interface

7.1 Introduction

This chapter explores the research theme of innovation with respect to sustainability through examination of the case of Interface, addressing the research question R3: *How is innovation with respect to sustainability managed in this context, and what are the enabling contextual factors for success?* Innovation is considered to be a motor of ecological modernisation, and while it is no longer typically considered to be the singular driving force for transformation (as it was in the past; Huber, 1985), it remains among the most important mechanisms to achieve it (Mol and Sonnenfeld, 2000). The research of this chapter contributes to the wider study of SOI in practice by defining sustainability-oriented innovation as the *production, assimilation or exploitation of a product, process, service, method, structure or social institution that is novel in its application, and which improves economic, environmental and social outcomes throughout the life cycle of the application, compared to relevant alternatives.* This definition is derived below. The chapter then presents an analysis of empirical evidence from Interface. It sheds light on how SOI is practised within Interface through a detailed descriptive case study discussing the company’s environmental programme, *Mission Zero*, and other relevant contextual information. The noteworthy innovation project *Net-Works* is introduced. By examining the contexts of successful SOI at Interface, and comparing this with previous unsuccessful SOI, this chapter identifies relevant factors for SOI success. This chapter extends a growing body of empirical studies focusing on this topic, which together will help to answer important questions around how sustainability-oriented innovation should be undertaken. It corroborates and enriches similar descriptive case study research by others in the field (e.g., Van Der Duin et al., 2007; Stubbs and Cocklin, 2008; Arnold and Hockerts, 2011).
7.2 Innovation and Sustainability

Innovation has always been critical for long-term business success. Throughout history, organisations which have innovated successfully have typically been rewarded with growth, profits and access to new markets (Bessant and Tidd, 2007). Those organisations which fail to innovate risk being disrupted and made obsolete in a process described famously as “the perennial gale of creative destruction” (Schumpeter, 1942). A further force acting upon the global business landscape is the requirement for society to develop sustainably. Broadly, this may be interpreted as the need for society to enable continued human flourishing without subjecting nature to increasing degradation, accumulation of man-made waste, or accumulation of materials from the earth’s crust such as heavy metals and fossilised CO₂ (Robèrt et al., 1997). In the context of the global marketplace, the need for greater sustainability is a topic which presents opportunities for innovators by rewarding a competitive edge to those adopting more sustainable practices (Konar and Cohen, 2001) and to those offering more sustainable products to their customers (Nicholls and Opal, 2005).

Innovation which produces improved sustainability may be described as “sustainability-oriented innovation” (SOI), a term first introduced by Hansen et al. (2009). In recent decades, an increasing number of descriptive and prescriptive works have been published which focus on these kinds of innovation processes (for systematic explorations of this literature, see Adams et al., 2012 and Schiederig et al., 2012). Sustainability-oriented innovation has gained recognition as a priority area for empirical studies (Bansal et al., 2012). Contemporary researchers seek to address the research-action gap that exists in this field, and to improve upon a rather sparse and highly variable literature (Adams et al., 2012; Bansal et al., 2012).

7.3 Sustainability-Oriented Innovation

7.3.1 Sustainability-Oriented Innovation in the Literature

Discussion of SOI is made more complex because it has been defined in several different specific ways (Carrillo-Hermosilla et al., 2010; Adams et al., 2012), as have other associated terms. In particular, the meaning of the related concept “eco-innovation” is
debated (Dyllick and Hockerts, 2002), with the question of the social dimension causing some disagreement (Rennings, 2000; Schiederig et al., 2012). ‘Intent’ is also an area of debate. Many authors discuss whether financially-driven improvements which happen to lead to social and environmental benefits as a by-product can be considered SOI (Kemp and Pearson, 2007; Bos-Brouwers, 2010; Carrillo-Hermosilla et al., 2010; Machiba, 2010). Innovation can be classed as incremental, such as a minor efficiency improvement, or radical, providing brand new features, dramatically increased performance or reduced cost (Leifer, 2000). Sometimes, radical innovations result in entirely new products or markets. These innovations may be classed as discontinuous or disruptive (Bessant and Tidd, 2007). The most radical forms of SOI lead to fundamental changes in both the business model and at the wider system level (Machiba, 2010; Adams et al., 2015).

Hansen et al. (2009) proposed that SOI was innovation with a “positive net effect on the overall capital stock” (pg. 1). The stocks referred to here by the authors are ecological, social and economic capitals – the Triple Bottom Line (Elkington, 1997). While this stands as a broad definition for SOI, it leaves much to be inferred, such as how the innovation process itself should be defined, or the time scale to be applied. A more detailed definition for SOI ought to satisfy a number of criteria. It should encompass new ideas which come from internal sources (production of ideas) and external sources (assimilation of ideas; Kemp and Pearson, 2007). It should also include old ideas which have found a new purpose (exploitation; March, 1991). It should describe a full range of innovation products, ranging from stepwise improvement on an existing design or process (incremental) to entirely new business models (radical and/or disruptive; Bessant and Tidd, 2007). It should concern any conceivable forms of innovation – products and services; processes and methods; or organisational structures and social institutions. Finally, to ensure sustainability, the definition of SOI should describe innovations which result in improved social, environmental and financial outcomes (Bos-Brouwers, 2010; Schiederig et al., 2012), or those which reduce negative impacts in these compared with other options.
7.3.2 Defining Sustainability-Oriented Innovation

To define SOI within the current work, this chapter modifies an existing definition for *eco-innovation* (Kemp and Pearson, 2007). Building on the Oslo Manual definition for innovation (Mortensen and Bloch, 2005), Kemp and Pearson define *eco-innovation* as being “the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives” (pg. 7). The authors expand upon Mortensen and Bloch by placing emphasis on assessment of the whole-life environmental impacts of the innovation, not just the short-term benefits. However, the social aspect is notably absent from Kemp and Pearson’s definition, though they include multiple references to the economic, social and environmental dimensions of sustainability in their discussion. Furthermore, some authors argue that focusing on eco-efficiency does not tackle the core problem of decoupling economic growth from environmental impact (Dyllick and Hockerts, 2002; Polimeni *et al.*, 2008; Jorgenson and Clark, 2012).

Rather than focusing solely on eco-efficiency, sustainability-oriented innovation must leave room for innovation which leads to system-level redesign and fundamental change in operating models, including changes in social structures. When considering sustainability outcomes, the importance of an explicit social dimension in such a definition should not be overlooked (Murphy, 2012). The need for greater social equity, social cohesion, participation and awareness of sustainability are vital to the lasting success of any environmental and economic benefits which could be produced by innovation. This is a key distinction between SOI and *eco-innovation*; a social dimension which embeds and complements the long-term environmental benefits of the most successful sustainability-oriented innovations (Ashford and Hall, 2011). Exceptional sustainability-oriented innovations can lead to disruptive, whole-system change. It is this system-level change which is required for human society to remain within sustainable boundaries (Machiba, 2010; Adams *et al.*, 2015).
The proposed definition for SOI broadens the scope beyond eco-innovation to include an explicit social dimension, complementing the economic and environmental dimensions as part of the three pillars of sustainability. Here then, SOI is defined as the production, assimilation or exploitation of a product, process, service, method, structure or social institution that is novel in its application, and which improves economic, environmental and social outcomes throughout the life cycle of the application, compared to relevant alternatives. Note here, as with Kemp and Pearson’s (2007) definition, that it is the result of the innovation, not the intent, which defines it as sustainable innovation. The proposed definition for SOI is duly compatible with the generic dimensions of the “cubic” framework for evaluation of SOI, first proposed by Hansen et al. (2009).

7.3.3 Contexts of SOI

A critical factor in the management of sustainability-oriented innovation is the innovative context, and how this affects the approach to innovation. In broad terms, a firm’s innovative context is the sum effect of various influencing factors at the firm-level and beyond. These include the organisation’s philosophical mindset and behaviour towards innovation, its capabilities, the regulatory environment of the countries in which it operates, or the receptiveness of its customers to products with environmental and social aspects (Adams et al., 2012; 2015). The innovative context has a significant influence over how radical an innovation is likely to be. Adams et al. describe three broad firm-level contexts with increasingly systemic, socio-technical, sustainable and integrated attributes: operational optimisation (level 1 SOI), organisational transformation (level 2 SOI) and systems building (level 3 SOI). The concept of these three innovative contexts by Adams et al. finds alignment with the work of other authors (Roome, 1992; Shrivastava and Hart, 1995; Tukker and Tischner, 2006; Machiba, 2010).

