

SUSTAINABLE DEVELOPMENT: THE NATURE OF CHANGE AND THE
INFLUENCE OF CULTURAL TRAITS

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SUSTAINABLE DEVELOPMENT: THE NATURE OF CHANGE AND THE
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Abstract

It is only in the last few years that researchers have started to investigate the impact of cultural characteristics on the approach nations take to addressing the demands of sustainable development. The basis of such work tends to resort to the use of frameworks that were developed by Hofstede and the GLOBE project. Rogge, Dessein, and and Verhoeve (2013) argue that research into subjects as complex as this should commence with work of a more exploratory nature. This thesis is multidisciplinary, and uses a variety of methods to provide that first exploration into the nature of this relationship. My review of literature reveals that there is general acceptance that paradigmatic change is necessary but that decision making, behaviour and politics all tend to “safer” incremental steps. Using systems theory to examine the nature of paradigm change I identify the potential scope of government influence. The remainder of my work concentrates on the development of case studies of Japan, Denmark, Sweden and the United Kingdom, focussing on the manner in which the governments concerned support small to medium sized enterprises (SMEs) within the country in developing more sustainable practices. I use these case studies to identify the impact of culture. I find that the cultural dimension as defined in classic frameworks is not the pertinent issue, but the nation is likely to be sensitive to environmental demands if the environmental damage impinges on areas of their life that they value. If there are characteristics within the nation that provide for care and support then action is more likely to be taken. The other characteristics necessary to see through financing such action are perserverence and a long-term view. My other finding is that the use of statistical analysis and frameworks of cultural characteristics is problematic in that they both simplify a subject that should be understood in all its complexity.

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Chapter 1. Introduction

“If you don’t understand everything, you don’t explain anything.”

(Claude Lévi-Strauss, 1978, p.13)

1.1 Sustainable development

The subject of sustainability has been recognised in many fields since the dawn of civilisation. This is due in part to the basic need within any civilisation to find food and water (Chant, 1999, pp.32–3; Fischer-Kowalski and Harberl, 2001, p.60). Indeed primitive people actively sought to minimise their impact on the environment, and were able to live in conditions that would not support current western lifestyles (Lévi-Strauss, 1962, p.226; Fischer-Kowalski and Harberl, 2001, p.70). This would suggest that development as defined by Truman, the establishing of western lifestyles supported by technological progress initiated in the industrial revolution (Howard, 1994; Sachs, 2000, p.28), has in fact moved societies away from an essential quality, that of being able to sustain a lifestyle. Encouraged by environmentalists, ecologists and pressure groups, followed by governments, economists and businesses, have all identified the need for sustainable development, and the last twenty years have seen it become a growing subject of academic interest.

Historically there has been a tendency to delay care for the environment in industrial societies until the point where the impact of environmental damage has become obvious. For instance, the dangers of lead in petrol were recognised as early as the 1920s, but it took 50 years for the governments of America and Europe to ban its use, by which time the proliferation of cars on the road and the incidence of lead poisoning had made it impossible to ignore the resultant problems (Brown, 2000). Similarly, the role of CFCs in breaking down the ozone layer was known some 10 years before the raised incidence of skin cancer in the southern hemisphere prompted governments to ratify the Montreal Protocol to control their use (Doniger, 2007). In both cases, subsequent action has facilitated dramatic improvement; nevertheless there is much evidence to suggest early resolution would have led to a smaller problem (Brown, 2000; Doniger, 2007).

It is only relatively recently that governments have acknowledged the need to control activities that are not environmentally sustainable, but there is still debate regarding the nature of the problem and the action that should be taken. It should be recognised that sustainability depends on more than just the control of climate change; another pressing demand that needs addressing is that of resource use.

The need to respond to depleting resources has been avoided in the same manner as the response to the need to curb emissions. For instance, known oil reserves in Saudi Arabia are one quarter of what is needed to maintain production until 2030, and one eighth of the quantity needed if demand grows as anticipated (Ramady, 2009).

At a more general level, it is claimed that the earth can supply less than one quarter of the resources required to enable the third world to match the lifestyle of the average American (Groc, 2007; Davies, 2008). However, resource use underpins much business activity and constraint is seen to threaten national competitiveness (Jinnah, 2003; Falke, 2011).

Environmental issues are inextricably linked to societal welfare; however, I would argue that values held by societies both constrain and direct action. A comprehensive call for action was made in the early 1970s with the publication of *The Limits to Growth*. Based on a computer simulation that admittedly omitted some parameters, it clearly argued that use of resources had to be curbed, but 20 years later an amended program revealed that society had overshoot the limits. A sequel 10 years later reported that little action had been taken (Meadows, Randers and Meadows, 2004).

International agreement such as the 2009 Copenhagen Accord is resisted on the grounds that it impedes equitable distribution of the burden associated with limiting environmental degradation (Johnson, 2007; The Economist, 2009). Thus it is apparent that whilst the need for global action was sufficiently pressing to stimulate the call for international action, other interests prevented the development of an adequate resolution.

The case of the Copenhagen summit was particularly interesting. Blocs of countries were sufficiently alike to desire similar outcomes to the extent that, prior to the summit, some had agreed to speak with one voice (LaMotte et al,

2010). However, at the summit itself, there was barely an agreement between any two countries (LaMotte et al, 2010). This suggests that something else beyond the degree of industrialisation or capacity to change influenced proceedings and the resultant decision.

There is also debate about the degree of change that is considered necessary in order to secure a sustainable future, ranging from the view that it is such that “business as usual” is feasible (Markus et al, 2006; Byrch et al, 2007; Clifton, 2010) to a change that is argued to be of the order of a paradigm change (Kearins and Springett, 2003; Kasterhofer and Rammal, 2005; Gobble, 2012).

1.2 Paradigm change and sustainable development

Sustainable development is a much debated term. However, for the purposes of this thesis, the term “sustainability” is to be understood to mean any style of life that can be maintained over time using an equitable share of environmental resources without depriving others of their share. It follows that “sustainable development” should be seen to embody making whatever changes are necessary to allow civilisations to move towards a sustainable position.

Kuhn, one of the leading philosophers in the latter half of the 20th century, developed the concept of the paradigm. He noted that the development of understanding was not linear, but whilst there was stability for a period, some form of revolution would change perceptions of knowledge and ways of thinking that operated previously would not be considered to be as useful in the new era. It was these periods of difference that Kuhn referred to as paradigms (Smith, 1998, pp.193–198).

Paradigms can be identified by a predominant way of thinking which does not align with dominant thought within a different paradigm. This can be to the extent that it is considered that they inhabit “different worlds”, interpreting events differently and even having different views of what is considered scientific knowledge. The difference is such that Kuhn concluded that they were incompatible, and the wisdom in one could not be deemed wise in another. Similarly, assumptions that are held to be valid in one paradigm are questioned in another (ibid).

The term “paradigm” is used more widely than Kuhn’s original conception of the phenomenon, but the common meaning within each of its usages focusses on

distinct patterns of thought. The loosest definition does not even demand incompatibility between the paradigms (Smith, 1998). For the purpose of this research, I will be using a definition of paradigm closer to Kuhn's original concept:

Where the intellectual foundations of the community are such that to move from his paradigm to another would require reorientation of the type identified by Kuhn as a gestalt shift. In this case we can identify a distinct scientific community with its own institutional foundation and academic career ladder existing within a particular field of knowledge. This use acknowledges the presence of competing paradigms in the same field of knowledge but requires them to be incommensurable.
(Smith, 1998, p.198)

In that the developed world appears to be following a trajectory that is considered not to be sustainable, it is argued that a sustainable trajectory is likely to involve a change of paradigm. Indeed, Ruckelshaus (1989), the first administrator of the United States Environmental Protection Agency, clearly considered the necessary change to be of this order when he stated:

Can we move nations and people in the direction of sustainability? Such a move would be a modification of society comparable in scale to only two other changes: the Agricultural Revolution of the late Neolithic and the Industrial Revolution of the past two centuries. These revolutions were gradual, spontaneous, and largely unconscious. This one will have to be a fully conscious operation, guided by the best foresight that science can provide. If we actually do it, the undertaking will be absolutely unique in humanity's stay on Earth. (Ruckelshaus, 1989, cited in Kajikawa, 2008)

The question of whether such paradigmatic change is required is examined along with the resultant implications. Ruckelshaus identified a critical quality of the change that is to be made, namely that it should entail a "conscious operation". Thus understanding of the dynamics of paradigm change as well as change management and the demands of sustainability constitute a necessary prerequisite to managing such transition. Paradigm change is therefore investigated and used as a benchmark against which to assess effective action.

1.3 Culture and sustainable development

It is argued that the differences in approaches to sustainable development could be attributed to culture (Husted, 2005; Park, Russell and Lee, 2005; Caprar and Neville, 2012). Caprar and Neville (2012) maintain that culture not only influences the manner in which a nation recognises environmental damage, but it also influences the nation's response and ability to change. There is a growing body of authors who identify a correlation with various activities that can contribute towards sustainable development, but as yet there is little evidence of studies investigating the precise nature of this relationship in this emerging subject.

An investigation into the characteristics of the relationship between culture and sustainable development is core to my thesis. This, however, demands understanding of the wider subject because it is necessary to differentiate between what can be attributed to culture and what is caused by another factor.

There are many definitions of culture, but the one that is relevant to this work is the styles of behaviour that are common to a nation. They are the characteristics that have been the subject of major studies such as those of Kluckhohn (1961), Hofstede (1984; 1991), Hampden-Turner and Trompenaars (1994; 1998), and House et al (2004) that reveal why nations differ in what they consider appropriate action and can fail to come to agreement.

The work of House et al correlated largely with that of Hofstede, undertaken some 20 years earlier. This could suggest that their findings are robust, and that both their work and the intervening study of Hampden-Turner and Trompenaars are relevant today and could provide the basis of greater understanding about the cultural characteristics that contribute to sustainable development.

1.4 The objectives of this research

Prior research identified by Caprar and Neville (2012) has sought to identify correlations between specific cultural characteristics and individual behaviours. This thesis seeks to assess the extent to which these correlations are robust. To achieve this objective, it is necessary to understand the demands of sustainable development as well as the behaviours associated with initiatives leading to sustainable development. These are explained in greater detail:

1.4.1 The demands of sustainable development

Since the turn of the century, the need for sustainable development has become accepted by most developed nations (EC, 2006, cited in Gehring and Plocher, 2009), but the definition is vague and contested (Ciegis et al, 2009; Quental et al, 2010). This leads to a need to assess the full implications of sustainable development, specifically:

- The nature of change that sustainable development requires.
- The extent to which governments and societies recognise the need for sustainable development.
- The factors that should be considered when addressing sustainable development.
- The agents involved in sustainable development.
 - The extent to which businesses could legitimately be expected to accommodate sustainable development.

1.4.2 The extent to which other factors influence the response to the demands of sustainable development

Decisions are not made in a vacuum. This thesis examines the range of influential pressures on the core decision makers, namely:

- Pressures that are faced by business decision makers.
 - The extent to which decisions are constrained by the decision-making process itself.
 - The extent to which the character of the decision maker influences the decisions that are made.
- The role of governments.
 - The extent to which political persuasion predetermines the style of decision made.
 - The extent to which the political environment facilitates the development of measures to support sustainability.
 - The range of tools and instruments that are available to encourage sustainable behaviours.

1.4.3 An assessment of the impact of culture

The papers summarised in the meta-analysis by Caprar and Neville (2012) are based on assumptions that need investigation. Critically, there is no indication

of whether the correlations that have been identified are in fact evidence of collinearity, or whether they stand in isolation of each other. Much more needs to be understood about the nature of cultural difference and its impact on action, in particular in relation to sustainable development, namely:

- The characteristics of the correlations that have been identified.
 - Whether the correlations are coincidental.
 - Whether the cultural characteristics work together or in isolation from each other.
 - Whether there is a dominant characteristic.
- The extent to which cultural characteristics are robust.
 - Whether a change in the precise factors that constitute a cultural dimension will change any correlations that have been identified.
 - The extent to which national cultures identified in a corporate setting are applicable at a broader level.

1.5 The nature of the subject area

Both culture and sustainable development share the similarity of complexity. Rogge, Dessein and Verhoeve (2013) identify three characteristics of sustainable development that result from its multifaceted nature and help explain the complexity of the subject, namely:

- The involvement of different actors with different agendas. These are not all complementary and consequently create tension and power struggles.
- The need to understand different types of knowledge emanating from disparate disciplines. These range from human behaviour to physics and chemistry. The need for knowledge is further complicated by uncertainty because it involves the prediction of long-term outcomes.
- Its management involves decision making by different bodies at different levels, incorporating a potentially erroneous assumption that they all have knowledge of each other's decisions.

Similarly, in relation to cultural studies, Hampden-Turner and Trompenaars recognise that “complexity requires many sources of knowledge and multiple authorities, all needing to be reconciled” (1994, p.94). In seeking to understand

the impact of culture on sustainable development, this thesis adopts a holistic interdisciplinary approach in order to ensure that the findings are robust.

1.5.1 Accommodating complexity

Accommodating the nature of the subject area outlined in section 1.5, this work has had to be extensive, because it was considered that concentration on just one area within the topic would prevent its full characteristics from becoming known and, critically, could lead to erroneous conclusions.

The required breadth of subject matter dictates a detailed methodology and an extensive review of literature to ensure all aspects are given due consideration. The methodology needed to include considerable explanation of the sample choice. Having examined the work identified in the meta-analysis conducted by Caprar and Neville, it became clear that sample choice itself could determine the findings. With a limited number of case studies, I had to be sure that the sample was carefully selected. For this reason an entire chapter prior to the case studies has been devoted to exploring cultural characteristics of nations and using the knowledge gained to inform sample selection.

1.6 The structure of this research

The critical review of literature in chapter 2 commences with an investigation into the development of the awareness of the need for sustainable development, along with an analysis of the different models used to depict sustainable development. The purpose of this is to establish whether the development of the understanding of the style of change that is required in order to achieve sustainable societies is of the order of a paradigm shift as suggested by Ruckelshaus (section 1.3).

The next section on the literature contains an examination of cultural difference in the developed world, and explores the different approaches to defining it. Finally, factors that relate to the decision-making process are assessed, in particular focussing on the character needed when decisions relate to sustainable development, including the impact of the role of the decision maker.

Chapter 3 provides a methodology that explains the philosophy supporting the remainder of the work along with further explanation of the methods used. The following chapter is an exploration of the dynamics of paradigm change that demonstrates the central role of governments and the need for education.

Indeed it is acknowledged that local governments are best placed to drive sustainable development initiatives (Betsill and Bulkeley, 2006).

Chapter 5 contains a further methodology, providing a detailed description of the process undertaken to select the samples that were to form the foundation for the final part of the investigation. Starting by developing a better understanding of the cultural characteristics of individual nations that have been found to support sustainable development, it then explains the selection of the nations for the final part of the work and identifies a framework for the development of the case studies.

Chapters 6 to 9 provide the four case studies developed as a basis for comparison, and chapter 10 provides a detailed examination of a sample of London boroughs as a form of control. Inhabiting the same city, they share the same culture, but boroughs have been selected that sample other parameters shown to influence steps taken towards sustainable development.

In chapter 11 the case studies are compared with each other and the cultures that have been attributed to the countries concerned. The resultant understanding is used to add the influence of cultural characteristics to the findings in chapter 4 relating to the mechanisms of paradigm change.

The final chapter concludes this thesis, identifying the extent to which the understanding about cultural difference and sustainable development adds further insight to the body of literature explored in chapter 2.

1.7 Situating this thesis in prior literature

Sustainable development is a comparatively new discipline, a search in a database using the term revealing that few research papers were published before the 1990s. As yet there is no commonly accepted interpretation of its definition. Ceigis et al (2009) recognised that individual schools of thought developed their own understanding of the concept, and conducted a systematic review of the definitions and interpretations in literature. Similarly, Borland (2009) identified a range of models that demonstrated the breadth of perceptions explaining the interaction of the various components seen to be fundamental to sustainable development. This research has combined both of these perspectives and included an analysis of the variety of views relating to the factors that underpin sustainable development. This more holistic overview

provides a more robust basis from which to identify themes, synergies and tensions relating to the subject.

Recent papers on sustainable development have started to cross the boundaries of more disciplines. My work has a more extensive cross-disciplinary nature, which includes political science and cultural and behavioural studies as well as the core of environmental science and environmental economics, a pairing which until recently dominated the subject. Subsequently, environmental economics has been studied alongside environmental politics because economics is a tool of the politician.

Researchers have identified differences in the adoption of relevant practices based on cultural influence, but little has been done to bring the two disciplines together (Caprar and Neville, 2012). Similarly, behavioural science has only been recently aligned with the challenges associated with sustainable development and decision making (Kajikawa, 2008) and it is argued that much more understanding in this area is needed to facilitate the academic subject of sustainable development in becoming applied and thus of functional use (Kajikawa, 2008).

With this in mind, and because many of the decision makers are in the political arena, political theory has also been included to assess the other pressures on politicians and the influence of the electorate. This differs from environmental politics in that it seeks to identify influence brought to bear on decisions by the political role itself rather than to analyse the different stances with respect to the environment adopted by political parties.

Thus, whilst much work is focussed on developing an understanding of individual issues at a deeper level, this work contributes a more holistic overview and analyses case studies using this broad overview to assess the manner in which disparate issues influence sustainable development within the developed world.

1.8 The contribution of this thesis

The aim of this study is to provide a deeper understanding of the relationship between culture and the “conscious operation” identified by Ruckelshaus that is required if societies are to move towards a paradigm that is sustainable. It identifies the type of change required and, using both theoretical and practical

models, shows how sustainable development requires a conscious decision that at times may appear to be counterintuitive.

The analysis of cultural difference aids the development of understanding of the causes of difference between nations in the global debate. In addition to this, the highlighting of specific difficulties that stand in the way of sustainable development can assist in the development of tools and activities designed specifically to mitigate their effect. Similarly, the consolidation of knowledge relating to current activities can facilitate the cross-fertilisation of ideas, broadening the scope of action for all.

Finally, this work has critically assessed the manner in which researchers seek to correlate individual cultural characteristics with specific behaviours leading to sustainable development. This is an important contribution because research into this combination of disciplines is in its infancy, and it is necessary to assess whether the approach is robust, or whether the complexity of the subject matter is such that a different approach should be taken.

Chapter 2. A Critical Review of Literature

It has been argued that governments and business alike should develop strategies that, whilst achieving short-term objectives, do not compromise their ability to facilitate long-term growth (Pehrsson, 2000; Laverty, 2004; Lombardo and D’Orio, 2012). Thus sustainability and the process of achieving it, sustainable development, have become topics of growing concern.

The finite nature of resources, growing competition for renewable resources and climate change are global issues that present a growing challenge to business and societies, and these issues are now becoming a more common constraint guiding planning decisions (Hutton, 2001; McManus, 2008; Murthy, 2012).

However, whilst there would appear to be a common goal, debate surrounds the subject and individual perspectives are such that the definition of the terms “sustainable development” and “sustainability” itself is still debated (Worrall, 1999; Meadowcroft, 2000, p.268; Dressner, 2002; Redclift, 2005; Luke, 2005; Aras and Crowther, 2009). It is also recognised that even with a common goal, cultural difference is such that the development of a common strategy to address sustainable development is compromised (Hampden-Turner and Trompenaars, 1994; Chang, 2002).

In seeking to develop understanding of these differing paradigms and the manner in which they relate to business activity, this review of literature will consist of seven sections.

In the first section I consider the role of business. If paradigm change is to be achieved then it could be argued that business should take an active role in driving the change. With this in mind, I review the onus on business to adopt a socially and environmentally responsible stance.

In the second section, I explore current understanding of the parameters of the subject of sustainable development and sustainability. I review literature that relates to the dependence of business on the environment and follow this by examining the emergence of the acceptance of environmental demands, together with the manner in which sustainable development and sustainability are defined and understood by different sectors, in order to reveal fundamental

divisions based on differing values and ideologies in the understanding of how the subject of sustainable development should be approached.

In order to fully understand the variety where considering sustainable development is concerned, the third section is a study of different models of sustainability which I examine along with responses to the models in order to determine the extent to which they represent mainstream viewpoints. Differences between ideals and action are revealed.

Responding to the observation that countries with similar histories and at similar stages of development display significantly different behaviours, in the fourth section, I concentrate on culture, identifying the manner in which cultural characteristics are classified and the veracity of such constructs with a particular focus on identifying the extent to which they facilitate the ability of those displaying a cultural characteristic to manage change and, importantly, accommodate the demands of sustainable development.

I then examine other influences that underpin the actions of a society. In the fifth section I examine decision-making models with a particular focus on the manner in which the nature of sustainable development is compatible with current practice in order to determine the extent to which the environment can be considered in business decisions. In addition, I examine the will to make such decisions through a review of economic theory relating to free riding.

In the sixth section I consider the decision maker themselves. This entails consideration of the discipline of behaviour in order to establish the extent to which circumstances could cause the decision maker to make a poor decision. These vary according to whether the decision maker is working alone or within a group setting.

In the last two sections I examine decision making in the political arena. The penultimate section investigates the role of the politician and the electorate in the democratic structure, along with the impact of public choice theory and the freedom of the politician to legislate on issues that relate to sustainable development, helping to ensure that I do not attribute behaviours to a purely cultural cause when there could be another legitimate answer. The final section is a review of the tools that are available to encourage sustainable behaviours.

2.1 The remit of business

In the dominant paradigm of the developed world, the profitable use of finance within a business is of paramount importance to both the business itself (Lloyd, 1998; Ali, 2006; Ayyagari, Demirgüç-kunt and Maksimovic, 2008; Zhou and Da, 2010; Volk, 2013) and governments, the latter being through the generation of tax revenues (Spangenberg, 2004; Ayyagari, Demirgüç-kunt and Maksimovic, 2008; Mouhammed, 2009).

From a business perspective, the profitable business attracts investment, facilitating growth (Primeaux and Steiber, 1997; Ayyagari, Demirgüç-kunt and Maksimovic, 2008; Volk, 2013). Indeed, profitability influences shareholders in two respects. Firstly, profits are a prerequisite for funding a dividend, and secondly, they facilitate growth in the value of shareholdings and thus influence the choice of viable investments (Primeaux and Steiber, 1997; Lloyd, 1998; Volk, 2013). This places an onus on the business to ensure that the return on investment is sufficient to retain its competitive position.