At the operational domain level, a firm undertakes level 1 SOI, characterised by incremental improvements towards sustainability such as process energy-efficiency or redesigned products with improved resource efficiency. Most organisations which undertake eco-efficiency-type innovation can be characterised as “level 1 organisations” (Adams et al., 2012). Level 2 SOI focuses on organisation-level sustainability at a broader scope than products and services (Adams et al., 2012). This can range from
standalone innovation activities at a department or division level, to firm-level and stakeholder-level activities. A typical example of this is a firm shifting from a product-based business model to a service-based business model.

Level 3 SOI refers to a highly radical context; an “ideal state” which arguably could not exist without changes in the extra-organisational institutions and factors; i.e. national policy, legal, macro-economic, regulatory, and the like (Lamming et al., 1999; Adams et al., 2015). Level 3 SOI goes beyond the creation of new products and services, placing emphasis upon system-wide innovations which affect the company, its suppliers, the marketplace and many other stakeholders. Of the studies reviewed by Adams et al. (2012), none presented empirical evidence for the existence of a radical level 3 SOI context, supporting the view that a truly sustainable firm has not yet been observed (Lamming et al., 1999; Adams et al., 2012).

7.4 Models for Innovation

7.4.1 Linear Models

Frequently, innovation is presented as a linear process, where new ideas are found and developed into products and services before being commercialised in the marketplace (e.g. "research, development, diffusion"). This linear conceptualisation of innovation, sometimes termed a “technology-push”, is pervasive – within research policy, in economic policy and in industrial contexts (Rothwell, 1994; Godin, 2006; Bessant and Tidd, 2007). Many authors have criticised the linear model of innovation (Kline, 1985; Rothwell, 1994; Berkhout et al., 2006; Godin, 2006; Bessant and Tidd, 2007; Van Der Duin et al., 2007). Crucially, linear models do not readily account for the surrounding context of the innovation – firm-level, industry-level, marketplace, environment, society, or wider. Furthermore, a linear conceptualisation of innovation does not recognise or support the crucial feedback or feed-forward (preventative/predictive) controls which enable ideas to shift radically as they develop (Koontz, 2010). The consequence of adopting a linear conceptualisation for innovation is an increased risk of the innovation failing at a late stage of development, resulting in a large cost or missed opportunity (Kline, 1985; Berkhout et al., 2010).
One version which enjoys widespread popularity is open innovation (Chesbrough, 2003). Open innovation takes the linear “technology push” model, and adds on external collaborations to buy and sell ideas (through licenses, spin offs and joint ventures), reducing the risk of research failing with no route to market. This concept has been embraced by some within Interface and in other companies (e.g., Procter & Gamble – see Dodgson et al., 2006). Like the linear conceptualisation, the open innovation model has also been criticised (Trott and Hartmann, 2009; Berkhout et al., 2010). Chesbrough’s model lacks feedback loops or contextual links – each of which is considered to be of fundamental importance to innovation management by modern scholars (Kline and Rosenberg, 1986; Rothwell, 1994; Bessant and Tidd, 2007). Furthermore, the author’s revelation of “external connections” for R&D based innovation has long been recognised by prior authors (e.g., Rothwell and Zegveld, 1985; Tidd, 1993; Rothwell, 1994).

### 7.4.2 Nonlinear Models

Many authors argue that, in reality, innovation is too complex to be described by a linear process (Rothwell, 1994; Cheng and Van de Ven, 1996; Berkhout et al., 2006; Bessant and Tidd, 2007). More pragmatic descriptions of innovation are as a non-directional process with no clear defined start, middle or end (Berkhout et al., 2006), or as a chaotic journey during which organisational learning takes place (Cheng and Van de Ven, 1996). Nonlinear models better account for the fact that pertinent feedback can come from a variety of sources, internal and external, including the users themselves (Von Hippel, 2005). This model is epitomised by the lean start-up methodology, where user innovation plays a fundamental role in an iterative cycle of product development (Ries, 2011).

One example of a non-directional process is the cyclical innovation model (CIM; Berkhout et al., 2010). This integrates the primary activities of the innovation process into a series of four connected nodes representing the activities of innovation: engineering, research and development, product design and market engagement (Bessant and Tidd, 2007; Berkhout et al., 2010). Though novel in its incorporation of the entrepreneur as a central “driving” node, the CIM is fundamentally reactionary with respect to social and environmental issues, which are supposed to percolate indirectly.
into consideration through the market engagement activity as the shifting demands of
the consumer (Berkhout et al., 2010). Another recognised non-directional model of
innovation is the chain-linked model (Kline, 1985; Kline and Rosenberg, 1986), which
contrasts the linear model by highlighting the complex and iterative nature of the
innovation process, the relationship between all parts of the process (R&D, design,
production, marketing, etc.) and the continuous engagement with research and
knowledge.

7.4.3 Entrepreneurship
Though the concept of an “entrepreneur” is perhaps most readily associated with start-
up companies, entrepreneurship also describes the activities of highly motivated
individuals within firms who act as catalysts, linking ideas with applications and
striving for growth (Schaltegger and Wagner, 2011). These in-house entrepreneurs are
critical for initiating and driving innovations (Pinchot, 1985). With the exception of the
CIM (Berkhout et al., 2006), entrepreneurship is typically represented as a property of
the whole system; embedded into (and between) each process. This mirrors the
entrepreneur’s system-wide knowledge, sense-making abilities and networking effect
(Bessant and Tidd, 2007; Schaltegger and Wagner, 2011).

7.5 Data Collection
The primary sources of data for this chapter were a series of interviews conducted with
each member of the company’s co-innovation team; seven members in total. Interviews
were recorded and transcribed to assist in analysis. In addition to these primary
interviews, telephone interviews were also conducted with members of the marketing,
sales, production and engineering teams, and with an external consultant who worked
with the co-innovation team. Detailed observational data was collected from within the
company over an 18 month period, and recorded in a journal. This period captured a
change in the company’s innovation process, moving from an unstructured system
towards a more structured, process-driven system. In order to explore the
implementation of the new innovation policies and strategies at the operational level,
several innovation workshops were attended at company sites in the UK and the
Netherlands. Relevant company documents were also analysed. These included a
company-produced “global innovation summit report”; a diagram showing the “co-innovation accelerator” (Figure 1); presentation slides, press releases, and blog posts by the co-innovation team and other Interface employees. Two videos which were produced by the co-innovation team were also transcribed. The research had exceptional access to the team and other company members, and an active dialogue was maintained with company employees and interviewees throughout the collection and analysis of the data in order to clarify inconsistencies, and to expand and develop the data. By collecting and cross-examining data about the innovation process from multiple sources, it is considered that the data collection and interpretation were likely to be an accurate representation of the reality (Yin, 2009).

As recommended in Yin (2009), analyses of the resulting transcripts, company documents and observation notes were started during data collection. In turn, the developing analysis helped to inform later interviews and also to prompt follow-up questions with the team to clarify specific points. Qualitative groupings (codes) were developed during the textual analysis, and were applied to text excerpts using qualitative analysis software Dedoose 5.2.1. The codes were reviewed and merged to produce a logical narrative of phenomena, then analysed as a whole.

7.6 The Case: Innovation activity at Interface

7.6.1 Key Innovation Projects

Despite widespread media coverage for its level 1 SOI accomplishments under Mission Zero, the company's attempts at more radical SOI have been largely unsuccessful. Three examples of these are highlighted. Each of these projects can be characterised as “late-stage” failures, with Interface having already invested significant resources on development and promotion before they failed in the marketplace.

The Evergreen Services Agreement (ESA) was a product-service model which was launched in 1995, following soon after the creation of the company's environmental programme. It offered customers the opportunity to lease a “long-term floor covering service”, rather than carpet products (Olivia and Quinn, 2003). The idea was to fulfil customer's needs for the function of carpet without requiring the ownership of the
products. This approach could be compared to long-term car leasing. At the end of the contract (and throughout it, as the individual tiles wore out), the used carpet was returned to Interface for recycling and reprocessing. In many ways, ESA has been the project for which Interface is best known. It encapsulates the “design for environment” principles of the industrial ecology paradigm, as championed by Allenby and Graedel (1993), through servicisation of products enabling the resource loop to be closed. However, the ESA put off customers because of its unconventional financial model, which attempted to shift a capital expenditure into a license-based model (Olivia and Quinn, 2003). Although the ESA is still available, uptake has been incredibly low, with only a handful of contracts ever sold.

*InterfaceRAISE* was an attempt to create a sustainability consultancy arm of the company in 2011. With *InterfaceRAISE*, the company sought to leverage its recognition as a global sustainability leader in order to deliver on its promise of becoming a “restorative enterprise”. In line with goal 7 of *Mission Zero* (Table 4-2), *InterfaceRAISE* set out to encourage changes in external organisations in order to create a shift towards a more sustainable economy. This was abandoned a year later, primarily because of the lack of a proper definition for the scope and nature of the work, reliance on part-time employee availability, and inexperience in operating this kind of service-based business model (Toffel et al., 2011).

*FairWorks* was a “social product” development process which was initiated by the co-innovation team in 2008. It attempted to utilise local artisans in India to weave handmade products from grasses (Interface, 2008). Here, Interface set out to create products with a tangible social benefit by providing skilled artisans with a route to a global marketplace through an inclusive business model. Despite its virtuous intentions, *FairWorks* failed in the marketplace due to a lack of scale, variable quality, high costs, and poor integration into the company’s core product range (Arratia, 2010). Each of these factors are recognised pitfalls in sustainability-oriented innovation literature (Esty and Winston, 2009). After four years of development, it was phased out without making a market impact.
7.6.2 Innovation Success: *Net-Works*

In 2013, Interface launched *Net-Works*, a disruptive, cross-sector, ongoing partnership between Interface, fibre manufacturer Aquafil and the Zoological Society of London (ZSL). *Net-Works* involves the recovery of discarded fishing nets in the Philippines and the recycling of them into high quality nylon to be used in manufactured goods such as the yarn for Interface’s carpet tiles. Net recovery is undertaken by partnering village communities through a mutually agreed social enterprise model. *Net-Works* has had a significant impact. One member of the co-innovation team commented that this project has greatly exceeded expectations, and it has gained an unexpected global recognition for its sustainability aspects. This includes prize wins during 2013-2014 from the European Commission, the Clinton Global Institute, Ethical Corporation, Accenture and the Sustainable Entrepreneurship Award. *Net-Works* has now spun out into its own organisation, supported by the original project partners with a separate website and its own dedicated team. The *Net-Works* programme is currently being expanded to other sites, with an ultimate goal of creating a social enterprise model which could be applied to other contexts and inspire similar activities by other companies.

7.6.3 Sustainability Characteristics of *Net-Works*

*Net-Works'* most prominent feature is that it addresses social, environmental and economic sustainability in a tangible and integrated way. Furthermore, *Net-Works* is a rare example of level 3 “system-building” innovation as described by Adams *et al.* (2012). It has demonstrated a novel approach to partnering for sustainability and gained significant recognition, with the potential to catalyse system-level changes.

Socially, *Net-Works* was designed to be self-supporting, and to integrate with the existing livelihoods of the partnering village communities. By collecting and selling the nets, the community-based partners earn a supplemental income which is aligned with their traditional way of life. In order to facilitate payment, a community savings & credit association (CoMSCA) was set up by the *Net-Works* programme, and is run by members of the community. This aspect in particular has empowered members of these communities to save money, organise loans and credit, and establish simple insurance models, all of which are helping to ensure long-term financial security, civic engagement, self-determination and education opportunities (Khoo, 2015). The project
has also built awareness about waste and recycling among the partnering communities, and engagement with the sustainability agenda has increased as members have witnessed the local social, environmental and economic benefits that a sustainability-focused project like Net-Works can bring. This is most clearly evidenced by the strong uptake for a dedicated environmental conservation fund among the communities in which the concept has been piloted. The environmental fund enables members of the CoMSCA to invest some of their money in local conservation projects in order to protect the environment upon which they are reliant (Khoo, 2016).

Environmentally, the project has made short term, local impacts as well as longer term, global impacts. Locally, Net-Works has directly reduced pollution and improved local marine stocks and biodiversity at the partnering sites. At a wider scope, the environmental impact of the yarn products made from the recovered nylon is significantly lower than equivalent non-recycled yarn products; with approximately 55% lower CO₂ emissions per kilogram (Aquafil, 2014). This in turn reduces the impact of Interface’s final carpet products by approximately 25% (Hensler, 2014).

Economically, it has been a major success. Net-works has earned several high profile awards and is a continued source of positive publicity for Interface and the project partners. The Net-Effect product (made from 100% ECONYL yarn and designed with an oceanic theme) has been successful for Interface, and a member of the sales team commented that the story of Net-Works has been a powerful, differentiating sales tool which has resonated with customers. At the local scale, the poverty-affected partnering communities have also benefited from a steady source of supplementary income. The mutually beneficial “social enterprise” approach helps to safeguard the long-term viability of the project.

7.6.4 How Net-Works Formed

As the FairWorks project failed and was being drawn to a close in 2011-12, members of Interface’s co-innovation team sought an alternative project to focus on. The goal remained the same: to address the social dimension of sustainability through the company’s products. Rather than attempting to create a new product line with a social aspect (like FairWorks), the team entered into an exploratory phase, seeking
opportunities to embed a social dimension into their existing core range. The level of trust demonstrated here by the company’s senior management in enabling such “exploratory” activity following the lack of success of *FairWorks* is notable.

At this time, Aquafil, one of Interface’s yarn suppliers, had recently rolled out their ECONYL recycling technology to convert postconsumer nylon waste into high quality recycled yarn. The main source of material for ECONYL at that point was the fishing industry (large fishing fleets and fish farms). Interface was already a purchaser of Aquafil’s post-consumer recycled products, but had not considered its potential role in the new project, as it lacked a tangible social dimension. The link to fishing communities in the Philippines came about through a researcher from Imperial College London, Hill, who had recently completed a PhD with ZSL studying livelihood approaches to marine conservation (Hill, 2011). Hill had met some members of the *co-innovation* team at a conference in 2011, and following this, the connection to Hill’s work and the Aquafil technology was made by Interface’s European Sustainability Director.

*Net-Works* was initiated by Interface, with Aquafil and ZSL joining at an early stage. In 2011, a meeting was held between Interface, Aquafil, Hill and several invited sustainability consultants. The outcome of that meeting was the core concept for *Net-Works* – to partner with local villages in the Philippines through an “inclusive business” social enterprise model (similar to that of *FairWorks*); to utilise Aquafil’s technology to process the waste, and to integrate the products into part of Interface’s tried and tested core ranges of products. Hill suggested a partnership with ZSL, who would advocate for the marine conservation aspects of the project. ZSL has an ongoing commitment to field-based conservation work, and recognised the opportunity to address “ghost fishing” in the region by incentivising the removal of abandoned nets that would otherwise continue to trap marine wildlife and damage reefs (ZSL, 2013). Throughout 2011-13, the team addressed numerous challenges and barriers to meeting their shared vision of a project with tangible environmental, social and economic sustainability aspects. Particular highlights included the invention of a mechanical baling system suitable for use in the electricity-free village environment, as well as negotiation for transport of the net material from the villages in Danajon Bank, Philippines to the Aquafil plant in Ljubljana, Slovenia.
7.7 Discussion

7.7.1 Consideration of Contextual Factors for Net-Works

Net-Works stands out as a rare example of a successful level 3 SOI project with its noteworthy sustainability aspects across all three dimensions of the Triple Bottom Line (Elkington, 1997). Finding a breakthrough to higher level SOI projects proved to be challenging for Interface, with several attempts ending in costly failure. The various contexts surrounding the successful project are examined here.