Whilst not attracting shareholders, the argument is also relevant in the not-for-profit sector where there is a need to maximise utility from the available funds in order to demonstrate responsible practice and hence attract support (Primeaux and Steiber, 1997; Valentino, 2006). A principal tool used in maximisation of utility and profits is that of cost reduction (Primeaux and Steiber, 1997; Ali, 2006).

It is against this imperative, that all businesses must manage their finances with great care, that the subject of sustainable development rests.

2.1.1 The stockholder

Proponents of the stockholder argument maintain that where businesses are funded by a third party, there is a moral duty to ensure that corporate managers maximise their profits, which should either be reinvested in the business or distributed in the form of shares to the investors who are in fact the owners of the business (Dobson, 1999; Asher, Mahoney and Mahoney, 2005; Kaler, 2006; Martin, 2013), gaining credence from the definition of the organisation that it is contractually “organized to achieve a specified end” (Hasnas, cited in Dobson, 1999), namely to make a profit for its owners (ibid).

2.1.2 The stakeholder

To counter the stockholder argument, it was maintained that other stakeholders have a legitimate claim to a share of the profits (Asher, Mahoney and Mahoney, 2005; Kaler, 2006; Hasnas, 2013; Martin, 2013). It could be shown that each stakeholder contributed some element to the business's profitability. Such cost to the stakeholder could range from labour to suffering from increased traffic or pollution (Kaler, 2006) and the stakeholder consequently deserved compensation from the profits in the form of fair wages or investment to ameliorate the suffering caused by the business activity (Asher, Mahoney and Mahoney, 2005; Kaler, 2006). Similarly, it is argued that stakeholders deserve consideration in strategic decisions relating to the policies and operations of the business (Emerson, Alves and Raposo, 2011; Hasnas, 2013).

2.1.3 Resolving the dichotomy

Criticisms of the stakeholder approach are varied. Firstly it was argued that it is morally unacceptable to use money invested for one purpose for another (Kaler, 2006; Martin, 2013), although Martin (2013) concedes that expenditure to parties within an organisation can be considered acceptable on the grounds that it can directly influence company performance. Secondly, seeing as shareholders owned businesses, the executives within the business were agents of the shareholders and should thus act in their interests (Kaler, 2006; Martin, 2013).

An economic argument maintained that a stakeholder approach would fragment the focus of the organisation and render it less efficient. This, it was argued, would result in lower profit levels and therefore less money within society, reducing overall benefit (Kaler, 2006; Orts and Strudler, 2009).

Importantly, the stakeholder argument was criticised for a lack of clarity regarding where the boundary should lie between who should be compensated and who should not, along with the difficulty of quantifying what that compensation should cost (Kaler, 2006; Orts and Strudler, 2009; Emerson, Alves and Raposo, 2011; Hasnas, 2013); indeed, there is significant variety regarding the exact nature of stakeholder theory (Orts and Strudler, 2009; Emerson, Alves and Raposo, 2011; Hasnas, 2013). Numerous more detailed criticisms of the stakeholder approach exist, largely in the form of equity and

practical application (Orts and Strudler, 2009; Emerson, Alves and Raposo, 2011; Hasnas, 2013).

To a certain extent, it is also argued that there is little difference between the two apparently opposing positions because of the impact of the market. It is considered that companies that have a poor reputation in relation to their stakeholders will find the value of their business is reduced, and therefore social pressure will cause the company to behave ethically (Dobson, 1999; Asher, Mahoney and Mahoney, 2005). Thus it has been deemed that corporate social responsibility is a moderating factor. However, this would only influence expenditure in issues for which there is real public concern.

2.1.4 Business duty towards the environment

The economist Milton Friedman has been described as the “ultimate defender of the stockholder model” (Dobson, 1999). His observations have been considered to be a reasonable benchmark against which to measure arguments claiming that business should attend to financing initiatives in support of sustainable development.

Friedman’s seminal essay “The Social Responsibility of Business Is to Increase Its Profits” (1970) provided a clear-sighted response that demonstrated the two schools of thought were not incompatible. The essay contains three passages that clearly express the need to consider stakeholders, but contextualises his arguments within the overarching need to be profitable.

Firstly, in stating that business should not “make expenditures on reducing pollution beyond the amount that is in the best interests of the corporation” (Friedman, 1970) there is an inherent assumption that some expenditure on pollution reduction is in the interest of business. He further demonstrates this need by hypothesising that it might be a sensible business choice to improve local amenities in order to secure a more able workforce. His accusation that business decision makers are “incredibly short-sighted and muddleheaded in matters that are outside their businesses but affect the possible survival of business in general” (Friedman, 1970) augments an appreciation of the need for businesses to be alert to and proactive regarding factors within the environment, and specifically society, that could threaten their future prosperity.

Gallagher (2005) explained the validity of this concept through the use of the case of tobacco companies where continued refusal to acknowledge the carcinogenic nature of cigarettes resulted in the payment of significant levels of compensation. Ethical action at the outset, namely acknowledging and warning of the danger of tobacco, would have avoided this expense. Critically, Friedman was suggesting that business should do nothing more than seek to be profitable not only in the short term but also in the long.

To fully appreciate Friedman's argument, it is necessary to situate his work against the backdrop of changing perspectives of society, business and governments that stimulated its production. Friedman's writings were written during a time of change in economic policy. In the period preceding his work, the focus of governments was on building capital in the wake of World War II (Aaronovitch et al, 1981, pp.76–79; Jan Luiten, 2000; Nwaforonso, 2009, p.11). However, this focus changed toward the end of the 1960s to one of investing in human capital based on the premise that economic prosperity depended on a skilled workforce (Kwon et al, 2009; Nwaforonso, 2009, p.11). Friedman consequently placed a greater emphasis on social responsibility than on environmental care because he was addressing the debate between the traditional stockholder position and the emerging movement relating to the need for businesses to support stakeholders.

In referring to the need to invest in order to secure the long-term survival of a business, it can be argued that the essence of Friedman's observation is that organisations must ensure that the resources they rely upon to function are sustained and, if profitable to the business's long-term prosperity, nurtured. I would therefore argue that Friedman could be understood to sanction expenditure on sustaining the environment provided it is in the long-term financial interests of the organisation to do so.

In this, Friedman could be considered to be ahead of his time because the world focus was not turned to the issue of environmental sustainability until the late 1980s when "Our common future" was published preceding the Rio Earth Summit (Leavoy and Phyper, 2010). Working towards achieving and maintaining environmental sustainability has now become an issue that is the basis of legislation, and planning to protect it is seen to be not only good business practice but potentially of vital importance for business survival

(Kiernan, 1992; Olson, 2005; Kiewiet and Vos, 2007; Leavoy and Phyper, 2010; Katrinli et al, 2011). Indeed, an environmental focus can itself provide a stimulus for business opportunity and prosperity (Porter and van der Linde, 1995; McDonough and Braungart, 2002; Canadian Business, 2010; Kepler, 2011; Duncan and Brundin, 2011).

2.2 Ideologies relating to sustainable development

The history behind the growth of sustainable development is of interest, because it identifies groups of protagonists that are still influential today. The way in which topics relating to sustainability became mainstream issues correlates with the extent to which environmental damage and exploitation by business activity was perceived to threaten values held by society.

The world's attention was initially drawn to the manner in which the environment would be threatened by growth in the early 1970s. There were isolated reports before this date, but they did not catch the attention of the masses (Tierney, 1990). However, collectively, together with ecological disasters that could not be ignored such as a Cleveland river igniting due to lax pollution controls on neighbouring industry, the problem of environmental damage caused by industrial activity was an undeniable threat (Nordhaus and Shellenberger, 2007, pp.22–24; Webber, 2008; Scott, 2009).

With an estimated 20 million Americans participating, Earth Day, held in 1970, proved to be a pivotal event (Tierney, 1990; Gallagher, 1998; Dresner, 2002; Webber, 2008). It was instigated by politicians and legitimised the development of laws to protect the environment, which before that point had been ruled to have no legal standing (Gallagher, 1998; Nordhaus and Shellenberger, 2007; Webber, 2008).

Further fuel for the sustainability debate was provided by the Club of Rome and the publication of *The Limits to Growth* in 1972 (Pezzoli, 1997; Hallman, 2002; Lumley and Armstrong, 2004; Jones et al, 2011). The book argued that the concept of growth underpinning western business practice was unsustainable to the extent that it would lead to societal ruin unless there was significant change in practice (Meadows et al, 2005). This led to a conference convened by the World Council for Churches in 1974 which produced a statement equating social stability with the need to distribute resources equally and structure

lifestyles that created environmental demands that were within the carrying capacity of the planet (Dresner, 2002; Hallman, 2002).

Thus different responses from a variety of sectors could be identified. Firstly, industrial activity associated with the business sector was recognised as the source of environmental damage. However, in line with Friedman's observation that business was "short-sighted and muddleheaded" about investment in externalities in order to secure long-term survival, it was not business that took the steps to protect the environment and with it their long-term interest, rather academics, church groups and politicians that catalysed public opinion giving government the mandate to act.

In the decade that followed, attempts were made to define sustainability and the associated term "sustainable development", and to understand what it entailed for both society and business. Again, this was government- rather than business-led, with the initiative taken up by the World Commission on the Environment where the development of the Brundtland definition of sustainability in 1987 (Leavoy and Phyper, 2010; Jones et al, 2011) created a catalyst for a proliferation of research and debate.

It is evident that the mainstream acceptance of the subject of sustainability is comparatively recent. It developed as it became undeniable that environmental damage posed a real threat to the paradigm of western lifestyles of which business activity is an intrinsic part. It is only around the turn of the century that attempts have been made to recognise the breadth of meaning embodied by the concept from different perspectives (Ciegis et al, 2009; Quental et al, 2010).

Indeed, the EU, considered to be a front runner where environmental protection is concerned, includes a clear statement of the need to consider environmental protection in the Amsterdam Treaty which came into operation in 1999; Article 6 states that "Environmental protection requirements must be integrated into the definition and implementation of Community policies and activities [...] in particular with a view to promoting sustainable development" (EC, 2006, cited in Gehring and Plocher, 2009), indicating that the most advanced nations where sustainable development is concerned recognised that they had not fully incorporated the concept by the end of the last century.

2.2.1 Factors contributing to environmental sustainability

The events that led up to the realisation that environmental degradation could potentially threaten societies and business also indicate the range of harmful activities that should be addressed. These can be classified in a variety of ways, but a critical development that emerged was the distinction between local and global damage. Traditionally, as illustrated by the Cleveland river igniting (Nordhaus and Shellenberger, 2007, pp.22–24; Webber, 2008; Scott, 2009), it was recognised that pollutants and emissions damaged local environments.

In contrast, the realisation emerged that some emissions caused environmental damage at a global level which in certain instances created an adverse effect that was not experienced by the original polluter (Cole, 1999; Norgaard, 2006). Indeed, it is agreed that the impact of global warming on marine life occurs long before it leads to significant loss on land (Hayashi et al, 2010).

The final environmental issue to become a matter of concern was that of resource depletion, and this included not only finite resources used in industry, but also land, for which there was growing competition (Dresner, 2002; Hallman, 2002; Meadows et al, 2005). Consequently, in broad terms, caring for the environment involves limiting resource use and reducing both emissions that affect the local environment and those that are damaging on a global scale.

Using Friedman's analysis as a benchmark, the onus for business to respond to these demands could arguably correlate to the extent to which these factors compromise a business's future existence. For instance, it is clearly in a business's interest to limit resource use and, in that the business would look to the local population for its source of employees, it would be expedient to minimise local pollution. Indeed, Porter and van der Linde (1995) argue that waste and pollution represent lost revenue because the utility from the resource has not been fully exploited.

The need to reduce activities that have global effect, however, is not overtly persuasive. Climate change does not pose such an obvious threat to business because the principal impact of climate change has a greater effect on the developing world (Schneider, 2011). However, the western world is not immune and it has been recognised that climate change could destroy infrastructures necessary for business (Howard, 2009) and displace people (Schneider, 2011)

who are potentially essential workforce. It can therefore be argued that there is a duty on businesses to embrace every facet of environmental welfare.

Ehrlich and Barry equated the environmental burden with the product of population, affluence and technology in that the technology determines the environmental impact of resources used, and the size of the population, coupled with their spending power, determines the quantity of the products utilised (Starkey and Welford, 2000). Whilst the precise nature of these factors has been challenged, this approach begins to identify the multifaceted nature of the problem.

2.2.2 Counter claims

One observation that has underpinned arguments that societies do not need to be too concerned about environmental degradation is that societies tend to pollute more as they begin to develop, but as they attain a certain level of affluence, there is a tipping point at which environmental conditions are seen to improve. This is described as the “environmental Kuznets curve” (Cole, 1999; Dasgupta et al, 2002; Galeotti, Maneraa and Lanza, 2009; Cox, Friedman and Tribunella, 2011; Lempert and Nguyen, 2011).

The concept has been criticised because it is argued that developing countries export their polluting activities and waste products to less developed countries, resulting in an apparent improvement in the home nation offset by growing pollution elsewhere (Dasgupta et al, 2002; Galeotti, Maneraa and Lanza, 2009). In spite of this there is limited empirical support for this concept (Cole, 1999; Galeotti, Maneraa and Lanza, 2009; Cox, Friedman and Tribunella, 2011). However, research has shown that substances have different tipping points and at best the environmental Kuznets curve can only be described as a “fragile” concept. As yet, it would appear that no tipping point has been found for carbon dioxide (Cole, 1999; Salahuddin and Khan, 2013).

In addition to this, it has been observed that the reduction of the environmental pollution per unit of production is more than offset by greater consumption that is also stimulated by affluence (Lempert and Nguyen, 2011; Ru et al, 2013).

Simon and Khan (1984) and Lomborg (2001) make numerous claims to substantiate their opinion that a focus on sustainable development is not needed, underpinned by the argument that environmentalists exaggerate the

case. For instance, the basis of the criticisms responding to the need for emissions control is the claim that the earth is self-repairing and the evidence for us is that air and water quality in America and London had steadily improved over time (Simon and Khan, 1984, p.59; Lomborg, 2001, p.77).

There are three principal flaws in the argument substantiating this claim. Firstly, the data used were limited in scope. Lomborg identified a lack of reference to dioxins and heavy metals in his data and discounted the relevance by stating it was “probably” not relevant (Burke, 2001, p.84). Secondly, these critics place a lot of credence on the environmental Kuznets curve (Simon and Khan, 1984, p.57; Lomborg, 2001, p.77); however, it has been established that this is a weak concept to rely on.

Burke (2001, pp.84–85) highlighted reports showing that environmental health within the Asia Pacific region, where societies were seeking development, had deteriorated to the point where its ability to support human existence was already compromised. This rendered the argument that the environment would correct itself at an undetermined point when sufficient wealth had been attained untenable because the capacity for further deterioration did not exist.

Finally, these critics refer to human intervention causing the environmental improvement that they claim to be evidence that the issue need be of no concern (Simon and Khan, 1984, pp.57–59; Lomborg, 2001, p.77) and, in doing so, undermine their own argument.

Further criticisms of the concept of the earth’s limited carrying capacity stem from economists who argue that falling real prices of natural resources are evidence that their supply is growing in comparison to demand (Beckerman, 1994; Dryzeck, 2005, p.53; Lam, 2011). However, where falling prices are due to the development of new technologies, demand is transferred to other resources (Dryzeck, 2005, p.53; Lam, 2011). This pattern, it is argued, comes with no guarantee that there will always be a substitute and therefore is an unsound justification for the argument that resources are limitless (Dryzeck, 2005, p.54), and provides evidence that continued efforts should be made to ensure that resources continue to be sufficient (Lam, 2011).

The concept of man’s contribution to climate change has also been disputed, with one of the more powerful bodies of opposition being the conservative

Republicans of America (Luce, 2006; Osofsky and Levit, 2008; Mccright, 2011) who maintain that the scientific evidence does not irrefutably prove that human activity causes it (Mccright, 2011; Schneider, 2011). This position legitimises businesses failing to invest in carbon reduction technologies. However, it is claimed that scientists now agree that there is sufficient scientific evidence to state categorically that humans have contributed to climate change (Osofsky and Levit, 2008; Mccright, 2011; Schneider, 2011) and that any residual disagreement reflects an inability to understand the science, rather than a lack of evidence (Mccright, 2011; Schneider, 2011).

Thus, whilst there are those who would argue that the carrying capacity of the earth need not be regarded, this would appear to be an effort to deny the harsh facts rather than a claim justified by solid evidence (Norgaard, 2006). Indeed Lomborg's criticism was found by the Danish Committee on Scientific Dishonesty to be such a case of blatant disregard for the fact that they considered it to qualify as a case of scientific dishonesty (The Economist, 2003; Dryzeck, 2005, p.56; Hansen, 2008), and it was only the claim that Lomborg acted out of ignorance rather than intention to deceive that prevented the case being carried (Dryzeck, 2005, p.56; Hansen, 2008).

2.2.3 Defining sustainable development

In 1995, at least 386 definitions of sustainable development were reported, largely reflecting individual perspectives within society as well as applications such as decision making. 100 of these could be related to disciplines within economics (Ciegis et al, 2009). This is an illustration of the extent to which the concept eludes universal agreement, and it is suggested that attempts to produce a common definition should be considered futile (Marcel, 2003; Ciegis et al, 2009; Quental et al, 2010).

The commonly accepted definition stemming from the Brundtland Commission, "development that meets the needs of the present generation without compromising the capacity for future generations to meet their own needs" (UN, 1987; Quental et al, 2011; Soares et al, 2012), is open to criticism, interpretation and debate (Stern, 1997; Worrall, 1999; Meadowcroft, 2000, p.268; Dressner, 2002; Redclift, 2005; Luke, 2005; Aras and Crowther, 2009). Indeed, it was designed to be "deliberately vague" (O'Riorden, cited in Stallworthy, 2002, p.2; Kojima, 2007, p.4) in order to embody the diversity of opinion underlying the

concept. This is evidenced in the number of interpretations of the Brundtland definition that are generally classified as “weak” or “strong”, or sit between the two positions (Ang and Van Passel, 2012).

2.2.4 Strong sustainability

Aligning with the values of the ecologist, in the strongest form, sustainable actions would lead to the preservation of resources for future generations to use in a similar manner to that in which they are currently used and thus depletion should be reduced to remain within the carrying capacity of the earth. In its strongest form, “deep greens” argue that the environment should be respected above the needs of humans (Dresner, 2005, pp.183–227) and environmental damage should not occur in any form because all elements within the environment should have a right to exist. However, a more anthropocentric view maintains that resource use should be at a rate that facilitates preservation of the lifestyle (Hopwood et al, 2005; Redclift, 2005; Byrch et al, 2009). This requires ensuring that the present generation limits its use of resources.

The implication for business and its current pattern of resource use is significant. Research suggests that the ecological footprint of the world in 1980 was at its sustainable limits (Meadows et al, 2005, p.293; Brown, 2003, p.37). This meant that businesses should be seeking to reduce their resource use to no more than the level of 1980. This, however, did not factor in population growth.

In the late 1990s, the rate of population growth was established as a cause of concern. The population had doubled in the preceding 40 years (Lester et al, 1999; Pimentel and Pimentel, 1999; Lam, 2011), creating a rate of growth of over 1.5%, at which rate the population of 1980 would be set to quadruple by 2070. This led to the belief that the materials intensity of goods and services should be reduced by a further factor of four in order to ensure that the necessary gains were made, putting further pressure on the changes that would be required by business. Indeed in 1995 Spangenberg maintained that there should be a 75% reduction of fossil fuel usage by 2050 (McLaren, cited in Welford, 1997, p.14).

Similarly, Spangenberg maintained that carbon emissions should be reduced by 77% (McLaren, cited in Welford, 1997, p.14). This is considered by some a

conservative estimate (Schofield and Manisty, 2009; Strachan and Usher, 2012; Crawford-Brown, 2012), with figures as high as 90% cited as the optimum level (Strachan and Usher, 2012). The Dutch National Institute for Public Health and Environmental Protection reported that the Netherlands would need to reduce consumption of both resources and energy as well as its waste creation by 80% in the period from 1988 to 2010 (Dresner, 2002).

Such reduction in resource use demands radical change (Kearins and Springett, 2003; Kasterhofer and Rammal, 2005) potentially including that of the business model itself (McDonough and Braungart, 2002; Smith, 2004; Gobble, 2012), but radical change is a risky strategy, posing a threat to business survival and economic sustainability (Doyle, 2000; Keizer and Halman, 2007).

Tenner (1996) examined the manner in which new technologies are fraught with unintended consequences. He identified a variety of instances when action taken to lessen the environmental burden resulted in the reverse because of unintended consequences (Elkington, 1999, p.216; McDonough and Braungart, 2002). Indeed, incomplete knowledge can undermine the ability to assess the impact of change, resulting in new risks to societies and the environment (Carson, R., 1991; Dresner, 2002, p.21; Zebda, 2002; McDonough and Braungart, 2002, pp.45–67).

These theorists who examine the difficulty in addressing strong sustainability also indicate the manner in which the western mindset can prevent recognition of existing sustainable technologies, citing examples, for instance, of hardwood harvesting methods adopted in non-western cultures that have not only profitably sustained societies, but enabled the environment to flourish at the same time, resulting in an increased stock of resources. They recognise, however, that such technologies are not necessarily transferrable, especially where environmental protection and welfare is concerned, because of the variety and complexity of ecosystems (McDonough and Braungart, 2002, pp.45–67). This lack of transferability of technologies would suggest that the “one size fits all” approach that underpins the global product is not conducive to strong sustainable precepts.

It is clear that strong sustainability poses significant problems for business. Its parameters are not fully known; it requires a higher-risk approach including

radical change and devolves the need for technologies to be selected at a local level.

2.2.5 Weak sustainability

The weakest forms of sustainability are seen to sanction the depletion of resources, provided there are substitutes that can be used in their stead (Hopwood et al, 2005; Redclift, 2005; Byrch et al, 2009). Indeed, those supporting the weak interpretation do not differentiate between natural and manmade capital and consider complete exhaustion of natural capitals to be acceptable (Solow, 1974, cited in Hopwood et al, 2005).