At the firm-level, several factors were relevant. The Mission Zero goals created a vision which drove a large amount of innovative activity at Interface, ranging from iterative to radical. As discussed in Chapter 4, the history and approach of Mission Zero clearly show that it is rooted in the ecological modernisation paradigm, with influences from circular economy, cradle to cradle, the FSSD and the triple-bottom-line. Interface’s engagement with these goals over such an extended period (approximately 20 years), coupled with the public commitment to deliver “zero” by the year 2020, created a “culture of sustainability”. This vision and culture empowered senior management to take long-term decisions towards achieving sustainability goals, such as permitting the co-innovation team to explore Net-Works despite the recent costly failure of an apparently similar project, FairWorks. Indeed, the company’s European Sustainability Director referred to this permissive attitude as a “safe failure space” for the co-innovation team, reminiscent of the concept of a niche or incubation room for sheltering and fostering radical innovations while they develop (Schot, 1998; Geels, 2002). It is also possible that this high degree of free reign was caused by a lack of management oversight of the co-innovation team, although this is deemed less likely since Interface has a long history of innovation activities with varying degrees of success, and FairWorks was not the first failed innovation project. As noted by the Chief Innovation Officer, “8 out of every 10 innovation projects fail”.

At the team level, perhaps most influential of all was the decision of the co-innovation team leader to continue in a similar vein to FairWorks by deliberately seeking a project with a social benefit. This drove the team to explore unconventional solutions, and ultimately led to the unusual partnership with the fishing communities through Hill. In
this regard, a further contributing context at the firm-level was Interface’s culture of entrepreneurship, and its highly active level of public engagement on sustainability (discussed in Chapter 5), which were instrumental during the early stages of Net-Works for identifying potential opportunities and partners.

Beyond the firm-level, Hill’s involvement during the early “ideation” phases brought marine conservation expertise and local knowledge of the village communities, but also led to the collaboration with ZSL, a non-governmental organisation (NGO). NGO involvement helped to ensure that the project could maintain its credibility and transparency in the eyes of customers and awards panels. ZSL benefited from involvement in the project by contributing to its stated goals of conservation of animals and their habitats, and by gaining an example of a multi-dimensional conservation partnership (with environmental, economic and social aspects) to promote to its members and on its website. On the supply side, Aquafil’s development of the ECONYL technology can be partially attributed to Interface’s influential force on its own supply chain, as described by Nelson (2009). ECONYL is one of several sustainability-oriented projects which Interface’s suppliers have delivered over the past decade (Hensler, 2014). The receptive customer base also played a role in Net-Works. As the final end product was not actually new (rather, Net-Works is a modification of the product material sourcing), it was clear through existing knowledge that the product would perform well with customers given the upgraded product background which the Net-Works narrative provided. In a similar vein, the industrial landscape provided a competitive backdrop which appeared to drive mutual “greening” among firms (Larson, 2007).

Conspicuous by its absence was any form of scientific measurement or reporting framework for the more intangible aspects of Mission Zero which were highly relevant for Net-Works, such as “sensitising stakeholders” (goal 6 – see Table 4-2) or “redesign commerce” (goal 7, Table 4-2). There exist popular and appropriate methodologies which could have been used for assessing such metrics (e.g. Global Reporting Initiative 4.0). Interface consciously elected not to use these, the reasoning for which is discussed in Chapter 5. Also absent was any form of supportive regulation or government
incentive. The chief co-innovation officer commented that regulation was simply permissive, but otherwise had minimal influence.

7.7.2 Summary of Contextual Factors for Net-Works

Summarising, there were a number of contextual factors which enabled Net-Works to succeed. At the team and firm-level, these were:

- Developed capabilities and experience – past knowledge from FairWorks and other innovation activity helped to avoid common pitfalls;
- Commitment to a social goal – caused the team to broaden their search and consequently make an unusual connection;
- Permissive management approach – allowing a “safe failure space” for the team to learn from failures and eventually find the breakthrough;
- Mission Zero – a high level sustainability vision and public commitment, rooted in the school of industrial ecology, and driving activity from the top down;
- Entrepreneurial culture – this was further enabled by a high level of organisational slack and loosely defined roles.

Beyond the firm-level, factors were:

- Involvement of academia (Hill) and NGO partnership (ZSL) – these partners provided advocacy and lent credibility to the project;
- Receptive customer base – the sensitivity of the design and architecture community to sustainability issues laid the pathway to market;
- Engagement of supply chain with sustainability – leading to future opportunities such as ECONYL with yarn supplier Aquafil.

Furthermore, conspicuous non-contributing factors were:

- No reporting, scientific measurement or monitoring of social goals;
- No recognisable policy contributions or drivers.

Cross-comparing Net-Works with the innovation projects at Interface, several shared contextual factors can be identified, but there are also a few exceptional factors which may have helped Net-Works to succeed where previous projects had not. In terms of scope, FairWorks, ESA and InterfaceRAISE each attempted to create a radical new product or service in support of sustainability, while Net-Works was integrated into the company’s existing product portfolio. This is a key factor, since it enabled the company to utilise existing pathways to the marketplace, and virtually guaranteed that the end result would have a positive uptake. The inclusion of an academic advisor at an early stage was also unique to Net-Works. Soon after Hill’s involvement, ZSL provided further
advocacy for the sustainability aspects of the project while also lending credibility, which likely contributed to the level of awards and publicity that the project received.

Comparing Net-Works with the other innovation examples presented in this chapter, the decision to pursue an innovation project which could be integrated into existing products meant that Interface could ensure market uptake for the innovation. However, this comparison raises an interesting question about the degree to which Net-Works is radical. From the perspective of the end product, there is no change in functional performance – Net-Works was designed to integrate with the company’s existing product ranges. The reduction in overall carbon footprint of Interface’s Net-Works products compared to similar non-recycled products is a relatively modest 25%, which falls below the 30% threshold to be considered “radical” (Leifer, 2000). However, when taking into account other considerations such as the positive social impact on poverty-affected fishing communities, the conservation of local marine life and the creation of a novel social business infrastructure designed for replication, it seems clear that Net-Works as a whole has delivered radical change in some sense. Thus, rather than being described as a product innovation, perhaps Net-Works is more accurately framed as a disruptive, system-level innovation (Bessant and Tidd, 2007), sincerely aimed at catalysing similar activity in other regions, and inspiring action with a positive message to others in industry, demonstrating that level 3 SOI can be successfully undertaken through an ecological modernisation approach to sustainability. Net-Works is an example of what level 3 SOI – systems building, (Adams et al., 2012) – looks like in practice. The existence of Net-Works supports the theory that Interface is undertaking aspects of “strong” EM (Christoff, 1996).

7.8 Chapter Summary

In this chapter, a working definition for SOI was derived, drawing from the established innovation literature and the nascent SOI literature. The case of Net-Works and other innovation projects were presented and discussed, and a number of relevant contextual factors for SOI were identified and listed. The importance of Net-Works is that it demonstrates how “strong” EM (Christoff, 1996) or “strategic sustainable development” (Robèrt et al., 2002) can be delivered in practice, and further, that such a project is
economically viable to the extent that it can be (and is being) replicated and scaled-up (Net-Works, 2016), further proving the model and reinforcing the importance of leadership in this field.
8 Discussion and Conclusion

8.1 Overview

This final chapter brings together the analyses of the case study material and considers their relations to the bodies of literature discussed throughout this work. After a summary of the preceding chapters in this thesis, the key findings are discussed, and there are then some reflections on the work itself and a discussion of potential areas for further research.

8.2 Summary of Chapters and Findings

The first chapter provided an introduction to the research topics, presented the research questions and gave an overview of this thesis. This thesis set out to explore the following topic: How can ecological modernisation be operationalised at the organisational level? In seeking to address this question, the research has examined the case of Interface, asking some more specific questions which focus on the organisational aspects of EM:

In the context of a mature, global manufacturing organisation which has adopted an ecological modernisation approach:

- R1: What are the important aspects in implementation of an ecological modernisation strategy at the level of an individual organisation?
- R2: What are the interactions between employee engagement and sustainability in the context of an ecologically-modernising organisation?
- R3: How is innovation with respect to sustainability managed in this context, and what are the enabling contextual factors for success?

The literature review (Chapter 2) discussed and critically examined the bodies of literature relating to this work. Ecological modernisation (EM) theory was introduced, and the prominent debates were discussed. In particular, the review identified the lack of work exploring EM from the perspective of an individual organisation. It was also
noted that the social dimensions of EM were underexplored, leaving open questions about the role of EM in changing culture and attitudes, or also understanding the interplay of mechanisms by which “carriers of reform” can bring EM to the wider sector and beyond. The review highlighted the distinctions between “weak” and “strong” EM, with typical “weak” EM transformations being waste-saving efficiency improvements which happen to result in reduced environmental impact, but are ultimately narrow cost-management exercises. “Strong” EM transformations correspond with activity which is driven towards the reduction of environmental harm, but which remains economically viable. It was noted that there is currently no evidence showing the existence of a firm which can be unambiguously characterised as undertaking “strong” EM. The literature review introduced concepts relevant to EM, such as corporate social responsibility, neo-classical economics, employee engagement, stakeholder theory, innovation and others. In relation to employee engagement, it was noted that there are potentially strong synergies to be explored for a firm in having an effective environmental mission which is inspiring to employees. In relation to innovation, it was noted that there is a dearth of studies that show successful sustainability-oriented innovation in practice. Chapter 3 presented the research strategy; a case study of Interface (a global manufacturing company), exploring the above research themes using grounded theory as an analytical approach. Later in this chapter there is a section reflecting on the research approach.

Chapters 4, 5, 6 and 7 presented the primary case material and analysis. Chapter 4 provided context for the following chapters by describing the company then analysing Interface’s Mission Zero strategy and related activities. It highlighted the prominent role played by CEO Ray Anderson in driving the environmental changes, and it was noted that the Mission Zero campaign had been successful in reducing waste and producing significant cumulative financial savings of at least $480M. Chapter 4 also highlighted Interface’s influencing role within the wider industrial landscape, where the company has led changes in the carpet and furnishings sector, and has also engaged with government and NGOs to influence standards and regulation.

Chapter 5 adopted the EM perspective to examine Interface’s behaviour as an organisation, and its role within a wider EM system. The chapter considered the
governance and management of the company, and classified it as being mixed “weak” and “strong” EM, with a highlight being the Net-Works project and a low-light being the company's relatively poor record of engagement and management of its employees.

Features and aspects of operationalising the EM strategy were also discussed, revealing the challenges faced by an EM organisation that relies on its sustainability credentials to differentiate itself from its competitors. As competitors responded to the shift in the marketplace and the gap which Interface had begun, the flooring market became filled with similar-sounding sustainability programmes to Mission Zero, and Interface had to work harder to convince customers that they were the leaders. This hinted at some “temporal dimensions” of EM – features and challenges that emerge during the company's long-term commitment to EM. Other challenges were the increasing difficulty of making environmental improvements as the more obvious and cost effective ways to reduce waste are quickly identified. Another temporal effect was evident in the company's GHG emissions reduction performance, which stalled in 2007-2012 (Figure 4-1). As one of company’s senior directors wrote in a 2012 blog post, “Many of our EcoMetrics that show such impressive cumulative accomplishments since 1994 have actually plateaued in recent years, and it's understood that there is no more “low hanging fruit.” We are in the “tall canopy” zone and have been for several years.” (Gudtz, 2012).

The company appeared to climb out of this plateau state after 2012-2013, coinciding with the launch of Net-Works and the consolidation of European production operations among other activities. Chapter 5 also showed that Interface imposed a toxic-screening protocol on its suppliers, which in turn led suppliers to reassess their strategies and eliminate toxics in order to reduce the risk of falling foul of a protocol like this in the future. This was one example among others showing Interface to be at the centre of a network of customers, industrial competitors, suppliers and other stakeholders upon which it had an influence – as a “carrier of reform”, under the EM worldview.

Chapter 6 addressed the topic of employee engagement, drawing upon interview data and other case material to analyse the various aspects of engaged and disengaged employees and the associated company factors. Several interacting dynamics are shown to be at play here. Employees were vital to the environmental performance of the company, particularly through contribution to the QUEST waste saving scheme and by contributing ideas for innovations. Employees were also shown to be “carriers of
reform” in some situations by providing a route for the company to influence other beyond its borders – through action in employee’s private lives inspired by *Mission Zero*, or through knowledge transfer via former employees who had left Interface to join another company. However, the claims of the company about the degree to which employees were generally engaged with *Mission Zero* were seen to be somewhat overstated, with many employees feeling disengaged. A set of two Gallup polls supported the conclusion that the company’s workforce was below average in levels of employee engagement compared with relevant industrial peers. Several barriers to engagement and possible sources of disengagement were identified, including a lack of training and a breakdown in communication between shop floor staff and senior management, leading to speculation and mistrust among some employees. Chapter 6 also showed the importance of a financial incentive to motivate staff to alter their behaviour and save waste and energy. Engagement alone was not sufficient to motivate employees to contribute to the QUEST scheme when payments were temporarily decoupled from the environmental performance.

Finally, Chapter 7 provides an analysis of the innovative context at Interface which gave rise to fishing net recycling project *Net-Works*. The chapter identifies several contributing factors to the success of *Net-Works* over previous, similar projects. These factors included the freedom for innovation workers to explore, fail and iterate, as well as the decision to deliberately focus on a social goal, which led the innovation team to explore fruitful partnerships with a non-governmental organisation (ZSL) and academic researchers, resulting in the high-quality innovation project, *Net-Works*.

### 8.3 Discussion of Concepts

#### 8.3.1 Scalar Dimensions of Ecological Modernisation

This thesis has applied ecological modernisation theory at the level of an individual organisation. In the literature, ecological modernisation theorists have typically focused on the dynamics of the theory at the macro-economic scale – considering the interaction of nations (and wider), science and technology, society, policy, the environment, industries and sectors, and the economy as a whole (Gouldson and Murphy, 1997; Mol, 2002). As Mol (2002) notes: “Most attention has been paid to technological change,
market dynamic and economic actors, political modernisation and new forms of governance, and the strategies and ideologies of social movements.” (pg 94). It certainly makes sense for the theoretic literature to focus discussion on the macro-economic scale, as this enables consideration and discussion of system-level forces and influences such as policy, markets, and social and political movements. However, macro-economies are composed of individual components - organisations, cities, societies and other actors – and there is also a need to understand the pragmatic implementation of EM as it occurs through empirical evidence.

Interface is characterised in this work as an EM organisation which is part of a wider economic system, and which has two-way interactions with that system, though which the process of EM is facilitated in both the company and the wider system, through various mechanisms. Consequently, the company takes a role as a “carrier of reform” (Mol and Sonnenfeld, 2000). By focusing the research on the individual organisation and providing a richly explored context, the research focused on the specific intrinsic and extrinsic drivers and mechanisms of EM activity. This focus allows some challenges to EM set out by York and Rosa (2003) to be considered. The authors challenge EM’s claim that the effects of further modernisation are beneficial for ecological sustainability, writing “if ecological modernisation theory is [making the claim] that institutional modernisation actually helps to reduce environmental problems and bring about a transition to sustainability—then it attracts the burden of looking beyond changes in the structure of institutions and actually demonstrating positive environmental outcomes stemming from modernization. It must provide a theoretical specification of the connections between institution building and environmental outcomes.” (pg 275). Looking at Interface and the case described in this thesis, it has been seen that a comprehensive programme of “greening” in the company (Mission Zero) has indeed led to external effects that have driven gradual system-level changes towards greater sustainability – encapsulating the essence of EM theory. A theoretical specification of these interactions may be constructed using three example pathways as a proof of concept:

- Pathway 1: Interface challenged its supply chain to become more sustainable. This resulted in a novel nylon polymer recycling process, ECONYL, which was previously thought to be technically unfeasible (Nelson, 2009). According to the
ECONYL website, (ECONYL, 2017), the ECONYL recycled polymer process is now associated with more than 60 brands of carpet and textile manufacturers, clearly demonstrating an effect expanding beyond the originating organisations and having a “greening” effect on the wider industry. A similar effect was seen when Interface imposed toxic bans upon its chemical supply chain.

- Pathway 2: Mission Zero knowledge transfer took place when some of Interface’s former engineers joined a new company. This resulted in Mission Zero waste- and energy-saving lessons being applied in the new setting, and significant waste savings and improved environmental performance for the new company, demonstrating another pathway for the company’s internal modernisation processes to influence the wider system.

- Pathway 3: Interface’s drive to produce highly marketable sustainability-related products led them to innovate and explore socially-oriented products, leading eventually to the creation of the social enterprise recycling programme, Net-Works. This positively impacted upon local fishing communities in the Philippines, while also injecting a greater amount of post-consumer waste into the ECONYL supply chain. Furthermore, the Net-Works project has now expanded to another site in Cameroon, and has stated ambitions to continue expanding to other sites – a clear instance of system-level ecological improvements.