Weak sustainability is clearly anthropocentric, the environment being seen merely as a resource to satisfy human needs and further business ends (Gladwin et al, 1995; Byrch et al, 2007; Clifton, 2010). It supports the continuation of business (Hopwood et al, 2005) which, it is argued, would adjust to diminishing resources in incremental steps (Bell and Morse, 2007) because the law of supply and demand would cause prices to rise, which would have the knock-on effect of causing research into alternatives to become financially viable (Beckerman, 1994).

At its most extreme, weak sustainability sanctions “business as usual” (Söderbaum, 2004; Dryseck, 2005, pp.51–70; Markus et al, 2006; Byrch et al, 2007; Clifton, 2010) whilst a slightly stronger approach would involve reducing waste and resource use (Söderbaum, 2004; Gladwin, 2006; Jallow, 2009) to the extent that it could be termed good business practice because maximum profit is then yielded from the resource (Söderbaum, 2004; Jallow, 2009). Similarly, proponents of the weak definition of sustainability believe that they can achieve reduction in resource demands through innovations and new technologies and as such aligns with the interests of industrialists (Hopwood et al, 2005; Markus, 2006; Jallow, 2009).

Thus the responses to the demands of sustainable development range on a continuum with the strongest being that of the deep greens and the weakest, business that considers that no change need be made. The critical difference that divides the strong from the weak is the concept that natural capital can be eroded and substituted with manmade capital (Söderbaum, 2004; Dryseck, 2005; Jallow, 2009).

These two positions reflect the fundamental differences in values that existed between Americans John Muir, the first pioneer for preservation of the environment, and Gifford Pinchot, the father of conservation. Preservation entailed maintaining an environment in an undisturbed state. Muir was keenly sensitive to the irreversible nature of change as a result of resource extraction where habitats and ecosystems were concerned and was keen to see wilderness left for future generations to enjoy (Muir, 1901, pp.182–185; Dresner, 2002, pp.19–20; Daniels, 2009). The ethos of using resources at the same rate at which they can be recreated aligns with his values.

Conversely, Pinchot maintained that “conservation stands for development” (Pinchot, 1901, p.187), claiming that the rights of the existing generation superseded those of future ones. This was mitigated by an imperative that waste should be avoided and a declared utilitarian requirement that resource use should benefit as many people as possible by as much as possible and thus enable future generations to inherit a strong society (Pinchot, 1901, p.188; Dresner, 2002, pp.19–20; Hopwood et al, 2005).

Pinchot’s view of conservation aligns with laws of economics that underpin business activity (Bowers, 1997, pp.179–182; Dresner, 2002, pp.19–20) and also fits with the weak interpretation of sustainable development, namely that resources can be exhausted so long as alternative capital is left for future generations (Bowers, 1997, pp.179–182; Stern, 1997; Dresner, 2002, pp.19–20). It is therefore apparent that significant division in opinion is deeply rooted in values that are not necessarily bounded by national characteristics.

Criticisms of the term “sustainable development” have been reviewed in appendix 1. They reveal a general acceptance that it does not address the demands of strong sustainability.

2.3 The dimensions of sustainability

Sustainability involves an intricate balance of multiple factors (Jones et al, 2011) and significant attention has been given to establishing frameworks with which to understand it. It has been established that three underlying dimensions have been recognised, with the need for economic prosperity underpinned by business activity identified first, augmented by the recognition of its dependence on social welfare, followed in the 1970s with the realisation that environmental

sustainability supported the ability for the other two worlds to flourish. These have become known as the three pillars of sustainability (Joshi and Krishnan, 2010; Hahn and Figge, 2011; Boström, 2012), formalised by the World Business Council for Sustainable Development as the need for social satisfaction, ecological balance and economic prosperity (Joshi and Krishnan, 2010; Hahn and Figge, 2011; Boström, 2012). Most frameworks use these three pillars as their core.

2.3.1 The triple bottom line

The relationship between business and the other two pillars was explored by Elkington (1997, 1998), who argued that business should recognise the value of social and environmental capital because both types of capital were essential for its survival (Elkington, 1997, 1998; Slaper and Hall, 2011). He thus introduced the concept of the triple bottom line which has influenced the activities of businesses and governments alike (Slaper and Hall, 2011; Gradinaru, 2012).

An enduring difficulty emanating from this position is that each of the three capitals has a different accounting structure and neither social nor environmental capital can be expressed in terms of finance (Aras and Crowther, 2009; Mintz, 2011; Sherman, 2012). Indeed some elements of accounting can only be achieved in qualitative terms (Pava, 2007; Mintz, 2011; Sherman, 2012) and, importantly, refer to discrete issues which cannot be offset against each other (Pava, 2007; Sherman, 2012). Thus, whilst the principle is laudable and has become widely adopted, it has proved to be a somewhat idealistic framework, rarely performed at a meaningful level, because of the specialist knowledge required by the author (Archel et al, 2008; Sherman, 2012) and the reader (Sherman, 2012).

Three criticisms have been levelled at reporting issues relating to the triple bottom line. Firstly, there is a suggestion that an ulterior motive of reporting is to manage organisational reputation (Pava, 2007; Archel et al, 2008; Giannarakis and Sariannidis, 2012) fuelled in part by the desire to attract investment from socially conscious investors (Spiller, 2000; Steven, 2011). Secondly, the triple bottom line is criticised for not providing sufficient protection for the environmental and, to a lesser extent, societal needs, which are considered to be seen as subordinate to the profitability of business (Borland, 2009). Finally, it

is criticised by economists who believe that accounting for capital using any form that is not monetary is untenable (Lempert and Nguyen, 2011).

In spite of these criticisms, there is growing evidence to show that triple bottom line reporting has now become embedded as a serious focus of business activity as the extent to which the economic world is dependent on the environment and society is becoming more apparent (Pava, 2007; Mintz, 2011; Sherman, 2012; Gradinaru, 2012). However, triple bottom line reporting simply recounts achievements. This does not assist in the development of objectives (Chalmeta and Palomero, 2011). One tool that has aided this in both the business and not-for-profit sectors is the balanced scorecard (Kaplan and Norton, 2011b).

Conceived in 1990, the balanced scorecard is a tool that encourages the development of performance measures, both tangible and intangible, across a broad spectrum of categories rather than just the financial (Kaplan and Norton, 1997, 2001a; Pineno, 2012). In addition to this, Kaplan and Norton (2001a, 2001b) noted that it had encouraged managers to articulate the methods by which growth would be achieved which would aid the integration of all of the categories being monitored within business plans (Chalmeta and Palomero, 2011; Pineno, 2012).

Simmons (2008) noted that the successful balanced scorecard operated in the organisations where staff had embraced the values within it. This does not reduce its use to these organisations, because it has been shown that the balanced scorecard is ideally suited to helping managers identify and disseminate their underlying values (Kaplan and Norton, 2011b).

Although the balanced scorecard was not specifically designed for sustainable development purposes, Kaplan and Norton (2004) identified its potential in measuring associated performance and there have been a variety of studies undertaken in which robust versions of the balanced scorecard that incorporate sustainable development have been created (Chalmeta and Palomero, 2011; Radu, 2012), mitigating the difficulty of reporting the triple bottom line using different capitals (Chalmeta and Palomero, 2011).

Therefore the benefit the balanced scorecard offers in defining the ethos of the organisation (Kaplan and Norton, 2001a) is extended to the environmental

values of the organisation because performance measures that are implemented demonstrate the level of environmental and societal concern. Its usage communicates the values associated with the triple bottom line both internally and externally, by articulating the targets that management seeks to attain.

2.3.2 Top line thinking

It is argued that, useful as it is, an inherent flaw in the triple bottom line is that it is used as a tool to minimise negative impact on the environment and society (McDonough and Braungart, 2002; Borland, 2009; Mock and Wernke, 2011; Arthur, 2011). However, McDonough and Braungart (2002, pp.45–67) maintain that processes designed to minimise environmental harm frequently result in a different, potentially more insidious problem because they do not entirely eliminate damage to the environment but sanction the least harmful option.

They propose that rather than focus on environmental protection, organisations should actively seek technologies that provide as much benefit to the environment as possible, hence the term “top line”. Whilst on first appearance it can seem to be an ideological position, there is evidence to suggest that this is a model that has proved successful in developing synergies that are otherwise overlooked (McDonough and Braungart, 2002; Smith, 2004; Gobble, 2012). Accordingly, along with improving profitability with a product, McDonough and Braungart (2002) propose that the design and product choice should seek to contribute to the environment through totally clean production and the ability to be recycled or degraded into compost, using techniques that enhance the lives of those working on its production to the extent that health and safety is not an issue.

Gobble (2012) recognises that top line thinking is a tool that can move the sustainability agenda from that of regulation to that of innovation. Laszlo and Laszlo (2011) recognised that on its own, it was not enough because of the potential for unintended consequences. Hence they proposed that both top and bottom line thinking should be involved in decision making.

2.3.3 Further dimensions of sustainability

Whilst the concept of the triple bottom line has become widely accepted, the debate is not over. As other aspects of existence become threatened, so

additional pillars are proposed. It is suggested that the model, subsequently labelled “the three P’s”, recognising people, planet and profit (Laszlo and Laszlo, 2011), should include a fourth pillar, namely culture (Howard, 1994; Yencken and Wilkinson, 2001; Trainer, 2005, Laszlo and Laszlo, 2011). It is also argued that a further pillar should be that of technology (Dresner, 2002, p.146; Agyekum-Mensah et al, 2012, p.432).

The philosopher Heidegger maintained that technology is a means to an end and as such has the potential to facilitate a sustainable way of life (Ziarek, 1998). Culture embodies tradition and ways of living. Thus Heidegger’s broad definition of technology, namely that of “human activity” (Ziarek, 1998), suggests that there is significant overlap between the two concepts. However, there are also substantial differences that would suggest they should be handled separately.

Basing her work on empirical study, Sanford (2011, pp.29–36) argued that there are five stakeholders that all contribute to the profitability of a business, namely the customer, investors, the earth, “co-creators”, referring to the organisation and its supply chain involved in the production of the goods or service, and the community, which extends to all communities touched by activities involved in creation, marketing and disposal of the product or waste generated in its production. Sanford identified that each stakeholder contributed a different type of capital to the product or service offered by the organisation, including skills and emotion, and needed some form of return in order to compensate for their contribution (Sanford, 2011, pp.29–36; Laszlo and Laszlo, 2011).

Laszlo and Laszlo (2011) extend Sanford’s list of contributors further by identifying ten forms of capital that sustain a business and argue that these capitals should be nurtured in order to ensure sustainability. In discussing natural capital they differentiate between the stability of the ecosystem and the environment’s ability to flourish and evolve. Similarly, societal needs are recognised as those of the population’s health and ability to be productive along with enjoying a sense of community. Cultural capital is evidenced by the traditions and ways of life that differentiate groups. Financial capital is seen to consist of manufactured goods and everything needed to manufacture them including the raw materials, finance, business acumen and technology.

Laszlo and Laszlo have used these capitals as the basis of nine criteria which they argue should be met in order to ensure sustainability. Whilst they agree that culture should be an individual consideration in their “integrated quadruple bottom line”, the nine criteria fit neatly into three categories: those of the triple bottom line, with “culture” being acknowledged as an adjunct to society, so much so that Alkailani, Azzam and Athamneh (2012) describe it as “the generic term for all life demonstrated by society”.

Accordingly in the view of Laszlo and Laszlo, to be sustainable, an activity should be “socially desirable” and “culturally acceptable” as well as “psychologically nurturing”. From the financial perspective, it should be “economically sustainable”, “technologically feasible” and “operationally viable”. Finally, in order to accommodate the needs of the environment, business activity should be “environmentally robust”, “generationally sensitive” and “capable of continuous learning” (Laszlo and Laszlo, 2011).

Laszlo and Laszlo appear to confirm that the principal tensions involved in the sustainability debate hinge on business activity in the economic sector, and the needs of society and the environment. They have, in doing so, defined with greater clarity the nature and demands of the “three P’s” and demonstrated the complexity of defining the nature of the interaction of business activities with the environment and society.

When identifying the need to maintain culture, Laszlo and Laszlo (2011) referred to “societies and social groups”. Güler and Crowther (2008), however, claimed that organisational culture should also be preserved. This would suggest a paradox, because sustainable development is associated with change including that of organisational culture (Arenas, Fosse and Murphy, 2011). Indeed, it is maintained that sustainability initiatives require employees who are engaged (Devi, Avanes and Archana, 2012; Galpin and Lee Whittington, 2012), a quality that is potentially sensitive to organisational culture (Fargher et al, 2008; Parkes and Langford, 2008; Welch, 2011). This would suggest that, where sustainable development is concerned, it is more important that an appropriate culture is fostered. This is noted at this point, although the larger issue of organisational culture is discussed later in this thesis.

Of the three sectors, the role of the economic sector requires closer examination. The contributors to the debate generally recognise the centrality of business and markets to the economic sector (Hart, 1997), and Laszlo and Laszlo (2011) and Sanford (2011) recognise business attributes rather than the more general economic ones.

Spangenberg (2004), however, adopts a different perspective. He argues that to a large extent, business activities are the cause of most sustainability problems. However, he also recognises that business is an agent that can be used for sustainable development. He therefore maintains that the three areas that should be maintained in order to achieve sustainability are the environment, society and institutions. The institutional component includes governments, which potentially hold the power to maintain peace.

Spangenberg also recognises that a healthy economy should not be an end in itself, but it should be viewed as a means that could be used in order to deliver social and environmental welfare. Indeed, Hahn and Figge (2011) maintain that sustainable development can only be achieved with corporate support and Merton (1976, cited by Margolis and Walsh, 2003) voices the paradox “Does the successful business try first to profit or to serve?” suggesting that profitability is potentially a prerequisite. Thus, economic success is seen to be a necessary component of sustainability but the manner in which it is achieved and used is also critical to sustainable development.

It is clear that the environment, society and the economy are central to all debates relating to sustainability and there is a strong case for recognising the different cultures within society. However, it should be recognised that the western world depends upon business prosperity to support the economy. Thus business activity is intrinsic to “the economy”. Spangenberg’s contribution (2004) introduces the need for institutional structures that deliver peaceful solutions to conflict, and further debate appears to have served only to further define the characteristics of these three economies ensuring that resources are invested effectively. Table 2.1 summarises these different dimensions of sustainable development.

The models of sustainability that attract the least criticism appear to support the strong interpretation of sustainable development. This finding correlates with the

discussion around the definition of sustainable development which would suggest that the strong definition is the more robust. However, there appear to be efforts to justify the weaker definition that would support “business as usual”. This dichotomy is explained by theory relating to decision making, especially when aligned with the demands that sustainable development in its stronger form appears to make.

Table 2.1: The dimensions and capitals relating to sustainability

Dimension	Capital	Reference
Market economy	Finance	Hart (1997)
Investors	Finance	Sanford (2011), pp.29–36
Co-creators	Capabilities	Sanford (2011), pp.29–36
	Financial capital	Laszlo and Laszlo (2011)
	Manufactured capital; finished products	Laszlo and Laszlo (2011)
	Intellectual capital; business acumen	Laszlo and Laszlo (2011)
	Technological capital	Laszlo and Laszlo (2011)
	Evolutionary capital; the ability to adapt	Laszlo and Laszlo (2011)
Organisational culture	The relationship the organisation creates with its internal stakeholders, largely the employees	Güler and Crowther (2008)
Technology	The manner in which ends are achieved	Dresner (2002), p.146
Institutions	A voice in political decision making	Spangenberg (2004)
Survival economy	Health and capabilities	Hart (1997)
Society	Employment, education, training	Spangenberg (2004)
	Social capital; community	Laszlo and Laszlo (2011)
	Human capital; health and ability to flourish	Laszlo and Laszlo (2011)
Community	Tangible and intangible capacity to tolerate and facilitate all stages of the product’s life	Sanford (2011), pp.29–36
Customers	Demand for the product or service	Sanford (2011), pp.29–36
	Evolutionary capital; the ability to adapt	Laszlo and Laszlo (2011)
Culture	The way of life and the ability to change	Howard (1994)
	Cultural capital; traditions and ways of life	Laszlo and Laszlo (2011)
Nature’s economy	Resources and capacity to absorb waste including CO ₂	Hart (1997)
Earth	Resources and capacity to absorb waste	Sanford (2011), pp.29–36
	Ecosystemic capital; the ability to flourish	Laszlo and Laszlo (2011)
	Natural capital; raw materials	Laszlo and Laszlo (2011)
	Evolutionary capital; the ability to adapt	Laszlo and Laszlo (2011)
Environment	Energy, material flows and land	Spangenberg (2004)

Appendix 2 contains a review of the different depictions of the models of sustainability to assess the added qualities that the diagrammatic form offers and identify opinion revealed in the criticism that they attract. It added weight to the findings above but did not reveal anything new.

Most diagrams oversimplified the relationships between the elements of sustainable development, but two of them reflected their interaction and complexity. The depictions that attracted criticism all portrayed the weaker form of sustainable development, and it was the oversimplification of relationships that attracted the most comment. This would suggest that theorists find it hard to find fault with the stronger depictions that acknowledge the complexity of the relationships involved, augmenting the conclusion made above, that the strong interpretation of sustainable development is the more robust.

2.3.4 The relationship between business and the other two sectors

Researchers present differing opinions about the relationship between business and the other two sectors. This is understandable when considering the range of differing business responses to the onus placed on them to accommodate the demands of sustainable development. Reviews of the corporate response, summarised in table 2.2, clarify the range of positions from resisting demand including that of legislation to developing new business models that both deliver the intended utility and contribute to environmental and social capital.

Table 2.2: The range of responses to sustainable development

Organisational response	Welford (1997), p.110	Zadek (2004)	Laszlo and Laszlo (2011)	Hopkins et al (2011)
Resistant to any environmental strategy; obstructive	Resist	Defensive stage	Ignore	
Obey legislation	Observe and comply	Compliance stage	Compliance	Cautious adopters
Accept the need to change and accommodate it when the opportunity arises	Accommodate	Managerial stage	Anticipatory (cost avoidance)	
Proactively seek to identify and adopt every change that should be made	Seize and pre-empt	Strategic stage	Eco-efficiency (identifying sources of profit)	Embracers
Environmental goals are part of the mainstream activity			Eco-effectiveness	
Operating a business model that makes no demands on the environment	Transcendent charismatic		Evolutionary; regenerative; top line thinking	
Proactively seek to influence third parties, e.g. involved in education initiatives		Civil stage		

Whilst Welford (1997, p.10) suggests that these are stances, Zadek (2004) and Laszlo and Laszlo (2011) identify them as stages of development and learning respectively. Hopkins et al (2011) identify the growing gap between “cautious

adopters” and “embracers” but, in general, consider organisations to be becoming more committed to sustainable development. Laszlo and Laszlo (2011) suggest that organisations that are at the compliance stage or just entering anticipatory stages have the mindset of “business as usual” whereas those that are entering the “eco-effectiveness” stage, having identified the potential of profitability in adopting more sustainable measures, have changed that mindset to one of “sustainability as usual”.

This range of responses includes businesses that are contributing substantially to sustainable development initiatives as well as those who prefer to ignore sustainable development entirely, including associated legislation, believing that paying fines is the more economical solution (Bowers, 1997; Laszlo and Laszlo, 2011). Thus it is not possible to categorise business as a homogenous group.

Regardless of stance relating to sustainable development, it is argued that the business sector is dominant (Parboteeah, Addae and Cullen, 2012). There are two justifications to support this observation. Firstly, environmental damage is caused by resource use in both the creation and the delivery of goods to satisfy demand (Krajnc and Glavic, 2003; Gould, Pellow and Schnaiberg, 2004; Stilwell, 2012) at a rate that is not sustainable (Krajnc and Glavic, 2003; Aras and Crowther, 2009a). Although a business might claim it is merely responding to consumer demand, demand itself is created through marketing activities of business (Asgary and Walle, 2002; Gould, Pellow and Schnaiberg, 2004; Wisman, 2011) and facilitated by the development of technologies that lower costs, reducing financial constraints on resource use (Gould, Pellow and Schnaiberg, 2004).

Secondly, corporate power is seen to be such that international companies are able to shape government legislation in a manner that favours their interests at the expense of the environment (Gould, Pellow and Schnaiberg, 2004; Wisman, 2011; Stilwell, 2012). Indeed, governments recognise the dichotomy between securing economic prosperity and controlling business activity and, as demonstrated by America’s reluctance to ratify the Kyoto agreement (Ball and Carlton, 2006; Oberheitmann, 2010), tend to uphold the interests of business, augmenting its apparent dominance.

It could be argued that the focus on profit making compared to corporate social responsibility (CSR) expenditure is to be seen most clearly during times of recession, when organisations economise in an effort to survive (Jothi, 2010). However, it was reported that only 22% of experts surveyed at the start of the 2008 recession believed that CSR activities would be negatively affected by it (Jothi, 2010). To some extent the predictions of this minority were upheld in that subsequent research suggested that at times of recession, the resultant pressures on competition cause businesses to adopt less ethical positions (Cooper and Frank, 2011), and CSR values were found to be an immediate casualty of the latest recession. Hopkins et al (2011) identified mixed behaviour. During the downturn, 25% of the 3,000 companies surveyed actively increased management attention and investment, and 24% reduced it.

In the subsequent years investment in CSR and associated activity increased in all but 3% of the companies reviewed. They identified financial profitability of the action taken as the primary motivator. Similarly, Giannarakis and Sariannidis (2012) reported a marked drop in reporting that met Global Reporting Initiative standards followed by a subsequent improvement, suggesting companies value sustainability reporting for the competitive advantage it offers (Hopkins et al, 2011; Parboteeah, Addae and Cullen, 2012) and the improvement in their credit rating (Aras and Crowther, 2009b). Both these actions, choosing to withhold CSR expenditure or seeking to invest in it for competitive advantage purposes, further evidence the primacy of the market economy.

Competitive advantage and reputation aside, profitability and considering the environment are not necessarily conflicting goals. It has been demonstrated that for some environmental issues, increased investment in preventing harm correlates with increased profitability (McDonough and Braungart, 2002; Margolis and Walsh, 2003; Hahn and Figge, 2011; Laszlo and Laszlo, 2011; Tang, Hull and Rothenberg, 2012), with “low-hanging fruit” such as waste management, efficiencies in energy use (McDonough and Braungart, 2002; Hopkins et al, 2011) and new business opportunities (McDonough and Braungart, 2002; Gandhi et al, 2006) being some of the more obvious examples.