These examples demonstrate that there are certainly pathways for Interface’s internal EM processes to “leak out” into the wider system – and this is quite deliberate. Recall that the company’s Mission Zero campaign includes a plan to “Redesign Commerce” (Table 4-2). The way that “redesign commerce” is articulated by the company today clearly aims as this system-level change: “Interface is driven by the obligation to leverage our leadership and influence to achieve greater systems change” (Interface, 2017). By analysing the activities of Interface in this work, and by applying the EM framework to the analysis, a clear contribution to the debates in EM theory has been made, providing a form of validation to the theory’s proposition that EM transformations at the level of a single firm or organisation can lead to system-level changes. Of course, there are limits
to the single-organisation approach of analysis. The most obvious limitation is the lack of statistical sample; only one company has been examined. There are also limitations which may have been masked in this work by the fact that it focused on Interface specifically. Interface is an extremely well-known organisation in the world of sustainability, evidenced by its consistent appearance among the "sustainability leaders" survey by GlobeScan. This means that Interface is a rather atypical example of a company, and the same approach might not be useful for other cases. However, this doesn’t invalidate the specific findings of this research. This work has shown that the EM theory can be scaled down to the scale of a single organisation, and that by doing so this work provides a robust defence of EM theory in this respect.

8.3.2 Social Dimensions of Ecological Modernisation

Discussion of EM in Chapter 2 highlighted the importance of the social aspects within EM theory. The social dimensions of EM include dynamics around employees, suppliers, sector members and customers, among others. Generally, employees within organisations have a vital role to play in contributing to EM of their organisation, whether through individual actions (saving energy in day-to-day activities), or by leveraging the actions of others through their ideas and innovations. In this work, particular focus was placed on employee engagement, and the case of Interface showed a glimpse of the potential dynamics relating the employee engagement and sustainability programmes like Mission Zero. A long list of barriers and concerns were raised in relation to employees. A recommendation to Interface and other companies in a similar position is to engage in carefully planned communication with the workforce in order to train them on sustainability principles, to facilitate the exchange of ideas, and to curtail the spread of myths and speculation (particularly those which undermine engagement and environmental performance).

Almost by definition, EM transformations involve processes of significant organisation change. Employees in Interface were certainly subject to change and uncertainty, potentially affecting their roles through redundancy and restructuring. Employees needed to be resilient as the company modernised in order to maintain a supportive social culture. Change programmes typically benefit from new talent and new ways of thinking (Boeker, 1997). Attracting and retaining exceptional new members of staff
with fresh ideas and an external perspective was something which Interface was successful at doing. This was particularly seen within the co-innovation team, which grew from two members to seven members between 2011 and 2016, all of whom were highly-qualified new-hires rather than internal promotees. A further synergy of the Mission Zero campaign in this regard was that it played a notable part in attracting exceptional talent; as one interviewee noted it enabled the company to “punch above our weight in terms of sustainability” [I_COI_5].

Exploring the social dimensions of EM in this case also revealed a pathway for knowledge transfer via former employees, as discussed in the above section. While this effect has relatively little bearing on Interface in isolation, there is potential for a profound effect on the wider macro-economic system as ideas, knowledge and expertise in sustainability are exchanged through the movement of people between companies and organisations. Similarly, citizens and organised social groups have a role to play – by being responsible consumers and working to shift the prevailing consumption culture towards more sustainable choices, and by creating the political willpower to enable intervention and environmentally-oriented regulation. In the case study, this was exemplified by Interface's existing customer base, (the architectural and designer community) who were said to be sensitive to environmental concerns and therefore a receptive market for a greener product (Hensler, 2014).

Among the most striking aspects of Interface with respect to social EM were its leadership, influence and political engagement. The company was able to leverage substantial influence in environmental circles and more broadly, particularly in the USA with membership on various senior advisory groups, but also in Europe with the company's efforts to campaign for a ban on landfill disposal of carpet waste. Interface showed itself to be highly influential among its own suppliers too, as discussed. As an influential leader, speakers from the company attended a large number of events each year to promote the company's achievement but also to inspire change and influence others. Considering these points together, Interface was having a substantial and deliberate influence on the wider systems in which it operated – societal and governmental. These factors combine under the EM worldview to further characterise the company as a proactive “carrier of reform” (Mol and Sonnenfeld, 2000).
A final consideration on the social dimension of EM was the success of Net-Works. One of the notable aspects of Net-Works and its predecessor, FairWorks was the decision by the innovation team to deliberately focus on a social goal. The result was a project which not only reduced the environmental impact of Interface and its supply chain, but also supplemented the livelihoods of subsistence villagers in the developing world. Again, Net-Works is held up in this case as a clear example of a single company influencing the wider system through its own EM-aligned activities.

8.3.1 Temporal Dimensions of Ecological Modernisation

Chapter 5 highlighted apparent “temporal dimensions” of EM – factors which could come into play in an organisation like Interface, which has a long-lasting and well-established sustainability programme. As Interface moves closer to sustainability in a journey that has now been active for 20 years, we see the emergence of certain challenges which might not be apparent in an organisation which was early in its sustainability journey. First, it is clear that the “low hanging fruit” of efficiency projects and changes which can be made quickly, at low cost and/or for a rapid return on investment have disappeared for Interface. In the early years, efficiency work and the QUEST scheme had yielded excellent reductions in environmental impact, but there is a diminishing return on further investment in efficiency activity. The early “low hanging fruit” years of environmental activity at Interface included an optimistic belief among the company managers that the goal of carbon neutrality was achievable by the year 2000 (this was later revised to 2020 with the launch of Mission Zero). The substantial early financial returns through waste savings from the QUEST programme were pivotal to build sustained trust in Anderson’s new direction for the company, and to keep up interest in the environmental activities among the shareholders. However, the company then moved into the “tall canopy” in the mid 2000s, at which time overall progress towards reduction of greenhouse gases plateaued (even worsened) in 2007-2012 (illustrated by Figure 4-1). Finally, after 2013, the company returned once again to stronger reductions in greenhouse gases. This is most likely a reflection of the consolidation of European operations, combined with considerable investment and changes in the company’s grid-purchased energy mix, increasing production volume (and associated economies of scale), and replacement of outdated production
equipment at several production sites. While the end-to-end results of emission reductions are impressive on Figure 4-1, the reality is that progress has once again slowed significantly in more recent years, with engineering projects on the production floor targeting ever smaller waste reductions and efficiency gains. Instead, it could be argued that the most successful activity during this time was the innovative Net-Works project. Net-Works operated on a different axis from waste reduction and energy reduction-type efficiency gains, focusing more on the external marketing and “redesign commerce” aspects of Mission Zero while making only a minimal contribution to the company's direct emissions (the project was explored in detail in Chapter 7).

This “temporal dimension” of EM implies that there is a change in the rate of progress associated with EM, at least at the organisational level. Generalising, one might conclude that the rates of sustainability performance improvement and return on investment at any given EM organisation are both highest at the outset of sustainability programmes, reassuring those who embark on their sustainability journey, and generating funds through savings which could be used to support the more difficult later stages. In the mid-stages, the quick-wins (“low-hanging fruit”) are typically already exploited, and although efficiency gains will continue to be made gradually, the big gains in efficiency will require more thorough re-working of processes, redesign of systems, and above all, innovation. It could be argued that Interface is on the cusp of entering a third stage. After 2020, upon reaching its Mission Zero goals, the company now promises to become restorative – going from a carbon neutral organisation to a carbon-sequestering one. This is reflected in the company's recent announcement of “Climate Take-Back”, an initiative which sets ambitious new goals relating to sustainability and system-level redesign. The company's carbon-sequestering activities will be gradually ramped up in the lead up to 2020, and continue to be expanded beyond 2020. This third stage clearly necessitates substantial further research and innovation for the company, and may well require new business models to monetise this decarbonisation activity in some way. Net-Works may be one example of this. This three-stage conceptualisation is consistent with the three stages of sustainability-oriented innovation suggested by Adams et al. (2012); operational optimisation, organisational transformation, and systems building.
In these later stages of EM, we also saw that Interface struggled when communicating the progress of its sustainability programme. *Mission Zero* has gone through evolution (of scope and of relevant metrics), and explaining the progress has become sprawling and complex. Furthermore, while Interface has become established as an environmental leader, so too have its competitors, all of whom have made environmental statements and commitments similar to Interface’s in order to access the “environmentally sensitive” marketplace which Interface sought to dominate. This diminishes the competitive advantage for Interface in adopting sustainable practices, undermining the business case for pursuing sustainability. However, the “winner” in this scenario is the environment, since through market forces all actors have been forced to strengthen their environmental positions in order to remain competitive. Overall, this evidence seems to point once again towards the idea that EM is taking place in the wider carpet and flooring sector, driven by market forces, with diminishing returns for the individual participants, but with an overall enhancing effect for the industry.

It is unclear whether the continued EM activity of Interface and the wider carpet industry will lead to further “progress plateau” effects in the future, or if the dynamics described in this chapter might combine somehow to alleviate the plateau effect. In performing this research, it has become increasingly clear that the relevant economic and social systems described in the case are non-linear and unpredictable, with a high number of interacting components and feedback loops. In other words, these are complex systems (Bar-Yam, 1997), and thus their behaviour cannot be easily predicted, even with models developed using extensive empirical testing.

### 8.3.2 Weak and Strong Ecological Modernisation

This thesis has provided insight into various aspects of EM through the lens of the case organisation, Interface. In developing this case, new theoretical perspectives have begun to develop. This section presents a new, visual conception (Figure 8-1) of ecological modernisation in relation to its oft-compared alternatives of neo-classicism and deep ecology (e.g., Stubbs and Cocklin, 2008).
The use of the terms “weak” and “strong” throughout the literature is problematic. The “ladder” conceptualisation of sustainable development (Baker, 1997) draws attention to this problem. The two terms are used in reference to ecological modernisation (Christoff, 1996), the Porter hypothesis (Porter and Van der Linde, 1995), and sustainable development (Baker, 1997). The framing of activities and strategies as either “weak” or “strong” not only stifles discussion over the relative merits of each type, but it also creates a false dichotomy, closing out the middle ground for discussion. Importantly, the “weak” version of the Porter hypothesis and “weak” EM are on different ends of the spectrum: the “weak” Porter hypothesis is weak because, while it leads to new innovation, it lacks the financial returns that make such innovation self-funding. Thus, it describes activity which addresses environmental issues, but is not economically viable. Conversely, “weak” EM describes a form of EM which represents a neo-classical, “technocratic” implementation (Huber, 1985), while “strong” EM implies institutional-democratic implementation which addresses environmental and social concerns as well as economic ones (Christoff, 1996; Mol and Spaargaren, 2000).

By dispensing with the crude “weak” and “strong” dichotomy, it is possible to envisage a continuum of approaches to sustainable development and environmental management, each of which is “better” or “worse” in different contexts or in fulfilment of different criteria (Figure 8-1). Indeed, it is possible to envisage “economically weak EM” which parallels the “weak” form of the Porter hypothesis. This proposed “economically weak EM” describes activities which overextend in their eagerness to solve social and environmental problems, and in doing so fall beyond the point of economic viability and are therefore pragmatically unsustainable.

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**Figure 8-1 - Ecological Modernisation and other perspectives**

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Figure 8-1 shows ecological modernisation positioned in the centre of two opposing groups. Towards the left of the centre, EM activity may become weakened by an over-commitment to addressing the social and environmental needs, without ensuring that activity is also economically viable. This is “economically weak EM”. Conversely, towards the right hand side, EM activity may become overly concerned with a high return on investment, resulting in “socially and environmentally weak EM” described as “weak” by Christoff (1996) and matching the critical perspective EM presented by others (Pepper, 1998; York and Rosa, 2003). This over-commitment to economic goals stifles the emergence of the truly impactful, radical activities, innovations and system-building which are needed for the achievement of sustainability. One could also apply the model to sustainable development, taking cue from the ladder model of Baker (1997), but reframing the emphasis away from the “ideal model” and instead towards a “pragmatic model” of sustainable development which addresses social, environmental and economic goals in a balanced manner, embodying the concept of the “triple bottom line” (Elkington, 1997). A popular argument which is made by some writers (e.g., Klein, 2014; Baker et al., 1997) is that the way to “improve” environmentally weak SD or EM is to adopt a deep ecology perspective. This work suggests that, by making a less dramatic shift, there is a strong and balanced middle ground found in the principles of strong EM.

Mapping back to the case data, this alternative “economically weak EM” was exemplified by the cancelled FairWorks innovation project, described in Chapter 7. FairWorks had exceptional potential for positive social impact, employing artisan weavers in a socially deprived setting to support their existing livelihoods. It also had very strong sustainability aspects, being made from rapidly renewable woven grasses rather than petroleum products. Ultimately, though, the product never made an impact as it did not address customer needs, was of variable quality, and was not economically viable. Similarly, the company’s Evergreen Services Agreement was a product which aimed at redesigning commerce by disrupting the carpet industry and providing a service-based product rather than operating with an ownership model. This concept of “servicisation” is core to the delivery of the circular economy (Andersen, 2007), and yet the product was a failure because it did not find willing customers. Once again, the innovation was let down by its poor economic performance, which ultimately destroyed the potential environmental and social benefits which could have accrued. As the chief sustainability
officer said during design of the successful *Net-Works* project, “This isn’t about philanthropy. It has to wash its face” [I_COL_5].

The model raises an interesting question about the position of for-benefit enterprises (Sabeti, 2011). However, this can be resolved by considering the fact that these organisations deliberately start out with greater expectations among their stakeholders about their environmental and social goals. Comparing this with organisations which are undertaking “strong” EM, this places the balance point of the for-benefit enterprise slightly to the left hand side of centre on Figure 8-1 Error! Reference source not found.. By reducing the pressure to make a high profit and agreeing these expectations with investors and shareholders, one could make the argument that the for-benefit model actually lowers the difficulty of achieving this balanced approach. However, this also comes at a cost, since as the balance point of the for-benefit organisation moves towards the left hand side; it misses a vital aspect of economic viability which could serve its needs: scalability. *Net-Works* is an example of a project which achieves economic viability and, in doing so, is able to be scaled up – indeed, the concept of scaling is now enshrined in the project’s mission statement (*Net-Works*, 2016). Interface could be shown on the diagram as being positioned within in the central trapezoid, spanning a range from left-to-right representing the company’s more technocratic aspects such as its efficiency saving activities, as well as its more sustainable aspects, like *Net-Works*.

### 8.4 Reflections on this Research

#### 8.4.1 Limitations of this Research

Methodologically, this work is an example of a single site case study. Case study research is, by its nature, a research strategy with fundamental strengths and weaknesses. Such research relies on the collection of rich, qualitative, contextualised evidence and data collected from one or more sources, which can then be analysed using a range of techniques. Two broad criticisms of the case study method are frequently made (Yin, 1986); first, that the findings cannot be generalised, especially compared with a large, randomised controlled trial; and second, that the researcher’s choices, approach, skill and biases have a too much of an effect on the outcome of the
research. These criticisms are common lines of argument, and this fact alone limits the impact that this work could have, since such evidence will typically not be used to directly support or inform policy decisions, regardless of care or approach taken by the researcher. Additionally, the specificity and time sensitivity of the case study make the findings very difficult to falsify, which limits the potential for errors to be found and further undermines the strength of the evidence.

In response to the concern that cases cannot be generalised, Flyvbjerg (2006) writes “...formal generalisation is overvalued as a source of scientific development, whereas ‘the force of example’ is underestimated.” Yin (1986) draws a comparison between a case study and a traditional, lab-based single experiment, noting that in neither instance does the experiment represent a statistical sample, but that in each example “the investigator’s goal is to expand and generalise theories...and not to enumerate frequencies”. Regarding the question of scientific approach and rigour, Yin (1986) again draws a parallel with other forms of research, arguing that researcher effects and bias can affect lab experiments, quantitative social research and historical research in a similar manner. The challenge is for the researcher to be disciplined, to work hard to account for biases, to be vigilant against jumping to conclusions, and never to exclude alternative explanations for phenomena, even if they do not align with the overall “narrative” of the work.