2.4 A consideration of culture

Numerous researchers have identified, or alluded to, the need to consider culture as a dimension of sustainability (Howard; 1994; Yencken and Wilkinson, 2001; Trainer, 2005, Laszlo and Laszlo, 2011; Caprar and Neville, 2012).

Whereas a clear link between environmental and social needs and the ability for business to flourish has been established, the role of culture is not so obvious. However, Trompenaars and Hampden-Turner (1997, p.6) state that “culture is the way in which people solve problems”, linking it to the approach taken in identifying action in the cause of sustainable development. More precisely, Park, Russell and Lee (2007) identified that not only cultural characteristics but also education were linked with the extent to which nations have achieved sustainable development according to the Environmental Sustainability Index of the World Economic Forum.

The post-cultural philosopher argues that because development is seen to embody the concept of “westernising” societies, which involves moving to a capitalist structure, culture itself will be replaced by utilitarianism, the underlying ethos of economics and capitalism (Castro, 2004). This suggests two issues should be considered when evaluating the position of culture and sustainability.

Firstly, national cultures are seen to be a casualty of westernisation, but the culture of utilitarianism and capitalism that underpins economic growth has in the past been at variance with the needs of the environment and not sustainable.

Secondly, culture is identified as a factor that determines the outcome of problem solving, influencing the extent to which societies foster sustainable development (Castro, 2004; Caprar and Neville, 2012). An appropriate culture should be nurtured. To understand the relationship between culture and sustainability it is necessary to define culture and identify its influence on society and business.

2.4.1 The dimensions of culture

Culture is described as an abstraction (Kluckhohn, 1962, pp.40–57), nebulous (Burnes, 2009) and multidimensional (Moore, 1980; Hofstede, 1984, p.21; Sams, 2011), and as “the total life way of a people, the social legacy the individual acquires from his group” (Kluckhohn, 1949, p.17) that is highly

influential in every aspect of life (Kluckhohn, 1949, p.26). It is argued that these characteristics should be considered when evaluating its impact on sustainability (Sams, 2011).

As with “sustainability”, the term “culture” has many definitions attributed to the need to satisfy understanding of the term from different paradigms such as sociology and psychology (Moore, 1980; Hofstede, 1984, p.21), to deficiencies in language and to its abstract nature (Tayeb, 1994; Lung-Tan, 2012). In a simplistic sense from a normative perspective, national culture could be termed “national difference” (Hofstede, 1984, p.21; Tayeb, 1994; Schein, 1992; Holt, 2011), consisting of many elements including values and beliefs that influence behaviour (Hofstede, 1984, p.21; Caprar and Neville, 2012; Lung-Tan, 2012). However, in reality it should be understood that identification of a national culture ignores complexity caused by local difference and multicultural characteristics of many nations (Hofstede, 1984, p.21; Tayeb, 1994; Lung-Tan, 2012). Despite these difficulties it is still useful to consider the role that researchers believe culture plays in the sustainability debate.

Moore (1980) and Cummings and Huse (1989, cited in Burnes, 2009) organised the concept, listing six and four categories respectively under which culture can be defined. There is some overlap in the two sets of dimensions, which are summarised in table 2.3 along with the categories identified by Kluckhohn (1949) and Schein (1992), who also provide broader categories under which the term can be explained.

An examination of these perspectives of culture is illuminating because they highlight the scope of its impact on behaviours, and aid understanding of the manner in which it should be considered a pillar of sustainability. Cummings and Huse (1989) categorise culture in relation to consciousness. In doing so, they move from basic assumptions at the deepest level to the visible outworkings of the subconscious which Moore analysed at greater depth. Categories falling under the classification of descriptive simply reinforce the multidimensional nature of culture (Moore, 2008).

The historical element points to the impact of a society’s shared history, not only lending culture an element of stability (Moore, 1980; Husted, 2005; Park et al, 2007) but also indicating that cultures can change over time (Moore, 1980) as a

Table 2.3: The dimensions of national culture compared

Kluckhohn and Mowrer (1944), p.4; Kluckhohn (1949), pp.196–227	Moore (1980)	Schein (1992), pp.25–37	Cummings and Huse (1989), cited in Burnes (2009), pp.201–202
Personality; when acceptable within the society		Unconscious beliefs and values	“Basic assumptions” that guide behaviours and reactions but cannot be challenged because of their unconscious nature
Sybolism, tabu on incest and in-group murder etc.		Espoused beliefs	“Values” governing what are considered acceptable standards
	“Enumeratively descriptive” provides an overview of culture in the fullness of its meaning		
Traditional rules of conduct			“Norms”, guiding principles that define behaviours
Behaviour determined by upbringing	“Normative” defines the behaviours and ideals together with an underpinning of tacit rules and values		
Folklore	“Historical” highlights traditional elements that are visible in cultures		
	“Psychological” in which culture is seen to influence behaviours by shaping the problem-solving and decision-making habits	The “climate” that influences group behaviour	“Artefacts” are considered the highest consciousness of culture, being observable in the form of physical artefacts as well as behaviours, structures and rules
	“Structural” abstracts the concept of culture to a pattern of relationships, recognising the interaction between its various constructs	“Artefacts” are the structures and processes that can be observed	
	“Genetic” is a somewhat misleading label for the artefacts emanating from a society.		

result of a major societal event (Husted, 2005) including economic development (Hermann, 2010; Cox et al, 2011).

Schein (1992, pp.25–37) explains the apparent complexity by identifying the different levels of culture involving “espoused beliefs”, which are the conscious and learned ideologies that underpin cultural outworkings ranging from artefacts to less tangible structures and corporate climates, supported by unconscious beliefs and values. These are at a personal level, but Kluckhohn argues that personality itself is a product of culture, being the product of upbringing which is embedded within culture (Kluckhohn, 1949, pp.196–227).

Kluckhohn was keen to differentiate culture from personality but provides a useful benchmark in considering that a trait can only be classified as cultural when it is considered acceptable by the societal group (Kluckhohn and Mowrer, 1944; Kluckhohn, 1949, p.197). Consequently a culture can only be considered to be “national” or “corporate” when it is shared by the majority of the community and it is suggested roughly 70% of the population should conform for it to be considered relevant (Sams et al, 2011).

The psychological recognition of culture relates to the manner in which problems are solved and needs are satisfied and therefore influences the response to sustainability issues, but the above analyses would suggest that it is the normative perspective, influencing behaviours including those of adherence to rules, that would predetermine the extent to which necessary change is achieved. Indeed, numerous studies have identified a correlation between certain cultural characteristics and action promoting sustainable development (Chang, 2002; Husted, 2005; Park et al, 2007; Scholtens and Dam, 2007; Sams, 2011; Caprar and Neville, 2012; Parboteeah et al, 2012).

The final category under which culture can be defined, that of the artefacts it produces, is highly relevant to the sustainability of resources although there is little literature on the subject. Whilst cultures retain unique characteristics and use diverse products, their consumption pattern is compatible with biodiversity (McDonough and Braungart, 2002, pp.45–67; Benessia, 2012), but when they are exposed to western development, cultures are in danger of losing their cultural identity (Hermann, 2010; Benessia, 2012).

Kluckhohn's observation that culture can create needs (Kluckhohn, 1949, p.26) becomes more relevant as developing societies swell the ranks of the consumer culture (Asgary and Walle, 2002; Paliwoda and Slater, 2009). However, such large-scale demand on a comparatively small range of resources is unsustainable (Shrivastava, 1995; Krajnc and Glavic, 2003; Aras and Crowther, 2009a).

2.4.2 The relationship between national culture and business

There is a body of research that would suggest that organisations evolve over time and it is the stage of development rather than national culture that determines their characteristics, thus denying the role of culture in determining the manner in which they behave (McMillan, 1973; Karoliny, Farkas and Poór, 2009; Holt, 2011). However, this does not account for differences that are apparent in organisations in different countries that are at a similar stage of development and thus the influence of culture is now widely accepted (Ofori-Dankwa and Reddy, 1999; Holt, 2011; Caprar and Neville, 2012).

In groundbreaking work, Caprar and Neville (2012) suggested that culture plays a dual role, correlating with its normative and psychological elements. Having recognised that national culture influences the extent to which environmental needs are acknowledged and institutions to support them developed, Caprar and Neville established that there was a time lag that varied according to national culture between such acknowledgement and steps to act on it. They also noticed certain cultural characteristics that influenced the degree of compliance with the stated aims, suggesting that firstly the psychological element of culture influences the extent to which a society responds to the need for sustainable development through establishing structures and policies, and secondly normative elements of culture influence the extent to which entities within the society comply with such policies. The interaction between these aspects of culture demonstrates a further category of Moore's definitions (1980), the structural, in that it illustrates interaction between the other facets.

It is clear that cultural characteristics are seen to be a necessary pillar for sustainable development, but it should be recognised that this pillar depends on specific characteristics, rather than merely exhibiting a strong national cultural identity. Similarly, the organisational culture referred to by Güler and Crowther (2008) should be seen to relate to specific cultural characteristics rather than

expressing the need to preserve the status quo. Specific cultural characteristics are investigated at greater depth later in this literature review.

2.4.3 The development of frameworks

Kluckhohn and Strodtbeck were among the first philosophers to identify a range of dimensions that could be used as a basis of understanding cultural difference (Taras, Steel and Kirkman, 2010). The individual characteristics were termed “value orientations” (Kluckhohn and Strodtbeck, 1961, pp.1–48) and were recognised as areas of behaviour in which performance could be ranked on a continuum. This work became the basis of a few further analyses of cultural difference contributing to the literature (Taras, Steel and Kirkman, 2010).

Each analysis has included the development of a framework that facilitates understanding of elusive qualities, and these frameworks are not entirely compatible (Earley, 2009, p.20; Taras, Steel and Kirkman, 2010; Brewer and Venaik, 2011; Bertsch, 2012). Indeed, the difference is such that Hofstede identified that national cultures did not equate with organisational cultures although the originators of the GLOBE study could see no difference (Earley, 2009, p.21). One reason for these differences between analyses of culture stems from culture’s multifaceted nature and lack of concise definition (Bertsch, 2012), resulting in a focus on different levels of culture (Earley, 2009, p.20). However, differences should not be trivialised, because there is a need for clear understanding of concepts that are being applied for the resultant analysis to be meaningful (Brewer and Venaik, 2011). Therefore the extent to which the analysis can be considered robust will be explored before assessing the implications of such works.

2.4.4 Kluckhohn and Strodtbeck’s value orientations

Prior to the work of Kluckhohn and Strodtbeck (1961), attention had focussed on the development of the concept of culture and understanding its parameters (Kluckhohn, 1949). The work of Kluckhohn and Strodtbeck took the subject to a new level of understanding in that classification of areas of cultural difference was undertaken (Alkailani et al, 2012). Kluckhohn and Strodtbeck (1961, pp.11–20) identified five distinct areas in which they suggested there were three positions on a single continuum. These areas were:

“Human nature orientation”, identifying the extent to which man recognised his inherent nature as good or evil, which was modified by belief of the extent to which man could change.

“Man nature orientation”, which identified the locus of control, varying from a fatalistic attitude to one where man dominated natural forces.

“Time orientation”, associated with the relative importance of the past, present and future.

“Activity orientation”, related to the value ascribed to “being”, “becoming” or “doing”.

“Relational orientation”, associated with the dominance of individuals, societal groups or the recognition of shared history with both familial and social ties.

Identifying attitudes to both society and environment, the relevance of culture to sustainability, even in this early work, is clear.

2.4.5 Hofstede’s dimensions of culture

Hofstede’s analysis of the dimensions of cultural difference is the most prominent of the major studies (Kirkman, Lowe and Gibson, 2006; Nakata, 2009; Alkailani, Azzam and Athamneh, 2012; Caprar and Neville, 2012). In his analysis, he originally identified four dimensions, namely “power distance” in which hierarchical authority and paternalism are recognised, “uncertainty avoidance”, “individualism” reflecting the degree of social cohesion, and “masculinity” recognising the continuum between caring for money and things and caring for people and relationships (Fang, 2003; Kirkman, Lowe and Gibson, 2006; Shi and Wang, 2011; Alkailani, Azzam and Athamneh, 2012; Caprar and Neville, 2012).

Hofstede defined the element of culture adopted to underpin his work as that of “the collective programming of the mind which distinguishes the members of one human group from another” (Hofstede, 1980, cited in Kirkman, Lowe and Gibson, 2006; Javidan et al, 2006). This programming contributes to the behaviours defined as “norms” as identified by Cummings and Huse in table 2.3 (section 2.4.1).

Hofstede’s approach is widely accepted and used, in part because of its clear framework (Kirkman, Lowe and Gibson, 2006; Shi and Wang, 2011), but this

simplicity is also a basis of criticism (Kirkman, Lowe and Gibson, 2006). Indeed, it is criticised at a number of levels which are examined below, namely:

- The underlying premise that cultures influence behaviours
- The assumption that the identified characteristics applied to an entire nation
- The extent to which there is a potential western bias
- The general applicability of his work given his research sample
- The identified dimensions, including the labels given to them

Hofstede's work was criticised at a fundamental level. The concept that culture can determine behaviour has been questioned (McSweeney, 2002; Taras and Steel, 2009; Taras, Steel and Kirkman, 2010a; Taras, Steel and Kirkman, 2010b). Indeed, a meta-analysis undertaken by Taras, Steel and Kirkman (2010b) revealed that personality traits such as job satisfaction can in fact be a stronger predictor of behaviour than culture. However, it also suggested that cultural influence becomes more apparent at group and national level than at the level of the individual. Its conclusions promote the need to recognise the generalisations made in the analysis and recommend the identification of a greater number of variables in the research vehicle in order to develop accuracy and explicitly rule out behaviours that are dominated by other factors.

The manner in which the values were attributed to nations in Hofstede's work has also provided grounds for criticism. Firstly, Hofstede's allocation of values to different countries appears to have been arbitrary to the point that they were changed between two publications of his work (Fang, 2003). Secondly, overgeneralisation occurred when grouping countries together. In particular, Arab nations were all treated as if they had the same cultural characteristics, but research carried out by Alkailani, Azzam and Athamneh (2012) suggests that countries should not be grouped together because this can mask significant differences. Indeed it was argued that difference can occur within national boundaries (Baskerville, 2003; Kirkman, Lowe and Gibson, 2006; Taras and Steel, 2009; Earley, 2009, p.27).

Hofstede was aware that his findings were generalisations and warned that his dimensions should not be used at anything less than a national level (Kirkman, Lowe and Gibson, 2006). However, for some countries, Hofstede's sample

appears to have been too small to be considered reliable (McSweeney, 2002; Gerhart and Fang, 2005). These criticisms suggest that overreliance on values attributed to nations should be avoided, especially when reviewing the actions of individuals within that nation.

Hofstede's work is also criticised for analysing culture based on western values (Fang, 2003; Javidan et al, 2006; Lung-Tan, 2012). Indeed, Schien (1992, p.27) warns that such bias can result from examining actions alone because interpretation will be coloured by one's own culture. The bias in Hofstede's work was considered to be even more fundamental; he was criticised for extrapolating a general theory from research conducted entirely for the benefit of the America-based IBM, using their staff as the basis of the sample, rather than using research conducted with the specific purpose of identifying cultural difference (McSweeney, 2002; Javidan et al, 2006; Venaik and Brewer, 2010; Shi and Wang, 2011).

It should be noted that Hofstede was careful to match respondents to ensure a "functional equivalence" (McSweeney, 2002), precluding other factors in explaining revealed difference, and suggesting that the only cause could therefore be cultural (McSweeney, 2002). However, Hofstede later recognised that there was not a single IBM culture and this undermined the premise of his analysis (McSweeney, 2002). In spite of this, subsequent testing of his model on other work groups suggests there is some credence in his results (House et al, 2004; Gerhart and Fang, 2005; Shi and Wang, 2011).

Indeed, subsequent work has helped confirm unilateral application of some of Hofstede's dimensions. A similar exercise, the Chinese Values Survey, which used Confucian values as the basis of research, was conducted incorporating 22 countries. The results showed a substantial overlap with three of Hofstede's dimensions, but there were two notable differences. Firstly, there was no correlation with the characteristics of uncertainty avoidance (Williamson, 2002; Baskerville, 2003; Fang, 2003), and secondly, an additional dimension of "Confucian work dynamism" was identified, a dimension that was subsequently adopted by Hofstede as "long-term orientation" (Baskerville, 2003; Fang, 2003; Kirkman, Lowe and Gibson, 2006; Shi and Wang, 2011; Lung-Tan, 2012), identifying the preference for saving for tomorrow opposed to living for today (Fang, 2003; Kirkman, Lowe and Gibson, 2006; Shi and Wang, 2011).

This addition, however, was seen by some as a further area of criticism. Hofstede was criticised for, rather than looking to a similar profile of respondent to match that of his first study, selecting a different category of respondent; he surveyed college students from a smaller base of countries in order to confirm this last value dimension (Fang, 2003; Shi and Wang, 2011).

Hofstede himself recognised a weakness in his model in that the masculine/feminine continuum incorporated assertiveness as part of the masculine characteristic, whereas it is recognised that those displaying feminine characteristics can also be assertive (Bertsch, 2012). It is thus argued that assertiveness should be a separate dimension (Bertsch, 2012) but Hofstede was unable to refine this because his initial source of material lacked the requisite detail (Bertsch, 2012), compounded by the fact that the respondents were all male (Moulettes, 2007; Shi and Wang, 2011). In addition to this, the feminine end of the continuum was assumed to be evident by a lack of masculine characteristics, when in fact there are distinct differences that were not measured (Moulettes, 2007; Shi and Wang, 2011). Studies seeking to replicate this dimension have failed (Baskerville, 2003).

Hofstede also identified potential confusion in labelling the opposite end of the individual continuum “collective”, stating it would have been better labelled “company” because rather than measuring societal factors, the questions contributing to this element all related to attitudes to the workplace (Brewer and Venaik, 2011).

It was also noted on a more general level that cultures can change over time, but Hofstede presented them as if they were fixed (Kirkman, Lowe and Gibson, 2006; Tang and Koveos, 2008; Taras and Steel, 2009, p.44; Venaik and Brewer, 2010) and should have acknowledged that the passage of time should confer caution in the application of analysis of national characteristics. Indeed, subsequent testing showed significant changes in national cultures occurred in the 15 years that followed publication of Hofstede’s analysis and could account for some of the difficulty in replicating his work (Fernandez et al, 1997).

2.4.6 The GLOBE project.

Focussing on leadership qualities, the Global Leadership and Organizational Behaviour Effectiveness research programme (the GLOBE project) spanned 62

countries with the aim of ascertaining characteristics that are essential to business (Guru, 2010; Venaik and Brewer, 2010; Shi and Wang, 2011). Involving in the region of 170 researchers from many nations (Smith, 2006; Venaik and Brewer, 2010; Shi and Wang, 2011), it avoided the bias attributed to Hofstede's analysis.

Part of the GLOBE project also entailed identification of national difference within the findings. As with Hofstede's analysis, cultural difference was not the primary focus of the study of the GLOBE project, but findings were considered sufficiently robust to contribute significantly to the discourse and have been refined over time (Guru, 2010; Shi and Wang, 2011; Bertsch, 2012), to a large extent confirming Hofstede's original analysis (Taras, Steel and Kirkman, 2010).

The GLOBE project identified nine dimensions of culture (see table 2.4 in section 2.4.10 below) that built and elaborated upon those of Hofstede, including the definition of the masculine or feminine continuum (Venaik and Brewer, 2010; Shi and Wang, 2011; Bertsch, 2012). The resultant dimensions are not entirely compatible with Hofstede's, although a use of similar terminology appears to mask the difference (Venaik and Brewer, 2010).

Completed in 2004, the large-scale study appears to be accepted as robust (Javidan et al, 2006; Bertsch, 2012), although there are still questions about its methodology (Bertsch, 2012), and debate regarding the correlation between the GLOBE study and Hofstede's cultural dimensions continues to contribute to the literature (Brewer and Venaik, 2011).

2.4.7 Differences between the two models

As part of the project team, Javidan et al (2006) offer a robust justification for the approach taken in the GLOBE survey. One principal difference between the GLOBE and Hofstede studies is that the GLOBE sought to identify both values and practices as a basis of its analysis (Javidan, 2006; Venaik and Brewer, 2010; Brewer and Venaik, 2011; Ralston et al, 2011; Shi and Wang, 2011), with the implication that the GLOBE dimensions defined a slightly different aspect of culture. Indeed, the GLOBE project defined culture as "embedded values (the way things should be done) and practices (the way things are done) in a society" (Yaprak, 2008) and "values, beliefs, norms, and behavioural patterns of

a national group” (Leung, 2005, cited in Javidan, 2006), aligning with the “normative” description of culture defined by Moore in table 2.3 (section 2.4.1).

This leads to a difference in the underlying definition that should be accommodated when comparing the two models, with the GLOBE model explicitly incorporating behaviour. The choice made in the GLOBE study is justified by the observation that most researchers refer to evidence demonstrating what is considered important when considering culture (Javidan, 2006), and the incorporation of behaviour makes the model more in line with their work (Javidan, 2006).

The GLOBE project also sought to identify and clarify the variables that appear to be unhelpful in Hofstede’s dimensions (Shi and Wang, 2011; Bertsch, 2012). In doing so, the problem relating to Hofstede’s dimension of masculinity was addressed (Venaik and Brewer, 2010; Shi and Wang, 2011; Bertsch, 2012). This was achieved by creating two further dimensions: performance orientation, which measured self-effort (Venaik and Brewer, 2010; Bertsch, 2012), and humane orientation, which acknowledged the values relating to altruism versus self-aggrandisement (Bertsch, 2012). It is argued that both these orientations are subsets of the masculine and feminine characteristics (Shi and Wang, 2011). The GLOBE project also created a dimension of assertiveness which was not considered to be related to gender orientation (Venaik and Brewer, 2010; Bertsch, 2012).