In undertaking this work, the researcher has remained cognizant of these limitations in the research method throughout, and further, has taken steps to counteract the effects of bias. This was done by making use of relationships to re-approach individuals in order to clarify points of uncertainty. It was also supported by beginning analysis early in the research project, which gave the opportunity to explore alternative explanations for phenomena during data collection and during analysis. In terms of direct effects such as interviewer effects (Gilbert, 2001), steps were taken to minimise this during the interviews (such as briefing interviewees thoroughly, and preferring confidentiality by default), but some effect is unavoidable, and must be accounted for in the analysis. For example, it is important to consider that what is being said by an interviewee may have been heavily suggested to them based on the way in which the question was posed. In
all cases, when reviewing and analysing interview data, the researcher had note of the exact wording of the original question to which they are responding.

Conceptually, the scope of this research was limited to selective elements of a single organisation. The study did not fully explore important aspects of the case organisation. Some of the excluded areas were the financial models and underpinning economics of the company and its products, the sales and marketing approaches and techniques, and the composition and structure of the company’s senior leadership and board. Detailed study of these areas would have almost certainly yielded very interesting new results which would have complemented the other themes of the work strongly. Further, the work is limited by the lack of triangulating data from other organisations. This made it difficult to “benchmark” certain phenomena when they arose in the single case, and the research relied on the experience of the researcher to identify points of interest, as well as a thorough review of the literature.

8.4.2 **Strengths of this Research**

Single case studies like this are capable of providing insights into under-explored areas. In this work, the case study research strategy was vital to explore the research questions posed at the outset. In particular, the choice of the case study approach for this work encouraged an exploratory approach, which encouraged the researcher to freely follow leads and fully explore the reasons behind particular findings or phenomena. For example, the Net-Works project drew the attention of the researcher initially because it was a major project which well publicised by the company upon launch. This led to an exploration of the co-innovation team and the discovery of other related innovation projects. In turn, this enabled the “bigger picture” examination of innovation across the organisation, forming the basis of the work of Chapter 7 and the related publication (Luqmani et al., 2016). As mentioned in Chapter 3, the embedded nature of the EngD doctoral training itself enabled iterations between the findings and data collection. This further strengthened the research by enabling the researcher to return to individuals and topic areas to confirm or clarify points, and uncover further details. It also helped the researcher to build a trusting relationship with the individuals featured in the research (and with the organisation as a whole), which led to exceptional access to people and information. A visiting external researcher would
probably not have been able to obtain such access. Another related strength of the approach was the longitudinal nature of the work. Other studies of Interface appear to present the company in an extremely positive light and use Interface as an example of an “ideal type” (e.g., Stubbs and Cocklin, 2008; Lampikoski, 2012; Dubose, 2000). Such studies, while seeming well grounded and carefully analysed, fall short of criticising the company in any way, instead utilizing the company’s relative success as evidence to support their arguments. However, these studies failed to identify any of the concerns raised in the current work, such as the weaknesses in the social side of Mission Zero, or the major challenges faced by the Evergreen Service Agreement. This demonstrates a potential weakness of studies which adopt a single-sampling approach to data collection (i.e. arranging a set of interviews with specific individuals during a short time period, and then analysing these all at once). By comparison, van der Heijden et al. (2012) undertook a longitudinal study of Interface involving several points of data collection over a 10 year period. The latter author was able to identify long-term shifts in the ability of internal change agents to make sense of sustainability at the company, and also uncovered numerous weaknesses in Interface’s approach to communication, which was littered with confusing jargon. These examples from the literature highlight a difference between case studies which involve a single sampling of the data, compared with the “iterated” case study approach as used in the present work. It is considered that iterations such as these are important for improving the robustness and accuracy of case studies at any scale. Conversely, it is possibly that “single-sampling” approaches are prone to error and should be used only if an iterated approach cannot be used.

8.4.3 Future Research Directions

Perhaps the most obvious way to expand directly upon this work would be to identify one or more organisations with which to undertake comparative cases. This would enable the findings at Interface to be directly compared and contrasted. Better still would be to compare Interface with similar companies in the same sector (e.g. Desso, Milliken, Shaw, Mohawk), and then to also compare Interface with other similar “sustainability leaders” such as Patagonia, Unilever or Marks & Spencer (GlobeScan and SustainAbility, 2015). This would help to calibrate the findings about sustainability leadership and sectoral dynamics, both of which are vital mechanisms enabling
ecological modernisation at the organisational level to translate to the wider, macro-sociological level.

The work identified temporal dimensions of EM, suggesting that there could be major challenges lying ahead for the thousands of companies embarking on sustainability journeys in the coming decades as they reach the “tall canopy” where the easy cost savings and fast return on investment activities have been done. Further exploration of this idea is needed by looking at other firms with long term commitments to sustainability, perhaps building upon the work of Eccles et al. (2014) whose work compared two cohorts of US companies representing the “top” and “bottom” of the scale in terms of the number of sustainability policies they had adopted by the year 1993.

Building upon the work of Adams et al. (2012), it would be interesting to explore whether there are any emerging “systems builders”, either in the private sector or in other sectors. A major challenge is in efficiently identifying true “systems builders” without wasting too much time wading through corporate spin and “greenwash”. A study could examine the practices and dynamics of the systems builders with the goal of enabling further systems builders to emerge and thrive, catalysing wider EM at the macro-sociological level.

Another potentially fruitful avenue for exploration, which this work hints at, is to consider ways to measure the influencing power of companies like Interface in the area of sustainability and corporate social responsibility. While the external results of “influence” can be observed, it is not clear how an influential position is built in the first place. What are the antecedents of a company's rise to a position of influence? What value is there for a company in being “influential”? An exploration might include Interface as an example among others, and could extend beyond the field of sustainability to consider other areas of corporate social responsibility such as responsible business practices, transparency, community engagement and political influence.

Finally, the challenge of complexity was raised earlier in this chapter. The systems described by this case and those studied by EM scholars are complex in nature, and thus
are very difficult to model or predict (Bar-Yam, 1997). There is a significant body of work associated with the modelling of complex systems, which is an entire topic of research in itself, but also has applications in domains such as policy, economics and ecosystems. An interesting potential future direction for research would be to build a complex theoretical model of an EM system using case data, theory and other qualitative and quantitative data. This could enable more realistic evaluation of the potential impacts of policy changes, market dynamics and environmental changes, and would be an interesting way to explore system-level EM theory.

8.5 Closing Remarks: Climate Take Back

Since the conclusion of the collection of the case material and the writing of this thesis, Interface has reassembled the Eco Dream Team and, with their guidance, has undergone a significant transformation towards a new environmental goal. “Climate Take Back” is the company’s new campaign, which aims to move beyond the 2020 vision of Mission Zero and “fulfil the vision of becoming a restorative enterprise”; that is, to go beyond being a “zero impact” organisation and towards becoming a “positive impact” one. The campaign is still in its early stages, but appears to involve the design of products with a negative carbon footprint. This aligns closely with the definition of systems building, as defined by Adams et al. (2012), who describe this environmental approach as “a strategy of seeking to become increasingly sustainable rather than less unsustainable” (pg. 18). According to the company’s promotional material, Climate Take Back does not replace Mission Zero, but takes it beyond 2020:

“After decades of hard work, Interface is poised to reach its Mission Zero goals by 2020. Climate Take Back is our new mission and we want to share it with the world. We commit to running our business in a way that creates a climate fit for life—and we call on others to do the same.”

(Interface, 2016)

It still remains to be seen whether Interface will actually achieve its Mission Zero goals in 2020. Given this recent move, it seems that the company is confident that the task can be completed, although as noted in this case study, there are significant gaps remaining
in achieving this, with the most difficult reductions to tackle being the final few percent. It is possible that this “Climate Take Back” initiative is a distraction tactic to draw attention away from the fact that the company may not really achieve its *Mission Zero* goals as originally promised. However, in this instance, optimism remains. Interface is a company undergoing radical change. The appointment of Jay Gould as President and CEO seems to have brought in a renewed sense of energy at the top of the organisation which had been notably absent since the loss of Ray Anderson in 2011. While Interface cannot solve the problems of climate change alone, this thesis has shown that a single organisation can leverage substantial change and ecological modernisation activity in related industries when it adopts a strategy of bold, proactive sustainability leadership with an engaged workforce and an innovative approach to tackling (and marketing) sustainability.
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