The term “individualism” is used in both studies and the terminology masked two further intrinsic differences:

1. Hofstede included the family along with the individual. In the GLOBE study, individualism related to the individual, and the in-group/collectivism dimension compared this with the extent to which familial or social group interests were valued (Brewer and Venaik, 2011).
2. Hofstede based his group value on “the ideal job” whereas the GLOBE’s revised values related to the actual job. The impact of this change is substantial. Hofstede measured the extent to which the respondent would like to be group-oriented, and his findings correlated strongly with the results of the GLOBE’s analysis of in-group collectivism, i.e. the ties to the family (Brewer and Venaik, 2011).

The GLOBE project has not come under so much criticism as Hofstede (Venaik and Brewer, 2010); indeed, researchers have been successful in confirming the validity of its dimensions (Bertsch, 2012). However, both the originators of the GLOBE project and Hofstede have been criticised for not accommodating the influence exerted by wealth (Smith, 2006; Tang and Koveos, 2008) whereby Maslow's hierarchy of needs explains the relationship (Venaik and Brewer, 2010). Of relevance to this thesis is the observation that innovation is only likely to occur when the lower-level needs of security, food and shelter are attended to (Venaik and Brewer, 2010).

Whilst the GLOBE study appeared to correlate strongly with Hofstede's, there was an inherent anomaly that called the validity of both into question. The GLOBE survey identified practice and values separately, but it would be expected that there should be some correlation between the two. This was not the case (Taras, Steel and Kirkman, 2010; Venaik and Brewer, 2010).

A variety of reasons for the discrepancy have been debated (Taras, Steel and Kirkman, 2010; Venaik and Brewer, 2010), including consideration of the data-gathering itself where it is proposed that questionnaires seeking self-reporting did not reveal values themselves, rather a marginal preference (Maseland and Van Hoorn, 2009). Alternatively the manner in which the questions were presented led to bias (Taras and Steel, 2009; Taras, Steel and Kirkman, 2010a). Thus it should be borne in mind that reference to these surveys could reflect attitudes rather than the more fundamental issue of culture. This does not discount the value of the dimensions, because it is action taken that is of importance for this research rather than the source of the motivation behind it.

2.4.8 Hampden-Turner and Trompenaars

Taking a phenomenologist approach, Hampden-Turner and Trompenaars have also evaluated national cultures. Their work was influenced by Hofstede (French, Zeiss and Scherer, 2001; Jacob, 2005) and involved testing managers at training events sampling different sectors, including management and administrators, amassing in the region of 15,000 respondents (Hofstede, 1996) over 15 years (Hampden-Turner and Trompenaars, 1997, p.1).

There were three fundamental differences between their work and that of the GLOBE and Hofstede. Firstly, Hampden-Turner and Trompenaars collected

many of the data specifically for the analysis; secondly, they moved away from the Likert scale structure, and finally, instead of asking what ought to occur in simple situations, they asked for one of two responses to more complex dilemmas (French, Zeiss and Scherer, 2001; McSweeney, 2002; Maseland and Van Hoorn, 2009).

Hampden-Turner and Trompenaars identified seven cultural dimensions (Hofstede, 1996; White, 2012), which were subdivided into detailed categories and were used to develop profiles of the nations being evaluated (Hampden-Turner and Trompenaars, 1994). The seven categories were:

Universalism versus particularism, relating to regulation through setting and observing rules as opposed to finding solutions for individual situations.

Individualism versus communitarianism, assessing the degree of focus on individual goals and the needs of the larger group or economic systems.

Neutral versus affective, considering behaviour types within the workplace and assessing the extent to which they are rational and mechanistic or governed by emotion.

Specific versus diffuse, recognising that business interaction can focus on the task in hand or involve more of a personal relationship.

Achievement versus ascription, identifying that in some cultures status must be achieved through progress up a hierarchy, whereas in others status is ascribed to the person rather than the position, lending it greater stability.

Attitude to time is a slightly more complex construct identifying perceptions relating to the past or present and future, which can involve considering them to be discrete periods of existence or cyclical whereby the past contributes to the future. This dimension also examines the tendency to conduct activities in a sequential or synchronous manner.

Attitude relating to the environment involves societal as well as environmental interaction and measures the extent to which individuals consider the impact of their actions on others or the environment as opposed to being sensitive to the impact of the actions of others or the environment on the individual.

In the shadow of Hofstede and the GLOBE project, the work of Hampden-Turner and Trompenaars has attracted little discussion. They were careful to avoid the criticism of overgeneralisation by clearly demonstrating the mixture of cultures that could exist in one nation (Trompenaars and Hampden-Turner, 1998). The work produced profiles of nations which have been used by researchers to test the veracity of specific dimensions (French, Zeiss and Scherer, 2001), which suggests there is accuracy in the findings relating to universalism versus particularism and individualism versus communitarianism (Hofstede, 1996; French, Zeiss, and Scherer, 2001), but the dimension that is of particular relevance to this thesis, the manner in which culture influences man's interaction with the environment, has attracted little comment.

Hofstede criticised the work at many levels, from claiming the questions in the questionnaire were interrelated, reducing the certainty with which the dimensions were supported by the data, to maintaining that the analysis was inadequate because it lacked multivariate analysis (Hofstede, 1996). In this latter criticism, Hofstede could have been accused of bias, clouding his view with his own preconcepts. Hampden-Turner and Trompenaars (1997) responded that Hofstede did not understand their approach and, given the multidimensional character of culture, should accept that breadth in analytical approaches facilitates revealing different characteristics (Hampden-Turner and Trompenaars, 1997, p.4; Hampden-Turner and Trompenaars, 1998).

It would appear from the response from Hofstede that he was sensitive to any work that did not correlate closely to his own findings, which he used as a benchmark when testing the findings of Hampden-Turner and Trompenaars. The titles of the Hampden-Turner and Trompenaars dimensions have also been criticised for not communicating the characteristics portrayed (White, 2012).

The dimension potentially demonstrating the greatest difference between Hofstede's analysis and Hampden-Turner and Trompenaars' work is that of power distance. Hofstede referred to power distance being the extent of inequality between those in authority and those further down the hierarchy. Included in this was the extent to which the opinions of subordinates are accepted (Hofstede, 1996). Trompenaars and Hampden-Turner (1997) did not believe that the two ends of the continuum were incompatible, recognising that in some cultures the hierarchy could exist but the opinions of the subordinates

were valued by those in authority who also took steps to care for the personal welfare of their workforce. They believed that power distance should not be viewed as a continuum but as a matrix, with the hierarchical/egalitarian continuum on one axis, and the extent to which the individual is valued and cared for in contrast to ensuring the task is completed on the other.

2.4.9 The dimensions of culture compared

A comparison of the four sets of dimensions demonstrates the manner in which different studies have resulted in a variety of dimensions. However, traces of Kluckhohn and Strodtbeck's original work can be seen in the other studies, especially those relating to relationships, with greater clarity. The description of the continuum in table 2.4 incorporates observations identified in the above discussion.

Whilst some analysts have critiqued individual studies and sought to confirm their veracity through replication of the findings (House et al, 2004) or to undermine them through criticising their methodology, table 2.4 demonstrates that the studies have to a certain extent added credence to each other by identifying clusters of behaviours. Of interest is that all four studies recognised that there were clusters in the attitudes towards the future and in self-serving versus society-serving action.

2.4.10 Cultural dimensions and their scope of influence

Understanding culture has been shown to be critical to understanding the personal freedom individuals have in decision making. Indeed, it is argued that the world view held by individuals is defined through their culture and the different world views can be classified as hierarchical, fatalistic, individualistic or egalitarian (Hart, 2002; Leiserowitz, 2006; Tikir and Lehmann, 2011). This determines the risk that is perceived and the manner in which the expected issues such as sustainable development are managed (Leiserowitz, 2006; Tanzi, 2011, p.41; Tikir and Lehmann, 2011).

Culture is seen to underpin the level of responsibility that individuals or groups have to each other and their environment, as well as the extent to which the solution should be rule-bound or derived from expert opinion (Leiserowitz, 2006). In broad terms, individualists resent anything that threatens their

Table 2.4: A comparison of the four studies of cultural dimensions

Continuum	Kluckhohn and Strodtbeck	Hofstede's dimension	The GLOBE study	Trompenaars and Hampden-Turner
The relative importance of past, present and future and the influence they have on each other	Time orientation	Long-term orientation	Future orientation	Attitude to time
Short-termism versus long-termism				
Whether activities are sequential or synchronous				
Status earned through achievement, or ascribed through role or position in society	Activity orientation	Masculinity	Performance orientation	Achievement versus ascription
Rule-bound versus value-based judgement				Universalism versus particularism
Hierarchical versus paternalistic management		Power distance	Power distance	
Power and self-enhancement versus paternalism and altruism			Humane orientation	
The extent to which the needs of the "ideal job" take precedence over individual and family needs	Relational orientation	Individualism		
The strength of individual versus family values			In-group collectivism	Individualism versus communitarianism
Individualism versus societal or work obligations			Institutional collectivism	
The level of attention given to the task in hand versus relationships between those involved				Specific versus diffused
The extent to which business interactions can include rational or emotional behaviour				Neutral versus affective
Masculine versus feminine characteristics		Masculinity	Gender egalitarianism	
Aggressive versus nonaggressive behaviours			Assertiveness	
The level of risk that will be accepted		Uncertainty avoidance	Uncertainty avoidance	
A fatalistic view of man's interaction with natural forces versus man's ability to dominate them	Man nature orientation			Attitude relating to the environment
The extent to which individual activities impact on the environment versus the impact of the environment on the individual				
The extent to which the nature of man is good or evil	Human nature orientation			

autonomy. Both the individualist and the hierarchist trust technology to solve problems. Egalitarians are threatened by anything that would appear unfair with respect to distribution and are suspicious of technology. It follows that culture is believed to influence the response to challenges (Leiserowitz, 2006).

2.4.11 Cultural dimensions and attitudes towards sustainable development

Meta-analyses of research using Hofstede's dimensions and those of the GLOBE project reveal the extent to which the categories relate to sensitivity and the capability to adapt to the demands of sustainability (Caprar and Neville, 2012), and test their veracity at a national level (Kirkman, Lowe and Gibson, 2006). Caprar and Neville (2012) identified the complexity inherent in cultural studies that could blur the impact of apparent cultural tendencies in that strength in one dimension could ensure that regulations are created to support the environment, but the dominance of a characteristic embedded in a different dimension could lead to a disregard for regulation, undermining its impact. As suggested by their analysis of prior research, Caprar and Neville showed that most research used Hofstede's dimensions as a basis and revealed the following tendencies:

Power distance was seen to be influential in nine studies, which unanimously identified that nations demonstrating characteristics of a low power distance are more likely to respond to the need for sustainable development than those with a high power distance.

A study based on GLOBE dimensions identified that financial support for sustainability initiatives was offered where there was a high humane orientation.

Individualism: A summary of eight studies revealed that nations with strong societal structures (low individualism) tend to provide a basis for the identification of unethical behaviours, whereas implementation of and adherence to policies encouraging ethical behaviours tends to stem from looser structures. The study using GLOBE dimensions identified that nations demonstrating a high institutional collectivism provided more financial support for sustainability initiatives.

Masculinity: A review of six studies identified that nations with a tendency towards the feminine group of characteristics tend to be more

sensitive to ethical and environmental behaviours, although enforcement is more common among the more masculine groups.

The GLOBE-based study found that low assertiveness and low performance orientation were associated with financial support for sustainability initiatives.

Uncertainty avoidance: Only three studies were identified that related to this dimension. One of these, involving 24 countries, linked high levels of uncertainty avoidance to the development of policies, whereas two studies that involve a total of 28 countries identified that a low uncertainty avoidance is more likely to uphold regulation.

Long-term orientation: Referred to in only two studies, the impact of long-term orientation was not so clear-cut. One small study involving students in two countries revealed that a high long-term orientation is more likely to lead to ethical behaviour where marketing is concerned, whereas a larger study involving 28 countries identified greater incidence of punishing unethical behaviour in countries with a low long-term orientation.

The GLOBE-based study identified correlation between financial support and a high future orientation.

This meta-analysis does appear to confirm that cultural factors are a significant influence in the approach a nation takes in addressing sustainable development. Caprar and Neville (2012) theorised that culture has two points of impact in determining behaviour. Firstly, it influences the manner in which ethical standards are recognised, and secondly, it shapes the process in which these standards are diffused into societal action.

2.5 Change management and sustainable development

In this critical review of sustainable development I have revealed that it demands change of a radical nature whereas there is a tendency for businesses to maintain a “business as usual” approach. I have also identified the manner in which cultural characteristics can influence a national response to the challenge of sustainable development.

It is reported that up to 70% of all change initiatives fail (By, 2005; Smith, 2011), therefore strategic choices underpinning the programme of change are critical

(Burnes, 2009; Becker, 2010; Tang, Hull and Rothenberg, 2012), demanding careful planning on behalf of the decision maker.

In this part of the review of literature I commence by investigating the characteristics associated with the type of change needed for sustainable development before analysing the different models of decision making in order to assess the manner in which they facilitate the adoption of the radical solution. The specific characteristics of sustainable development are then assessed to reveal characteristics of “the problem” decision makers are seeking to solve and further establish the manner in which it facilitates the development of a radical solution.

2.5.1 Terminology of change types

There is some confusion in the use of terminology in literature referring to change (By, 2005). Some authors differentiate between continuous and discontinuous (By, 2005; Smith, 2011), whereas others refer to incremental change and discontinuous (By, 2005), suggesting that “continuous” and “incremental” might be synonymous (By, 2005). However, Burnes argues that there are three models: incremental, continuous and discontinuous/punctuated equilibrium (Burnes, 2009, p.406). He also identifies two continuums, one relating to scale and importance and the other to the dimensions of incremental and radical change (Burnes, 2009, p.407).

Definitions provided for discontinuous change such as “change which is marked by rapid shifts in either strategy, structure or culture, or in all three” (Grundy, 1993, cited in By, 2005) or “single, abrupt shift from the past” (Luecke, 2003, cited in By, 2005) suggest it could refer to the continuum of scale and importance and is likely to involve radical change. Both incremental and continuous change are seen to be either “smooth” or “bumpy” in nature (By, 2005; Burnes, 2009, p.406; Smith, 2011), relating to the extent to which the rate of change varies over a period of time (By, 2005; Burnes, 2009, p.406).

2.5.2 Paradigmatic change

Ensuring societies are on a sustainable trajectory has been seen to require radical change. Indeed, Ruckelshaus (1989) described the change in terms that were commensurate with a description of a paradigm change as defined by Kuhn.

Of critical interest to this thesis are the dynamics of paradigm change. It is only when the scope of the constituent agents of change is understood that research can be undertaken to assess the extent to which paradigm change can be controlled and directed.

Paradigm change is referred to in literature, but generally as a descriptor rather than the subject of interest. However, the exception to this is Kondratieff, who initially observed that the global economy appeared to adopt a cyclical pattern of growth and recession (Tarascio, 1988) that was accompanied by significant technological revolutions (O'Hara, 1994; Silverberg and Verspagen, 2003; Papenhausen, 2009).

The theory has been developed into what is now referred to as long wave or Kondratieff's wave theory (O'Hara, 1994; Silverberg and Verspagen, 2003; Papenhausen, 2009). The subject of long waves has been overshadowed by short- and medium-term economics, and little has been subsequently contributed to the discussion (O'Hara, 1994; Silverberg and Verspagen, 2003). The latest recession has revived interest, although the literature concentrates on the economic elements rather than developing an understanding of the drivers of change that are identified within the system itself.

The components of paradigm change

The initial observation by Kondratieff related to economic cycles, but it was argued that these were driven by business cycles. It was observed that there was a clustering of activities fuelling growth (O'Hara, 1994; Freeman and Perez, 1988, in Dosi, 1988), including innovation that triggered the investment in new production systems. This was followed by recession resulting from economies that achieved through a focus on process innovation and the exploitation of economies of scale (O'Hara, 1994; Freeman and Perez, 1988, in Dosi, 1988).

Societies also needed to change in order for the innovations to be accepted. The role of governments was seen to be required (Perez, 1983) in firstly controlling the amplitude of the economic swing (O'Hara, 1994) and secondly ensuring the innovations were profitable and supporting them with necessary legislation (Anderson, 2006; Kingston, 2006). However, it is also argued that such action is in response to crisis rather than forward-looking planning (Rhodes, 1991).

Each paradigm has a new technology at its heart; however, the precise character of this is unpredictable. The seeds of the new paradigm are sown in the later years of its predecessor, meaning that there is some connection between the old and the new (Smihula, 2010).

Papenhausen (2009) considers the character of the decision maker to be relevant, linking global changes in the capacity of individuals to accommodate risk to global traumas such as war and the subsequent development of the individual. Critically, Perez (1983) identified that the innovations preceded the cyclical change, suggesting that the business cycle was part of the process of paradigm change rather than a victim of it.

The three entities that have been identified in literature as involved in paradigm change and are thus of relevance to this thesis are business (including the capacity of the individual decision maker), governments and society.

2.5.3 The rate of change

There are advantages and drawbacks to both continuous and discontinuous change. Firstly, continuous learning is seen to enhance the view that change is non-threatening (By, 2005) and results in a “learning organisation” (Nielsen-Englyst, 2003; Burnes, 2009, p.146), but it is seen to be more costly with the need to develop a programme of initiatives and associated resources (By, 2005) and there is the threat that more radical changes that might be needed are overlooked (Nielsen-Englyst, 2003). In contrast, whilst discontinuous change is considered more cost-effective, it does not appear to achieve lasting benefits (By, 2005; Tang, Hull and Rothenberg, 2012) and can engender resentment and complacency (By, 2005).

In general, the pace of change is seen to be increasing (By, 2005; Burnes, 2009, p.151; Smith, 2011). However, Tang, Hull and Rothenberg (2012) suggest that it should be moderated in order to ensure that solid growth is achieved in terms of organisational capabilities and the associated technological requirements. This suggests that the most effective change is seen to be at a steady rate that is continuous, not necessarily the appropriate medium for change of the magnitude that is considered necessary to achieve sustainable development.

2.5.4 Managing complexity and radical change

The complexity involved in accommodating the breadth of change demanded by sustainable development should also be recognised (Van Marrewijk, 2010; Burnes, 2009, p.151; Elliot, 2011; Tang, Hull and Rothenberg, 2012) and it is argued that complexity should be constrained in order to focus the investment in terms of complementary technologies and to co-ordinate the development of capabilities (Tang, Hull and Rothenberg, 2012). This can increase the overall pace of change because learning is not fragmented (Tang, Hull and Rothenberg, 2012).

It is important to note that incremental steps build on prior knowledge, but radical change, by its very nature, does not fit closely to prior knowledge (Newman, 2000; Akg et al, 2007; Becker, 2010) and should be scheduled to accommodate the additional time that it will require to enable the change to be absorbed (Becker, 2010), including unlearning concepts and practices that are made redundant (Akg et al, 2007). Indeed, it has been found that existing knowledge can prove incompatible with the desired change and actively hinder its absorption (Wang and Bansal, 2005; Akg et al, 2007; Becker, 2010).

In addition to limiting the variety of changes to be accommodated at any one time, the order in which changes are introduced is also important. It is necessary to ensure that capabilities are developed internally before beginning to develop an external focus (Newman, 2000; Tang, Hull and Rothenberg, 2012).

2.5.5 The dynamics of decision making in relation to sustainable development choices

It has been demonstrated that change of the nature required for sustainable development requires strategic decisions to facilitate successful implementation. However, it is not just the manner in which change is introduced that needs to be determined. Decisions are also required to identify the associated goals and objectives that should be achieved. At its most fundamental level, such strategic management, whether at institutional or governmental level, is influenced by internal and external constraints (Nutt, 1998; Peterson, 2010) as well as the ability to assess the benefit gained from the decision in order to achieve the desired goals (Janis and Mann, 1977, p.26; Nutt, 1998; Peterson, 2010). An examination of the manner in which these

elements influence decisions relating to sustainable development indicates why apparently rational decisions fail to align with the needs of strong sustainability.

Sustainable development involves management of public goods that the neoclassical economist would classify as externalities (Bowers, 1997, p.38; Park, 2006). These are resources from which entities cannot be excluded and which are therefore freely available for all at no cost and fall outside the market system (Holcombe, 2000; Park, 2006). Seeing that market forces cannot be used to restrain their usage, controlling the use of public goods requires international cooperation by all governments and organisations (Bowers, 1997, pp.33–38; Finus, 2002, p.20; Ebster and Jensen, 2006). At government level, such control comes in the form of legislation and/or economic measures which would include monitoring and enforcement (Barton, 2001; Fauchald and Stigen, 2009), or a collaborative agreement creating a duty to act in accordance with an agreed framework (Gehring and Plocher, 2009; Hansford and McKerchar, 2010; Susskind, 2013).

There is choice in the manner in which governments and organisations can address the need for sustainable development. An investigation into decision-making structures and the associated tools can assist in identifying why, at a theoretical level, organisations do not act in line with the best course of action to address the need for strong sustainable development.

The decision-making framework

The rules of economics and the underlying theory of business are based on the assumption that decision makers are rational beings and will be able to make decisions that maximise utility (Weck-Hannemann, 2001; Cox and Hayne, 2006; Zhang and Leezer, 2010; Gsottbauer and van den Bergh, 2011). There are many models for decision making, starting with the model commonly accepted to be the one demonstrating best business practice, namely the rational approach. Other models accommodate behavioural characteristics, such as bounded rationality, bounded self-interest and bounded willpower (Shogren et al, 2010).

Literature relating to decision making together with the nature of accommodating the needs of the environment is examined as well as the abilities of the decision makers themselves in order to identify any

characteristics that could account for the tendency to adopt a weak approach to sustainability whilst acknowledging that the strong approach is the more robust.

2.5.6 The rational approach and the cost-benefit analysis

The rational approach to decision making relies on systematic analysis of a situation in order to determine appropriate action (Winterton, 2003; Christensen and Varnes, 2008; Betts, 2009) and is employed with the purpose of identifying an optimal decision (Janis and Mann, 1977, p.26; Zebda, 2002). Its importance in literature is that the rational maximisation of utility is an underlying premise of economic theory (Leonard and Biberman, 2007).

The rational approach should seek to balance satisfaction of multiple criteria by generating and systematically testing solutions using weighted criteria to ensure that each aspect to be satisfied is given appropriate consideration (Janis and Mann, 1977, pp.29–30; Heracleous, 1994; Leonard and Biberman, 2007; Ahmed, Hasnain and Venkatesan, 2012; Betsch and Held, 2012). In theory the model looks sufficiently robust to attract much attention (Betsch and Held, 2012) but the practical outworking is not as straightforward.

The cost-benefit analysis is a tool commonly used by governments to ensure that their decisions accommodate environmental costs, providing the requisite rational assessment of both the costs and the benefits associated with any given action (Zebda, 2002; Multinational Monitor, 2009). In theory this makes it possible to ensure that the benefit gained from a decision is at least equal to the cost incurred (Haberberg, 2005, p.32; Hughes, 2009, p.5), but it requires detailed analysis, including the need to generate and assess the viability of a range of solutions (Haberberg, 2005, p.26; Betts, 2009; Kutschera and Ryan, 2009), that can result in a process that is too slow for fast-moving, dynamic situations (Goll and Rasheed, 1997; Koch, Eisend and Petermann, 2009; Kutschera and Ryan, 2009), and it is not suited to complexity (Koch, Eisend and Petermann, 2009).

Difficulties associated with the cost-benefit analysis

1. Elements of the environment are very hard to value in monetary terms (Turner, 2007; de Serres et al, 2010), which is considered to be ethically unacceptable (Helm, 2005). There are a range of methods that can be used such as hedonic pricing or contingent valuation (Vogt, 2002, p.188; Helm,

2005; Mueller, 2007; Hausmen, 2012), but they are all fraught with difficulty (Mueller, 2007) including vulnerability to behavioural failure (Brown and Hagen, 2010; Shogren, 2012a) and cannot be considered accurate (Hausmen, 2012), and it is easier to determine the cost of damage, rather than the benefit gained from its amelioration (Helm, 2005). Indeed, it is argued that social and environmental capitals cannot be calculated on a financial basis (Dowlatabadi, 1999; Guglyuvatyy, 2010; Mintz, 2011; Sherman, 2012) but are best expressed in qualitative terms (Pava, 2007; Mintz, 2011; Sherman, 2012). Thus the ability to identify the financial cost of resources in order to conduct an accurate cost-benefit analysis is severely compromised (Helm, 2005; Pava, 2007; Sherman, 2012).

2. The long-term nature of environmental damage is such that it is difficult to predict its exact nature and associated costs accurately (Finus, 2002, p.36; Dijkstradaan, 2006; Turner, 2007; Szekeres, 2011; Wagner and Zeckhauser, 2012; Zaharia and Zaharia, 2012) and the long-term nature of any return on investment in its protection is contra to a quest for short-term planning and profits (Finus, 2002, p.36; Burres, 2005; Turner, 2007; Gehring and Plocher, 2009).
3. Savings gained through moving to a cleaner technology cannot always be calculated with ease (Shogren, 2012b).
4. Discounting, a technique used for comparing future costs with their present value, does not follow the same rules when applied to environmental issues, distorting comparative costs (Turner, 2007; Guglyuvatyy, 2010; Hepburn et al, 2010; Szekeres, 2011; Zaharia and Zaharia, 2012). This is compounded by the long timescale inherent in issues relating to sustainable development (Haurie, 2003) and the difficulty in establishing realistic discount rates (Nordhaus, 2007; Hepburn et al, 2010) along with the non-linear behaviour of impact caused by environmental change (Dowlatabdi, 1999) in contrast with the preference for short-term planning (Hepburn et al, 2010).
5. Accounting for the cost of emissions is limited to the costs borne locally, when the effect of emissions from one locality can be far more devastating elsewhere. Conversely, only local benefits of emission reduction would be

considered, therefore the full scale of benefits is not recognised (Foster and Wise, 1999; Vogt, 2002, p.178; de Serres et al, 2010).

Numerous criticisms have been raised relating to the rational approach to decision making and the cost-benefit analysis. Firstly, the justification of the cost-benefit analysis assumes that, having identified that the benefit exceeds a cost, the cost can be absorbed (Multinational Monitor, 2009). It is an unsafe assumption when measurement of the cost is not possible in quantitative terms.

Secondly, there is a tendency for the results of a cost-benefit analysis to be biased towards the specific goal of the exercise, which in the case of the cost-benefit evaluation is generally that of ensuring that an activity yields a net financial gain (Zhang, 2007; Betsch and Held, 2012). It is argued that the cause of this is subconscious (Betsch and Held, 2012) but this undermines the rational process behind the decision (Leonard and Biberman, 2007; Zhang, 2007).

Thirdly, rational decision making is seen to require extensive skills and thus it is argued that it is subject to error (Janis and Mann, 1977, p.26; Heracleous, 1994) and is vulnerable when decision makers suffer from any form of cognitive impairment. Whilst software can deliver much, especially in mathematical analysis (Kharchenko and Pysarchuk, 2011) and specific operations (Jolai, Jahangoshai Rezaee and Vazifeh, 2009; Djassemi, 2012), it cannot be considered to be a total solution (Wiederhold, 2000; Webb and Gallagher, 2009; Kelton, Pennington and Tuttle, 2010) as it involves simplification of reality and the threat of misinterpretation of outputs on behalf of the decision maker (Wiederhold, 2000; Kelton, Pennington and Tuttle, 2010).

Fourthly, the model assumes that the decision maker is free to make any decision without the constraint of legislation or directives (Heracleous, 1994). However, the concept of path dependency suggests that the decision maker is constrained by the tenets and structures of the paradigm under which the decision is being made (Heracleous, 1994; Betsch and Held, 2012; Koch, Eisend and Petermann, 2009), and the process itself constrains the innovative solution (Heracleous, 1994).

Finally, the nature of the rational decision-making model could depend on the personality and experience of the decision maker (Zhang and Leezer, 2010; Ahmed, Hasnain and Venkatesan, 2012; Haran, Ritov and Mellers, 2013).

Logical thought is linked to left-brained activity in contrast to the right-brained activity needed for the more creative approach (Leonard and Biberman, 2007; Lowy, 2011), suggesting that in fact a purely rational approach to decision making constrains the decision maker from being creative by focussing the activity within the left hemisphere (Heracleous, 1994).

Two of the measures used in the Myers-Briggs test, a test of personality, substantiate the link between individual personality and the ability to make decisions. Firstly, it measures the extent to which thought styles tend towards being intuitive or logical. This provides recognition that the two styles of thought are on a continuum and individuals vary in their natural preference. Secondly, the Myers-Briggs test measures the ability individuals display in using those thought styles (Brockmann and Anthony, 2002; Betts, 2009). Thus it suggests that individual decision makers have not only a natural preference for the type of model used, but also different skill levels in its use.

Contrasting with the opinion that individual character traits tend to predetermine the approach an individual will take, it is postulated that decision makers will use either intuition or logic depending on the constraints under which the decision is to be made (Leonard and Biberman, 2007; Betsch and Held, 2012) or use a variety of approaches for an individual decision (Leonard and Biberman, 2007). In that the Myers-Briggs test measures personality along continuums between two extremes, it is reasonable to argue that character still plays a role because those for whom a characteristic is towards the middle of a continuum will have a degree of ability in the contrasting approach.

2.5.7 Behavioural failure

Whereas the rational decision-making model suggests that careful analysis of the problem would point to a desired solution, an emerging theme of behavioural economics recognises the characteristics of the decision maker themselves that could undermine their ability to identify an optimal solution (Janis and Mann, 1977, p.26; Zhang, 2007; Brown and Hagen, 2010; Etzioni, 2011; Shogren, 2012a). Indeed it is argued that at best, the rational decision is an ideal that is rarely achieved in complex decisions (Simon, 1992; Heracleous, 1994; Zhang and Leezer, 2010). A study of behavioural economics broadens understanding of external factors that would influence decisions, including those made using the satisfaction model detailed in section 2.5.6 (Zhang, 2007;

Shogren et al, 2010; Etzioni, 2011; Gsottbauer and van den Bergh, 2011).

Behavioural economics is identifying an ever-increasing range of human characteristics that would colour a decision (Shogren et al, 2010; Gsottbauer and van den Bergh, 2011). I will examine the more common influences listed below:

- Bounded rationality
- Bounded self-interest
- Bounded willpower

Bounded rationality

Bounded rationality occurs when it is recognised that limitations obstruct the ability of the decision maker to make a purely rational decision (Evans, 2007; Zhang, 2007; Alvesson and Spicer, 2012). The concept of bounded rationality is the recognition that in real situations, a purely rational approach to decision making is unlikely because of issues such as limited mathematical or logical skill sets, knowledge and time (Janis and Mann, 1977, p.26; Heracleous, 1994; Haberberg, 2005; Zhang, 2007; Betsch and Held, 2012).

The decision not to expend time of the order required to make a rational decision could itself be considered a rational choice (Janis and Mann, 1977, p.32). Moreover, it is argued that the two processes of intuition and rational thought work in conjunction with each other (Haberberg, 2005, p.26; Zhang, 2007; Kutschera and Ryan, 2009; Savolainen, 2009) but, without the structure of tools aiding the entire rational decision process, they are more vulnerable to bias due to inaccurate or inconsistent valuation of resources or risk aversion (Botzen, 2011; Shogren, 2012a). The impact of this is such that when presented with the same choices that have been expressed in different forms, decision makers will make completely different decisions (Zhang, 2007; Shogren et al, 2010; Botzen, 2011). Indeed it is argued that decision makers are guided by preferences that are themselves incomplete and inconsistent, but are deemed to reach rational decisions (Janis and Mann, 1977, p.24; Botzen, 2011).

When considering the impact of limited knowledge in conjunction with a complex subject such as sustainable development, the role of ignorance is heightened. Debates around emerging information raise questions that disclose new areas of uncertainty and ignorance (Brandon, 2012; Alvesson and Spicer,

2012). Whilst experts recognise the need for more knowledge, the layperson is less likely to identify such gaps and may not think to raise critical questions (Harvey et al, 2001), or may rely on assumptions or “pseudo knowledge” (Harvey et al, 2001; Brandon, 2012; Alvesson and Spicer, 2012).

Where such lack of knowledge is recognised, it is assumed that the employment of an expert will be sufficient to ameliorate its effects (Brandon, 2012; Alvesson and Spicer, 2012), but trust in experts can be misplaced (Brandon, 2012) and can bypass development of understanding and tacit knowledge required to underpin rational decision making (Karlsen and Karlsen, 2007; Alvesson and Spicer, 2012).

One of the effects of bounded rationality is that decision makers resort to habitual patterns involving either formal or informal rule-bound behaviours that lead to tunnel vision. These behaviour patterns, labelled “skilled incompetence” by Argyris (Euchner, 2010; Alvesson and Spicer, 2012), can prevent managers from identifying critical issues or addressing the difficult question (Euchner, 2010; Alvesson and Spicer, 2012) and avoid addressing the true needs relating to sustainable development.

Bounded self-interest

Bounded self-interest relates to a degree of altruism or sense of fair play that is exhibited in a decision (Evans, 2007; Zhang, 2007; Shogren et al, 2010).

Bounded self-interest is based on a prior assumption that, given no constraints, people would only act in self-interest, but this is not always the case in certain situations. Self-interest is seen to be bounded when there is a need to establish or maintain a reputation of fairness and in situations when reciprocity or compensation for some perceived injustice is seen to be needed (Zhang, 2007; Gsottbauer and van den Bergh, 2011). The implications would suggest that companies developing a reputation of being socially responsible will adopt a more altruistic stance in decision making, and that decisions made in the public eye tend to be more altruistic than those made in private (Shogren, 2012b).

Bounded willpower

The concept of bounded willpower accepts that decision makers may not have the strength of character to make a decision for the greater good when it carries an immediate cost (Evans, 2007; Shogren et al, 2010; Gsottbauer and van den

Bergh, 2011). There are three outworkings of this. Firstly, when faced with a choice between immediate gain and long-term gain, a decision maker may not be able to deny themselves an immediate gain even if the benefits of the longer-term gain far outweigh those of the immediate one (Shogren et al, 2010). Secondly, the decision maker may prefer to take similar action to that of his or her peers rather than stand out and act differently even if there is potential gain in doing so (Janis and Mann, 1977; Shogren et al, 2010). Finally, the extent to which the decision maker is risk-averse will colour the decision taken (Gsottbauer and van den Bergh, 2011).

2.5.8 The satisfaction model

The satisfaction model of decision making results from constraints rendering a rational approach unsuitable and involves selecting a satisfactory choice at the risk of sub-optimisation (Janis and Mann, 1977, pp.21–41; Haberberg, 2005; Zhang, 2007; Kutschera and Ryan, 2009; Shogren et al, 2010; Gsottbauer and van den Bergh, 2011). It can occur when the decision maker short-circuits any of the rational decision-making process, settling on a satisfactory solution that is not necessarily optimal (Janis and Mann, 1977, pp.21–24; Zhang and Leezer, 2010).

One difficulty inherent in rational decision making is the need to be able to trade benefits and losses across criteria. Not only is this a difficult process, but it creates stress in the decision maker (Janis and Mann, 1977, pp.50–51; Hogarth and Karelaia, 2005), which correlates with the potential threat of failure relating to the decision in question. This can lead to a subconscious tendency to avoid adopting a rational approach (Janis and Mann, 1977, pp.81–133; Hogarth and Karelaia, 2005). Betsch and Held (2012) argue that decision makers balance the two modes of satisfaction and maximisation when making decisions.

Tversky formalised an approach the decision maker could adopt, namely “elimination by aspects”, whereby criteria are used as filters to reject solutions that fail to meet predetermined standards (Janis and Mann, 1977, pp.31–33; Hogarth and Karelaia, 2005; Yee et al, 2007; Savolainen, 2009). Should there still be choice at the end of the process, the standards are raised, then a random choice could be made (Janis and Mann, 1977, pp.31–33; Kerimi, Montgomery and Zakay, 2011) or the procedure repeated (Janis and Mann, 1977, pp.31–33). It is argued that it is most effective when there are numerous

factors to consider because it simplifies the complexity (Andrews and Manrai, 1998). An alternative model, “acceptance by aspects”, reverses the process, whereby solutions must meet criteria in order to be shortlisted (Yee et al, 2007).

The “elimination by aspects” approach is criticised for handling all aspects as if they were of equal importance (Janis and Mann, 1977, p.32; Hogarth and Karelaia, 2005; Yee et al, 2007; Kerimi, Montgomery and Zakay, 2011) and producing sub-optimal solutions because a solution that fails one standard could in fact offer superior performance on the remaining ones and thus would potentially have been an optimal decision (Janis and Mann, 1977, p.32; Hogarth and Karelaia, 2005). However it is argued that if the approach is used judiciously by eliminating the solutions that fail to meet the most important criteria before reviewing the remainder, more accurate results are achieved (Janis and Mann, 1977, p.32; Hogarth and Karelaia, 2005; Savolainen, 2009).

Prospect theory, developed by Tversky, includes the use of weighted criteria so that their probabilities and relative importance are considered (Yee et al, 2007; Savolainen, 2009; Gsottbauer and van den Bergh, 2011; Kerimi, Montgomery and Zakay, 2011). Alternatively decision makers facilitate compensation when a solution excels in one area but does not meet the criteria in others (Yee et al, 2007). These methods can result in decisions that nearly match the performance of a rational decision (Janis and Mann, 1977, p.32; Hogarth and Karelaia, 2005; Yee et al, 2007).

Other satisficing models exist but they do not match the performance resulting from the judicious use of “elimination by aspects”, which itself does not demand the skill set required for the rational decision (Janis and Mann, 1977, pp.32–33; Hogarth and Karelaia, 2005).

2.5.9 Systems approaches

Systems thinking offers the decision maker various tools in the form of modelling techniques that facilitate an exploration of relationships between the different entities within a system and testing of the impact of proposed solutions (Swart and Powell, 2006; Leonard and Biberman, 2007). It facilitates the understanding of complex situations before starting to consider an appropriate intervention (Swart and Powell, 2006; Leonard and Biberman, 2007).

A systems approach to decision making has been shown to be effective (Swart and Powell, 2006; Leonard and Biberman, 2007; Pagano and Paucar-Caceres, 2008) because it facilitates analysis of the entire system, including consideration of externalities (Swart and Powell, 2006; Leonard and Biberman, 2007), and, in mapping cognitive perception, aids communication (Pagano and Paucar-Caceres, 2008). It is credited with being an approach that engages the imagination and thus facilitates novel solutions (Leonard and Biberman, 2007) and consequently could facilitate decisions leading to radical change.

2.5.10 Decision-making models that appear to avoid logical process

The models discussed above all employ some measure of deliberate logical process (Zhang and Leezer, 2010; Betsch and Held, 2012), but it is important to recognise other ways of decision making. These all involve a certain degree of intuition, but, as shown in the following discussion, they should not be rejected merely on the grounds that they lack any form of logical structure.

The garbage can

Using the unpredictable nature of business and unintended consequences as justification, the garbage can model responds with a structure that is based on trial and error or random action, not necessarily focussed on a specific problem (Betts, 2009; Parag and Eyre, 2010; Alvesson and Spicer, 2012). The strength of this approach is that it facilitates the adoption of novel solutions (Parag and Eyre, 2010; Alvesson and Spicer, 2012), but its weakness is that it does not accommodate feedback and thus its consistent use undermines organisational learning (Alvesson and Spicer, 2012).

Intuition

Reliance on intuition is also an accepted decision-making approach (Galeotti, 1992, p.26; Simon, 1992, p.27; Brockmann and Anthony, 2002; Betts, 2009). Whilst intuition can play a large part in bounded rational decision making (Simon, 1992, p.27; Betts, 2009; Betsch and Held, 2012), it depends on utilising tacit knowledge, which by its very practical nature (Brockmann and Anthony, 2002) cannot be articulated (Karlsen and Karlsen, 2000; Brockmann and Anthony, 2002), and therefore appears to cause the decision maker to bypass steps in a rational decision making (Simon, 1988, p.116–117; Leonard and Biberman, 2007; Betts, 2009) when in fact it involves an “intellectual and cognitive process” at a subconscious level (Brockmann and Anthony, 2002).

It is argued that intuition is in response to cues (Simon, 1988, pp.116–117; Zhang and Leezer, 2010) that trigger tacit knowledge, acquired through past experience, that can be every bit as robust as logical thought (Simon, 1988, pp.116–117; Brockmann and Anthony, 2002). Intuition can produce good-quality decisions and discoveries (Simon, 1988, pp.116–117; Betts, 2009), including making radical breakthroughs (Simon, 1988, pp.116–117; Brockmann and Anthony, 2002), and has been shown to be superior to any other model (Brockmann and Anthony, 2002; Leonard and Biberman, 2007; Betsch and Held, 2012).

It has been shown that trends can be identified at a subconscious level before any rational evidence for the trends is noticed, meaning that intuitive responses can also be more sensitive to changing environments (Leonard and Biberman, 2007). Research demonstrates that successful decision makers in dynamic situations acting on intuition have ensured that they have a good understanding of the salient facts prior to being faced with a decision (Goll and Rasheed, 1997; Kutschera and Ryan, 2009; Haran, Ritov and Mellers, 2013).

Haran, Ritov and Mellers (2013) argue that those who produce the best intuitive decisions are “actively open minded thinkers” who devote more energy to gathering information. However, to achieve a decision intuitively, reality is frequently simplified (Goll and Rasheed, 1997; Zhang, 2007) and perceptions may be biased or dated, especially with issues relating to the environment (Haberberg, 2005, p.27).

Skilled incompetence and groupthink

Alvesson and Spicer (2012) recognise what they consider to be a further model that should be considered because of its impact on the scope of decisions made and because it potentially adds to the understanding of intuition. Questioning the manner in which seemingly intelligent decision makers ignore real risks, they identified a deliberate ignoring of accepted models that have proved their worth.

Skilled incompetence is not the flawed thinking described in Argyris’ use of the same term, although the results are similar (Hill, 2013). Alvesson and Spicer (2012) recognised a different behaviour, whereby, resulting from either

organisational culture or individual preference, the decision maker has consciously elected to abandon tried and tested methods.

This behaviour type, which they refer to as “functional stupidity” and has been observed by other academics (Strickler, 2013), has similarities with “groupthink”, which is characterised by a corporate unwillingness to look beyond the boundaries of group opinion (Cutting and Kouzmin, 2000; Pirson and Turnbull, 2011).

The outworking of this is that the decision maker does not start to analyse the problem and question existing understanding or the parameters of the problem. It has the advantage of facilitating flow in organisations, enabling people to concentrate on the core tasks (Alvesson and Spicer, 2012), but its weakness is that it inhibits the raising of critical questions and adopting an innovative stance (Alvesson and Spicer, 2012). Consequently, with both skilled incompetence and intuition, the novel solution required to effectively address new dilemmas posed by the demands of sustainable development is not so likely to be identified.

Skilled incompetence or intuition?

Alvesson and Spicer’s description of “skilled incompetence” demonstrates a model that is in many ways similar to that of the use of intuition. However, at a superficial level their assertion that the subsequent response lacks justification demonstrating its suitability and tends to remain within a tight framework of tried and tested solutions (Alvesson and Spicer, 2012) points to a critical difference, because intuition typically can produce a radical solution (Simon, 1988, pp.116–117; Brockmann and Anthony, 2002). It is feasible, however, to speculate that the “skilled incompetence” identified by Alvesson and Spicer is in fact the same as intuition, but the decision maker is without the breadth of tacit knowledge that only experience can deliver. Indeed it is argued that senior management are more likely to make a robust decision using tacit knowledge because of their broader experience (Brockmann and Anthony, 2002; Leonard and Biberian, 2007).

Betsch and Held (2012) refer to poor decisions that have emanated from intuitive decision making being such that would not have been made if logical processes had been conducted, claiming that the decision maker had not accommodated emerging information, identifying weaknesses in line with those

of “skilled incompetence”. Moreover, the same issues relating to personality that were discussed in relation to the rational decision also apply to the intuitive decision. Personality can have a bearing on the expertise with which the approach is utilised (Heracleous, 1994; Ahmed, Hasnain and Venkatesan, 2012).

2.5.11 The imperfect decision: sub-optimisation and incremental change

A range of decision-making models have been reviewed in terms of their ability to identify the optimal decision and it has been recognised that the majority of organisational decisions are sub-optimal (Janis and Mann, 1977, p.23). A question remains as to whether a sub-optimal decision can be considered good enough.

Woerdman (2005) referred to a paucity of material relating to the impact of sub-optimisation. More is written relating to the shortcomings of the sub-optimal decision in the discipline of design than in that of decision making, although the arguments are comparable. Sub-optimisation occurs when a solution delivers some of the desired attributes but fails in others (Janis and Mann, 1977, p.22) and where a different solution would have met more of the desired criteria.

Indeed, the solutions that cannot be improved upon are rare (Janis and Mann, 1977, p.23; Assink, 2005). It is argued that successive incremental changes can accumulate to significant change (Janis and Mann, 1977, p.33; Levin, 2000) although this method is criticised for delaying progress (Janis and Mann, 1977, p.33). However, there comes a point where incremental changes cannot yield any benefit and the optimal position is achieved for that technology.

This is a principal criticism of sub-optimisation, namely that it can lock action into a specific trajectory that might not be the optimal path (Levin, 2000; Woerdman, 2005; Trisolini, 2010). Whilst subsequent radical change can rectify the inadequacy in the trajectory (Woerdman, 2005; Assink, 2005), this becomes a serious issue when it is too difficult to change the technologies or strategies involved (Woerdman, 2005; Trisolini, 2010). The difficulties range from those of cost (Woerdman, 2005) and investment in infrastructure to more subtle issues of an inability to unlearn “wisdom” and tacit knowledge developed whilst pursuing a sub-optimal trajectory (Assink, 2006; Trisolini, 2010).

2.5.12 Aligning decision making with the complexity of sustainable development

The review of literature relating to the approaches to decision making has revealed that there are numerous methods that can be adopted involving different levels of rational thought. The type of solution depends in part on the strategy adopted, and the review of literature has revealed that because of the uncertainty involved in predictions relating to sustainable development, this tends to result in decisions that are incremental rather than radical.

Notwithstanding, some decision-making structures including action resulting from incomplete knowledge can prompt the more radical solution.

It has been established that models of rational decision making involve breaking complexity down into more simple units of information (Egidi, 1992, p.11; Kutschera and Ryan, 2009; Benson and Dresdow, 2009). However, the complexity of sustainable development is not suited to such an approach (Koch, Eisend and Petermann, 2009; Lowy, 2011).

Managing sustainable development involves specific issues that undermine attempts to identify rational action. The critical problem of market failure is explained and the specific characteristics of environmental management that create uncertainty and complexity are identified in order to demonstrate further the difficulties in identifying appropriate action.

2.5.13 Market failure

The neoclassical environmental economist perceives that many aspects demanding intervention where sustainable development is concerned are caused by market failure which is attributable to the nature of the environment. It is argued that there are elements of the environment, such as the air we breathe, that cannot be reserved for a particular use and are termed “non-excludable”. There is no market value attached to these elements, because they are freely available and therefore cannot be marketed (Bowers, 1997, pp.33–38; Vogt, 2002; Ebster and Jensen, 2006). Many elements of the environment are external to the market system and as such vulnerable to overconsumption.

The underlying premise of environmental economics is that market failure can be corrected by ascertaining the financial value of resources that currently fall

outside the market and developing instruments such as permits, taxation or subsidies at government level that influence their use. Market failure is resolved because a market for these excluded resources is created, placing economic pressure on the business sector that makes it financially viable to adopt a sustainable practice (Bowers, 1997, pp.33–39; Johnson, 2001; Shogren et al, 2010; Carlson, 2012).

The measures used to resolve market failure need to be based on realistic valuations of environmental damage which cannot be reliably achieved for the reasons listed in section 2.5.6.

Thus accounting for environmental issues and in particular calculating the environmental cost resulting from a specific action is not compatible with deriving a financial value as a basis of comparison for the profit gained by using environmental resources. This inability to accurately value environmental resources, which is investigated in greater depth in appendix 3, compromises the remedy to market failure.

Governments therefore need to resort to other measures in order to encourage the business sector to adopt appropriate measures. However, the complexity of environmental issues needs to be considered in its entirety when making a decision (Borland, 2009; Ceigis, 2009; Wagner and Zeckhauser, 2012). The complex nature of issues underpinning sustainable development limits the ease with which such measures can be developed (see appendix 3).

The nature of the environmental damage is such that its parameters are not fully known and therefore the radical solution cannot be easily identified. Indeed, Haberberg (2005, p.32) argues that in complex situations, the decision maker is more likely to avoid the radical solution, preferring to retain the familiarity inherent in incremental change. Ariely and Mazar (2013) attribute this tendency to the variety of potential solutions posed by the problem. In addition to this, behavioural economics suggests that an optimism bias inherent in most decision makers causes people to consider the outcome of action to be more effectual and to discount the size of problems more than appropriate (Kastenhofer and Rammel, 2005; Brown and Teernstra, 2008; Beau, 2013).

I have established that decision makers, when acting as free agents, would tend to avoid action favouring the environment even when the rational analysis of the

problem indicates that it would be expedient to do otherwise. However, decision makers also have frameworks to work within. Numerous sustainability standards, including the Kyoto protocol, the precautionary principle and the association of sustainability practitioners, have been established that endorse the manner in which businesses are encouraged to move towards sustainable development (Kastenhofer and Rammel, 2005; Kulesa et al, 2007; Caprar and Neville, 2012). It should be noted, however, that frameworks such as the Kyoto protocol are not necessarily sufficiently robust (Torvanger and Godal, 2004; Olmstead and Stavins, 2006).

2.5.14 The decision-making environment

These frameworks themselves become an infrastructure, shaping the mindset of decision makers (Caprar and Neville, 2012). It is argued that this structure does not necessarily function as intended (Kastenhofer and Rammel, 2005; Brühwiler and Hauser, 2008), being undermined by stakeholders that are external to the agenda of sustainable development (Kastenhofer and Rammel, 2005; Brühwiler and Hauser, 2008; Moody, 2008) or creating conflicting targets that do not allow the full breadth of issues to be accommodated in a decision (Kulesa et al, 2007; Brühwiler and Hauser, 2008; Moody, 2012).

Decision-making frameworks have been criticised for becoming a barrier to the adoption of action in line with strong sustainability (Kastenhofer and Rammel, 2005; Kulesa et al, 2007; Caprar and Neville, 2012). Moreover it is suggested that their voluntary nature and apparent lack of rigour in monitoring procedures are exploited by those seeking “green” credentials for competitive advantage alone (Gillespie, 2008; Caprar and Neville, 2012).

The precautionary principle

Whereas the cost-benefit analysis is a tool used to sanction activities that could potentially harm the environment, the focus of the precautionary principle is to ascertain whether that harm can be avoided (Montague, cited in Multinational Monitor, 2009).

Rational and bounded rational decisions use evidence to support a decision, but there are instances when such evidence is not available (Burrell, 2005; Montague, cited in Multinational Monitor, 2009). Whereas a lack of knowledge is overlooked when using a cost-benefit analysis, under the precautionary

principle a decision's unknown harmful effects are considered to be grounds to take preventative measures (Burres, 2005; Montague, cited in Multinational Monitor, 2009). Critics of the precautionary principle maintain that it hinders radical change because of the inherent level of risk in such change (Dresner, 2002, p.157). The inclusion of action to ameliorate potential risk imposes an onerous burden of care on businesses (Burres, 2005; Dryzek, 2005, p.178), which, until the precautionary principle is adopted on a global level, would render them uncompetitive (Burres, 2005).

The constraints of global control

There is no international organisation that has the authority to exert controls over the behaviour of individual countries or organisations with respect to environmental issues (Finus, 2002, pp.15 & 43; Spangenberg, 2004; Fauchald and Stigen, 2009; Arriagada and Perrings, 2011; Susskind, 2013), although principle 2 of the Rio Declaration on Environment and Development states that governments should exercise "responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction" (Boyle et al, 2011). Thus, whilst there is an obligation to control environmental damage, legislation is made at a national or regional level (Barton, 2001; Boyle et al, 2011).

The lack of strong global measures, in spite of numerous summits including that of Copenhagen to develop them, is a clear example of the acknowledgement of the need to change in contrast to a lack of action that delivers the desired outcomes at an international level. A number of reasons have been given that suggest the cause of this apparent failure. In seeking to limit emissions, it is first necessary to identify desirable levels of reduction (Böhringer and Löschel, 2002, p.107; Nordhaus, 2007), a fair resource entitlement for each country and the burden of cost associated with necessary reduction of resource use (Yakota, 1999; Böhringer and Löschel, 2002, p.106; Buchholz, Haupt and Peters, 2005). Identification of all of these is problematic.

Firstly, public policy is developed using economic models including the cost-benefit analysis, which, as already established, is not suited to assess action relating to environmental damage. Application of the cost-benefit analysis would yield an outcome whereby global warming is acceptable provided the benefit of further reduction in environmental impact can be shown to be greater than or

equal to the cost involved (Böhringer and Lösschel, 2002, p.107; Boom, 2002, p.214; Guglyuvatyy, 2010) and is based upon the assumption that it is possible to financially compensate for environmental damage (Dowlatabadi, 1999).

The cost-benefit analysis does not accommodate the scientific reasoning behind the projected figures (Dowlatabadi, 1999; Böhringer and Lösschel, 2002, p.107; Grafakos, 2010). Thus the proposed reduction of resource use and carbon emissions differs from that calculated by those using the more scientific “tolerable window approach” or TWA (Dowlatabadi, 1999). The data required to assess TWA with any integrity are highly complex and include too many variables that are unknown (Yokota, 1999; Dowlatabadi, 1999; Böhringer and Lösschel, 2002, p.108; Haurie, 2003; Nordhaus, 2007). Thus the cost-benefit analysis is rendered unworkable but scientific predictions themselves are subject to debate.

Secondly, there are a number of methods to determine a fair allocation of resources, but it is possible to argue that each one of these is not equitable.

- Resources could be allocated using current usage as a comparator (Böhringer and Lösschel, 2002, p.118; Sinden, 2010), an approach that is endorsed by economic theory and the efficiency principle (Sinden, 2010). This, however, preserves current inequalities and puts an undue demand on nations that currently have low consumption patterns (Böhringer and Lösschel, 2002, p.118; Sinden, 2010).
- Resources could be allocated per capita (Böhringer and Lösschel, 2002, p.118), which from an idealistic viewpoint is the more just approach (Sinden, 2010). However, there are many ways of distributing under this scheme, from basing it on population numbers to linking it to the GDP, creating room for disagreement over method between the countries most adversely affected by the specific choice (Sinden, 2010).
- Recognition could be given to the specific needs of individual countries (Yokota, 1999; Böhringer and Lösschel, 2002, p.118; Sinden, 2010). However, this could potentially leave poor countries with little incentive to cut their resource demand (Sinden, 2010).

Finally, equitable distribution of costs is subject to the same arguments relating to usage of resources (Böhringer and Löschel, 2002, p.118), but it also depends upon first determining what that cost might be. This has not been possible with some models identifying considerable loss whilst others find considerable gains (Böhringer and Löschel, 2002, p.109; Fischer and Morgenstern, 2006), with the variation being reported to be up to a factor of five (Fischer and Morgenstern, 2006).

The difference in estimation of costs depends on the scope of costs included in the model as well as the requisite reduction target (Böhringer and Löschel, 2002, p.110; Fischer and Morgenstern, 2006) and also requires projection of profits both with and without abatement. These figures are difficult to ascertain with any accuracy (Böhringer and Löschel, 2002, p.110), in part because of the choice of technology considered (Fischer and Morgenstern, 2006), including the impact of unknown potential new technologies that might be developed as a result (Böhringer and Löschel, 2002, p.116).

The treaties and agreements that have emanated from climate change summits such as Rio, Kyoto and Copenhagen have created binding agreements for the countries that have ratified them (Gareau, 2008; Gehring and Plocher, 2009; Hansford and McKerchar, 2010; Susskind, 2013), but these are voluntary agreements (Finus, 2002, p.15; Susskind, 2013) leaving individual countries freedom to choose how they are implemented (Gareau, 2008; Hansford and McKerchar, 2010; Susskind, 2013) and some countries, including, in the case of the Kyoto protocol, the USA, free to retain their independence (Gareau, 2008; Gehring and Plocher, 2009; Hansford and McKerchar, 2010; Susskind, 2013).

Voluntary agreements

Voluntary agreements typically take one of three forms; firstly, public agreements, in which achieving specific standards is voluntary and participation confers a reward in the form of membership to programmes (Alberini and Segerson, 2002; Cunningham, 2004; Blackman, 2008; McEvoy and Stranlund, 2010) such as ISO 14000. Secondly, negotiated agreements (Alberini and Segerson, 2002; Cunningham, 2004; Blackman, 2008; McEvoy and Stranlund, 2010; Brau and Carraro, 2011), in which both a regulator and an entity to be controlled agree on terms which could include avoidance of direct regulation or taxation provided targets are met (McEvoy and Stranlund, 2010; Brau and

Carraro, 2011), such as the United Kingdom's climate change agreements (Cunningham, 2004; McEvoy and Stranlund, 2010). Finally, unilateral agreements occur without any regulation (Alberini and Segerson, 2002; Blackman, 2008; McEvoy and Stranlund, 2010).

Voluntary agreements require monitoring either through self-reporting or through external auditing and enforcement if they are to ensure the desired ends are achieved (McEvoy and Stranlund, 2010). They are undermined if the regulatory structures lack credibility or transparency (Cunningham, 2004).

Voluntary agreements carry distinct advantages, principally facilitating the most economic solution to the difficulty being resolved (Alberini and Segerson, 2002; McEvoy and Stranlund, 2010). This is because they leave the individual agents involved free to choose the method of achieving the desired outcome (Alberini and Segerson, 2002; McEvoy and Stranlund, 2010), including the development of innovative solutions (Brau and Carraro, 2011), they are quicker to implement (Alberini and Segerson, 2002; McEvoy and Stranlund, 2010), and it is suggested that enforcement is more efficient in voluntary agreements than in a regulatory approach (McEvoy and Stranlund, 2010). Voluntary agreements, however, are not entirely effective.

One characteristic of sustainable development is that certain factors such as the freedom to emit greenhouse gases are pure public goods. This is because they satisfy two conditions. Firstly, as already established, they are not excludable, and secondly they are "non-rival", meaning that their use by one entity does not diminish the capacity for others to use them (Bowers, 1997, pp.33–38; Vogt, 2002, p.178; Ebster and Jensen, 2006; Arriagada and Perrings, 2011).

This property has critical implications for the motivation of countries at a national level or individual organisations because, firstly, action by one entity to limit its carbon emissions can be undermined by excessive emissions by others (Vogt, 2002, p.178; Arriagada and Perrings, 2011). Secondly, any rational entity seeking their own welfare alone would underestimate both the need for action and the benefit gained by it in order to reduce any obligation placed upon them. This is facilitated by the trans-boundary nature of causes and effects. Consequently, climate control measures will not be set at an optimal level (Bowers, 1997, pp.33–38; Vogt, 2002, p.178; Arriagada and Perrings, 2011).

If all nations were to agree to measures to reduce activities causing climate change, the total benefit would be accounted for and stronger action would be taken, but without close monitoring and sanctions, it is a classic situation for free riding by individual countries.

Free riding

Free riding is associated with the control of the use of public goods (Holcombe, 2000) and therefore relevant to voluntary agreements. It occurs when an entity does not contribute its full share to the efforts made towards sustainable development but is able to benefit from the investment made by others without carrying the associated costs (Finus, 2002, p.17; de Serres et al, 2010).

Non-cooperation could be argued to be a rational choice (Asch and Gigliotti, 1991; Bowers, 1997, p.35; Finus, 2002, p.17). There are four situations that are considered likely to encourage the occurrence of free riding, namely:

- if perception is that the individual impact of the decision is minimal (Stigler, 1974; Janis and Mann, 1977; Asch and Gigliotti, 1991)
- if there are a large number of individual entities in the group that is entering the voluntary agreement (Asch and Gigliotti, 1991)
- if the targets set are difficult to attain (Finus, 2002, p.35)
- if it is known that free riding is prevalent (Asch and Gigliotti, 1991; Fischbacher and Gächter, 2010)

On the other hand, free riding is considered less likely to occur when the participants in a voluntary agreement are aware of the benefits to be gained in complying (Delmas and Keller, 2005) or where there is involvement by upper management (Delmas and Keller, 2005). Close monitoring also has increased the levels of cooperation (Finus, 2002, p.36; Delmas and Keller, 2005), especially when accompanied by sanctions designed to outweigh the benefit gained through non-cooperation (Finus, 2002, pp.37–39; McEvoy and Stranlund, 2010).

Seeing that free riding is a problem that occurs in voluntary agreements involving groups, one way to prevent it from occurring is to form agreements with each entity as an individual, thus ensuring individual targets are met (McEvoy and Stranlund, 2010). Specific structures relating to the exact

regulatory agreement are also seeking to influence the level of free riding (Brau and Carraro, 2011).

The lack of global control, along with the voluntary nature of agreements and the ability to free ride, gives freedom to manage sustainable development to individual governments. Depending upon their ideology, governments either legislate to control activities or they develop fiscal measures that enable market forces to act as a controlling measure (Bowers, 1997; Ovaska, 2003; Carlson, 2012).

Economic measures devolve the decision relating to the action taken to the polluters themselves and are designed to correct market failure (Bowers, 1997; Carlson, 2012). They are generally preferred over command and control methods because they provide the flexibility for individual entities to identify the most economic method to reduce resource use (Bowers, 1997; Boom, 2002). However, in section 2.6.11 and in the discussion about determining voluntary agreements in this section I have identified the weakness of this approach. It has been shown that developing the tools to support sustainable development is highly complex.

2.6 The decision makers

Having reviewed the decision-making process and related it to the challenges of sustainable development including the global controls that would constrain freedom to change, it is important to consider the decision makers themselves in order to understand the constraints under which they work and the pressures that might cause them to act in a way that is not necessarily in the best interests of the organisations for which they work or of the environment.

2.6.1 The individual and decision making

Decision making is carried out by individuals, be they working in organisations or governments, as a group or in isolation. The manner in which the decision is judged influences the decision-making process. Referred to as conflict theory, the critical issue relates to the degree to which the decision maker stands to gain or lose personally as a result of the decision.

It is argued that issues such as personal reputation or promotion prospects heighten the impact of potential failure and consequently influence the degree of care taken in the decision (Janis and Mann, 1977, pp.50–51; Weiss, 1982;

Bouckenooghe et al, 2007; Zhang and Leezer, 2010). The risk of failing in a new venture is such that the decision maker is likely to avoid making radical change in order to lessen the risk of blame for any subsequent failure (Argyris and Schon, 1996, p.230). Janis and Mann (1977, pp.50–51) identified four different results depending on circumstances:

Vigilance: the decision maker diligently seeks an optimal solution where there is a greater chance of success.

Hypervigilance: where it is clear to the decision maker that there is no readily available solution and this is accompanied by a shortage of time, then the decision maker could panic, impairing cognitive function, which at worst would render him/her incapable of making that decision.

Buck passing: where the decision maker believes there is no realistic solution, a level of despair prompts the decision maker to give up looking for a workable solution and concentrate on defending the choice made.

Procrastination: where the decision maker's reputation hinges on completion of an existing course of action, there will be resistance to change even if it would lead to a better outcome.

Subsequent testing of the theory indicated that personal attributes and motivation contributed to these reactions (Weiss, 1982; Bouckenooghe et al, 2007; Umeh and Omari-Asor, 2011). Indeed some of these behaviours are seen at corporate level where the reduced functional capacity is termed "threat rigidity" (Staw, Sandelands and Dutton, 1981). Other avenues of research have also shown a correlation between emotion and cognitive function such as to suggest that emotion diminishes the extent to which complexity and a radical solution can be considered (Sjoberg, 1982; Umeh and Omari-Asor, 2011; Kong-Hee, 2012).

Whilst research into the impact of stress has to some extent emanated from management of disasters, it has also been shown to apply in more common situations such as those involving uncertainty or the mental state of the decision maker (Sjoberg, 1982; Umeh and Omari-Asor, 2011; Muurlink, Wilkinson and Peetz, 2012) and has been identified as being instrumental in preventing organisations from taking logical remedial action that could have prevented insolvency (Staw, Sandelands and Dutton, 1981; Muurlink, Wilkinson and Peetz, 2012).

In some instances the decision maker will shy away from finding a radical solution, especially when organisations are not performing as well as expected (Muurlink, Wilkinson and Peetz, 2012). Easterbrook's hypothesis suggests that the relationship between stress and cognitive ability is an inverted U-shape indicating that above a certain point, any increase in stress associated with a decision will diminish the breadth of focus given to the task, undermining the decision maker's ability to address the complexity involved (Muurlink, Wilkinson and Peetz, 2012).

It is argued that in certain situations, "defensive behaviour" is adopted, which can result in distorting predicted outcomes to suit or emphasise the long-term nature of the issue in question (Janis and Mann, 1977, pp.91–92; Bouckenooghe et al, 2007; Umeh and Omari-Asor, 2011) to the extent that decision makers are unable to identify and respond appropriately to internal or external stimuli (Sjoberg, 1982; Umeh and Omari-Asor, 2011; Muurlink, Wilkinson and Peetz, 2012).

In contrast to the issues identified in relation to conflict theory, overconfidence is also seen to lead decision makers into making unwise decisions (Sjoberg, 1982; Oppenheimer, O'Neill and Webster, 2008). The discipline of sustainable development is vulnerable to these behaviours because it is an issue involving long-term forecasts that are subject to significant uncertainty.

Research into the effect that demographic difference has on risk aversion is inconclusive (Halek and Eisenhauer, 2001; Hallahan, Faff and McKenzie, 2004; Ho, 2009). Some research suggests that risk-taking and age are negatively correlated (Papenhausen, 2006). This, however, contradicts findings suggesting the reverse (Riley and Chow, 1992; Halek and Eisenhauer, 2001; Hallahan, Faff and McKenzie, 2004).

Papenhausen proposes that the ability for an individual to become a risk-taker is subject to environmental events during their development, with the implication that societies with a shared history will be predestined in their ability to develop radical solutions (Papenhausen, 2006, 2009). This theory is undermined because of the assumptions within it. According to generational theory, the character of the individual is determined by the environment in which they were raised (Papenhausen, 2006, 2009; Shragay and Tziner, 2011). Papenhausen

argues that the resultant skill sets drive the clustering of innovations, leaving periods where the decision makers do not have the character to make such decisions (Papenhausen, 2006, 2009), and claims that this is a significant factor in Kondratieff's long wave cycles.

Even accepting the declared assumptions, this would only be the case if all management teams consisted of individuals of the same generational age band. It has been shown that French graduates from the same cohort select varied styles of work (Guillot-Soulez and Soulez, 2014), suggesting that at best generational theory is a relatively weak determinant of behaviour and skill sets. In spite of finding the theory in its totality hard to accept, it is reasonable to accept that there are sufficient members of society who are averse to risk-taking to spawn such a hypothesis, and this augments the observation that some individuals are unsuited to taking such decisions.

2.6.2 Decision making and groups

Group decision making is employed in order to overcome weaknesses of the individual either in terms of cognitive ability or in terms of knowledge (Houghton et al, 2000; Cox and Hayne, 2006; Xu, 2009). The problems relating to the decision maker and the individual also exist in group settings, although the dynamics change somewhat and further difficulties are introduced. When working in a group setting the potential personal loss to each individual is that of reputation.

The effect of adding breadth of expertise to inform the decision making is to increase complexity and potential disagreement (Weiss, 1982; Tesh, 1999; Xu, 2009). The outcome can make decision making more protracted and the proposed action more unwieldy (Noll, 1976; Weiss, 1982). This effect of delaying action further fuels an inherent desire to find a simple solution within the framework of current, well-understood structures (Noll, 1976; Munnichs, 2004).

When working within a group, the final decision either is made through consensus or rests with a team leader who does not necessarily have the expertise to differentiate between the options presented (Gahran, 2003) and is in turn constrained by external pressures such as budgets and party politics (Weiss, 1982).

A number of dynamics influence the degree to which group decision making can result in a rational decision. When seeking a group consensus, the decision can be significantly weighted by the perceived status and interpersonal or communication skills of those presenting opinions (Eden and Ackermann, 2001; Franco, 2008; Martinovski and Wenji, 2009; Jochemczyk and Nowak, 2010; Hajkowicz, 2012). Group members are also known to make unsubstantiated claims in an effort to promote personal agendas (Janis and Mann, 1977, p.91; Munnichs, 2004; Franco, 2008; Jochemczyk and Nowak, 2010; Hajkowicz, 2012) and voice opinions beyond their area of expertise, undermining trust in the group's output (Munnichs, 2004). When a group shares a similar knowledge base, bias might not be eliminated, and errors of judgement can still occur (Houghton et al, 2000).

Further difficulties are experienced when experts work together. When scientists differ, there is a need to see whether in fact the difference is such that it redefines the parameters of the problem, highlighting greater complexity (Munnichs, 2004; Oppenheimer, O'Neill and Webster, 2008). There is a tendency, however, to suggest that the problem is such that no agreement is possible, enabling policy makers to disregard or oversimplify the science (McNamara, Luce and Tompson, 2002; Munnichs, 2004; Oppenheimer, O'Neill and Webster, 2008). It is also argued that the complex nature of scientific research that involves sponsorship from organisations with an interest in the results could cause the researcher to lose sight of the need for a totally unbiased opinion (Gahran, 2003; Munnichs, 2004; Cassidy and Buede, 2009; Gauchet, 2012).

Despite these difficulties, it should be recognised that uncertainty, an inherent characteristic of sustainable development, fosters legitimate disagreement (Oppenheimer, O'Neill and Webster, 2008; Cassidy and Buede, 2009; Hueffer et al, 2013), adding further uncertainty. Hueffer et al (2013) maintain that, handled in an appropriate manner, difference can be used to identify optimum solutions because, provided the source of difference is founded on knowledge, a broader spectrum of needs is accommodated in the final decision. Optimised decisions, however, tend to mediocrity because of the need to accommodate conflicting demands (Greasley, 2010).

Groupthink and choice shifts

In addition to the difficulties outlined above, a phenomenon identified by Janis (1972) of “groupthink” can occur when individuals refuse to voice misgivings (Janis and Mann, 1977, p.129; Heracleous, 1994; Houghton et al, 2000; Gandossy and Sonnenfeld, 2005). This can create a culture of mistrust because true opinions are not aired (Gandossy and Sonnenfeld, 2005) and can result in a decision that is not moderated by counter-opinion (Janis and Mann, 1977, p.132; Gandossy and Sonnenfeld, 2005; Hajkowicz, 2012). Lacking the necessary critical approach, groupthink can result in decisions that are biased and carry a greater risk of failure.

A further effect of group decisions is that the decision tends to be more extreme, either in terms of being more radical or, conversely, more cautious than any of the individuals would have made on their own (Cox and Hayne, 2006; Eliaz, Ray and Razin, 2006; Hajkowicz, 2012). The direction of the choice shift is believed to depend on the construction of the group concerned, exaggerating the tendency within the majority of the group (Eliaz, Ray and Razin, 2006). Both these effects move the decision away from one that is rational, and the latter moves it away from the radical decision.

2.6.3 The influence of stakeholders

A “stakeholder” in an organisation is a group, individual or entity that can affect or is affected by the achievement of the organisation’s objectives (Freeman, 1984, cited in Hutt, 2010; Spitzeck and Hansen, 2010). The examination of the ability of individuals to make decisions in section 2.6.1 identified that those in the public arena are influenced by the potential impact their decision would have on their reputation. Research suggests that organisations behave in a similar manner and have consequently become more sensitive to the specific groups of stakeholders (Spitzeck and Hansen, 2010; Emerson, Alves and Raposo, 2011).

Stakeholder pressure takes three forms. Firstly, and considered to be the most critical, a stakeholder may hold coercive, normative or utilitarian power, actualised in the form of potential threats, legislation or media exposure, and being able to offer resources respectively (Buchholz and Rosenthal, 2004; Emerson, Alves and Raposo, 2011). Secondly, organisations are conscious of their reputation and would seek to attend to stakeholder needs in order to

benefit from the associated goodwill, and finally, organisations are influenced by the extent to which the issue concerned is considered to be of importance or urgent because this augments the reaction to their decision (Emerson, Alves and Raposo, 2011).

The group that is closest to the business and labelled “incrementalists” by Steger, Ionescu-Somers and Salzmann (2006) consists of employees and customers (Steger, Ionescu-Somers and Salzmann, 2006; Trebeck, 2008; Hutt, 2010; Spitzeck and Hansen, 2010). This group not only directly influences the organisation but is the principal source of its value. Therefore there is an implicit need to respond to the concerns of its members (Trebeck, 2008; Spitzeck and Hansen, 2010). One of the most influential stakeholders in this group is the customer (Spitzeck and Hansen, 2010), being ranked as a primary stakeholder along with suppliers and the workforce (Emerson, Alves and Raposo, 2011; Verbeke and Tung, 2013).

The remaining stakeholders, typically referred to as secondary stakeholders, include NGOs and political entities that use political leverage to influence business decisions (Hutt, 2010; Spitzeck and Hansen, 2010; Verbeke and Tung, 2013). Freeman recognised that this group was too diverse and needed sub-dividing, and identified institutional stakeholders, namely those that could regulate, economic stakeholders, being those that operated within the market, and ethical stakeholders, which consisted of pressure groups (Pesqueux and Damak-Ayadi, 2005; Emerson, Alves and Raposo, 2011).

Other groupings of the remaining stakeholders are based on their behaviours rather than their roles, delineating between “challengers” (Steger, Ionescu-Somers and Salzmann, 2006), which include NGOs and consumer groups that seek transparency and social and environmental responsibility (Pesqueux and Damak-Ayadi, 2005; Steger, Ionescu-Somers and Salzmann, 2006), and “bystanders”, which are the entities that hold political power, such as governments and unions (Steger, Ionescu-Somers and Salzmann, 2006).

Verbeke and Tung (2013) attribute the bystander role of governments to the desire of governments to maintain a stable business environment, which regular changes of government could otherwise erode. Thus, whilst governments are potentially highly influential, they are only likely to take significant action at times

of crisis. Where sustainable development is concerned, Verbeke and Tung (2013) argue that “business as usual” is the default position of governments. They are only stirred to action in response to a call for change from sufficient constituents that are influential by either their force of numbers or their status. This bystander position is not considered unreasonable because it is argued that attention to corporate social responsibility will ensure that businesses behave appropriately without government intervention (Buchholz and Rosenthal, 2004).

Steger, Ionescu-Somers and Salzmann (2006) identify the media as a further stakeholder group, but note a distinct difference in their relationship with the organisation. The media do not have a direct interest in events, their role being to inform society of events, but they broadcast opinions expressed by others and as such are seen to hold significant power to influence others.

Hutt (2010) includes the media in the list of secondary stakeholders, but Trebeck (2008) refers to them as a tool used by the other groups rather than being a stakeholder in their own right. The media are indirectly influenced to act in response to the decisions made in business and therefore, according to Freeman, qualify as a stakeholder. Oliver et al (2008) argue that the media do not change opinion; rather their power lies in the threat that they could do so, suggesting that whilst the media may not change consumer opinion, businesses respond to them because of the fear that they will be influential.

Hutt (2010) noted that the boundaries between these groups are blurred by the manner in which stakeholders may hold two roles, such as those of an investor who is also a shareholder or a customer who also belongs to an NGO. These dual roles temper the stated objectives of individual stakeholder groups, which can weaken the influence that they hold, especially when a stakeholder is also a stockholder.

Thus stakeholders are seen to be influential in the decision-making process within business. The primary concerns of business are those of the consumer and, to a lesser extent, the employees. However, businesses also respond to political leverage, whether emanating from governments or NGOs.

2.6.4 Decision making in the political arena

Decision making has been evaluated and shown to tend to favour the more conservative decision, especially in the light of the challenges faced by managing environmental issues. However, when these decisions are made at governmental level, further considerations influence the outcome. The nature of politics renders it poorly equipped to handle the fuzzy nature of sustainable practice. It is argued that the decisions made by governments depend upon rational deliberation (Dessler and Parson, 2010; Bolleyer, 2011), but this is undermined by the use of rhetoric in political debate (Dessler and Parson, 2010).

It is suggested that, lacking the necessary expertise themselves, governments tend to assume that technological solutions will be found to more difficult problems such as energy usage (Noll, 1976; Meadowcroft, 2009) and turn to agencies both to research and to establish policies (Noll, 1976; Pautz, 2010). When only one agency is involved, the scope of knowledge development and change is limited to that of the focus of the one entity (Noll, 1976; Whittington, 2012), which can have its own hidden agenda (Whittington, 2012).

Governments have come to see that it is necessary to take a broader approach when developing policies, recognising the need to balance the needs of the environment with those of business (Hecht and Miller, 2010; Slaper and Hall, 2011; Gradinaru, 2012). This can entail the addition of further advisory groups. However, as demonstrated when examining the group decision-making process, the addition of experts does not necessarily facilitate either a rational or a radical solution.

The complexity of decisions made at a governmental level is such that the process is vulnerable to conflict theory as defined by Janis and Mann (1977). Weiss (1982) identifies the same range of behaviours from vigilance to procrastination, hypervigilance and buck passing that I referred to in section 2.6.1.

In addition, the process of rational decision making tends to be undermined by difficulties existing both in the arena of new policies and in that of new knowledge development. When one agency has developed a policy, its reception tends to be blocked by the remaining agencies (Noll, 1976; Cong, Li-

Hua and Stonehouse, 2007; Voß, Smith and Grin, 2009). Indeed this is similar to the “not invented here” syndrome identified by Katz and Allen in 1982, in which groups resist potentially useful information offered from an external source (Cong, Li-Hua and Stonehouse, 2007; Voß, Smith and Grin, 2009; Takahashi and Inamizu, 2012).

In politics there is a resistance not only from those whose voice has not been heard but also from those who believe the policy is acceptable, especially if they belong to a large group. This is because they will not see the need to invest time in the debate, believing that their interests are already well represented (Noll, 1976).

Uncertainty is a characteristic of sustainable development because of incomplete knowledge, and the forward-looking nature of the subject demanding long-term forecasting which can produce significant difference when only minor changes are made to the underlying conditions (Haran, Ritov and Mellers, 2013).

This is a characteristic that makes the subject vulnerable to manipulation for political ends, either by politicians or by their agencies. There is evidence to show that politicians can seek to minimise the uncertainty inherent in a problem being addressed in order to establish policies that appear plausible and acceptable (Noll, 1976; Gahran, 2003; Munnichs, 2004; Hughes, 2008, p.7; Hajkowicz, 2012) or, as has been the case with America’s lack of action on climate change, to defer what could be controversial policy making by claiming the need to wait until uncertainty is eradicated (Kelley, 2006).

Conversely, some organisations seek to increase the apparent uncertainty in order to strengthen their proposal for a solution (Noll, 1976; De Clercy, 2005; Loomis, 2009) or create confusion in order to obfuscate what could be deemed unacceptable action (Gahran, 2013; Whittington, 2012).

2.6.5 The constraints on governments

The primary role of democratic governments is to manage the allocation of resources and promote the welfare of the people over whom they govern (Kawaura, 2003; Farazmand, 2005; Engelen, 2007; Cooley, 2009; Tanzi, 2011) in a manner that protects society in terms of security at a national and international level, health and welfare (Kawaura, 2003; Farazmand, 2005;

Cooley, 2009; Tanzi, 2011). This also entails maintaining stable economic conditions that, under a laissez-faire government, support business activity (Crockett, 1997; Hantke-Domas, 2003; Farazmand, 2005), and, in a socialist one, facilitate necessary provision for society (Farazmand, 2005; Cooley, 2009; Tanzi, 2011, p.81). A mixed economy, welfare state model of government would also provide for the basic needs of the poor, a role that has placed increasing demands on government resources and attention (Farazmand, 2005; Cooley, 2009; Tanzi, 2011).

Thus the role of governments is core to sustainable development. Their remit is to support society and maintain a healthy environment for business along with ensuring the environment is given sufficient regard for it to continue to sustain society and business.

It has been shown that a multilevelled governmental structure is an obstacle for the implementation of environmental protection (Balakrishnan, Duvall and Primeaux, 2003; Firsova and Taplin, 2009; Gehring and Plocher, 2009), hindered by the production of contradictory guidelines and policies (Firsova and Taplin, 2009). The competing demands made on governments by business and society, however, also erode their ability to develop structures to attend sufficiently to the needs of the environment. For instance, the terrorist threat to societies and business has been seen to distract governments from the more invisible threat of environmental damage, diverting funding accordingly (Brown, 2003, p.38; O'Brien and Read, 2005; Lorenzoni and Pidgeon, 2006).

A more firmly entrenched distraction, however, is that of globalisation. Indeed, using executives as a measure of public concern, a survey taken in 2010 showed that three quarters were considering the impact of the emerging economies, and two thirds were considering the need for greater connectivity within the global markets. Only half were considering potential resource shortages (Bisson, Stephenson and Viguerie, 2010; Wilburn and Wilburn, 2011). Globalisation has resulted in transnational NGOs that deny governments absolute freedom in their actions (Farazmand, 2005; Balboa, 2009; van Meerhaeghe, 2012).

Furthermore, globalisation has elevated market forces to an international level that demands a market-based approach to government (Balakrishnan, Duvall

and Primeaux, 2003; Farazmand, 2005; van Meerhaeghe, 2012) and creates a need for greater public spending (Balakrishnan, Duvall and Primeaux, 2003; Tanzi, 2011, p.82). To this end, governments seek to attract foreign investment and create a favourable climate for business, which is achieved by minimising regulation and taxation (Fauchald and Stigen, 2009; van Meerhaeghe, 2012), the very tools used to promote sustainable development. Thus conflicting demands on governments moderate their ability to act.

2.7 Public choice theory

I have established that the primary demands on governments are to deliver societal welfare at many levels, with an ever-increasing focus on maintaining a healthy climate for the business sector which can be contra to the demands of sustainable development. However, it is argued that the choice of action depends on the motivation of the decision maker (Boom, 2002, p.215; Engelen, 2007; Gsottbauer and van den Bergh, 2011). Political science and public choice theory address many of the issues that might cause decision makers in public office to choose options that do not necessarily align with best practice.

Action taken by governments falls within the larger remit of political expedience rather than just being a response to market forces (Crockett, 1997; Engelen, 2007; Andrews et al, 2011). Whilst government actions may be with the intent of correcting market forces based on economic theory, the motivation behind such actions is political.

The traditional philosophic view of politicians attributed them with moral judgement that enabled them to make rational decisions in the light of reasoned argument (Zafirovski, 2001; Sugden, 2004). However, public choice theory argues that politicians in democratically elected governments are motivated by self-interest that creates other overriding agendas (Boom, 2002, p.218; Sugden, 2004; Engelen, 2007). Firstly, it is recognised that at a fundamental level, the strongest motive is for the government or politician to be re-elected (Boom, 2002, p.219; Vogt, 2002, p.180; Engelen, 2007). Secondly, there is a need to satisfy sponsors who fund electoral campaigns whereby governments will favour their interests at the expense of the general voter (Zafirovski, 2001; Boom, 2002, p.219). Thirdly, there is an inherent aversion to risk which could expose a government or politician to failure (Boom, 2002, p.219; Daughety and

Reinganum, 2010). Finally, politicians have their personal preferences that can colour their choices or are subject to behavioural failure (Zafirovski, 2001; Boom, 2002, p.219; Engelen, 2007). In short, politicians are seen to be “risk-averse opportunists whose main objective is to be re-elected” (Boom, 2002, p.220).

Public choice theory is criticised for being overly suspicious of politicians’ motives (Zafirovski, 2001; Casse, 2007). Whilst giving credence to the suggestion that earning a positive public opinion is a driving motivation that underpins political decisions, recognition that those made in private are more likely to reflect the true opinion of the politician with respect to best action (Daughety, in Reinganum, 2008) suggests that the common good is also sought, as does recognition of the role of altruism (Hantke-Domas, 2003).

Public choice theory is also criticised for treating all politicians alike, in spite of evidence that some are not as self-seeking as those portrayed by the theory (Zafirovski, 2001). The accusation of self-seeking motives is justified by apparently poor decisions, but these could equally be attributed to the difficulty of working for a common good, supported by the argument that the complexity of the factors to consider can render developing a rational decision an impossible task (Mueller, 1997; Zafirovski, 2001, p.15). Mueller (1997, p.15) accuses public choice theorists of being prone to make naïve assumptions about behaviours when reality is much more complex.

In spite of criticisms of public choice theory, evidence supports the observation that special interest groups are regarded at the expense of the general good (Zafirovski, 2001; Bailer, 2012). Similarly, evidence observable in the cyclical manipulation of the budget to ensure a “feel-good factor” when the election is due supports the concept that governments respond to the underlying motivation of re-election (Paldam, 1997; López and Ramírez, 2008; Drometer, 2012).

Indeed, politicians are voted into office for a relatively short period of time, which is incompatible with the long-term nature of sustainable development. This is of relevance when seeking to deliver legislation to support moves towards sustainable development because the benefits might not be seen within their period in office (O’Riorden, 2009; Leder, 2010; Wagner and Zeckhauser,

2012). Consequently, politicians tend to avoid the reality of the extent of the change that is required, preferring to consider the need for re-election (O’Riorden, 2009).

There are grounds to accept elements of public choice theory. It is argued that governments are sensitive to the median voter, seen as the pivotal group to satisfy where re-election is concerned (Holcombe, 1989; Vogt, 2002, p.179; Bailer, 2012). Vogt (2002, p.186) argues that such a constraint results in poorer outcomes than what would have been achieved had the government adopted an economic model to determine action.

2.7.1 Political agendas and decision making

Etzioni referred to the process of identifying the data on which to base a decision as “scanning” (Janis and Mann, 1977, pp.36–39). It is argued that satisficing demands a flexible approach depending on the conditions under which the decision is being made (Janis and Mann, 1977, pp.36–39; Zhang and Leezer, 2010). Etzioni found that bureaucrats used “mixed scanning” strategies ensuring sufficient data were gathered to suit their own purpose, the acceptance of their proposal. This entailed selective data gathering and manipulation of tools such as elimination by aspects to ensure that “crippling” objections were eliminated. The outworking of this is that policy decisions tend to involve incremental change during times of stability and it is only at times of crisis, when there is more opportunity to gain consensus, that the more radical decision is made (Janis and Mann, 1977, pp.36–39; Weston, 2000).

2.7.2 The ethos of political parties

Before examining the extent to which policies are a reflection of the desires of the electorate, I will first review the stances held by different political beliefs. Western societies have long held a belief of the right to private property as promoted by Adam Smith (Shafer, 2006; Henry, 2008; Sen, 2011; Laing, 2011), the ethos of individual economic freedom as espoused by John Locke (Shafer, 2006; Henry, 2008; Hosseini, 2010), and the support for free trade as established by Bastiat (Baugus, 2008; Henry, 2008).

Consequently, economic theory has dominated western decision making based on the argument that rational individuals would naturally seek optimal solutions (Shafer, 2006; Henry, 2008) and underpins the argument that markets have a

right to self-regulation (Shafer, 2006; Henry, 2008; Giddings, 2009, p.116; Hosseini, 2010). This faith in market forces has been the dominant force shaping the style of government of republican, conservative and, to a slightly lesser extent, liberal parties (Shafer, 2006; Giddings, 2009, p.116), who consider that intervention can disturb the market equilibrium and tend to adopt a laissez-faire approach facilitating free trade (Block and Barnett, 2005; Henry, 2008; Giddings, 2009, p.116).

The laissez-faire approach is accordingly limited in the extent to which proactive action is seen to be taken with regard to the environment (Block and Barnett, 2005), although where the environment is concerned, ideological difference is not so clear-cut.

In contrast to the laissez-faire ideology is that of adopting interventionist action, more frequently favoured by the less liberal parties (Mutanga, 2011). This approach is driven by the opinion that private ownership and subsequent private benefit do not lead to an equitable allocation of resources (Henry, 2010; Mutanga, 2011). Intervention was supported by both the economists Keynes and Pigou, who argued that it corrected instances of market failure (Henry, 2010), discussed in section 2.5.13.

There is a debate about the extent to which different parties adopt a laissez-faire or interventionist ideology, and their positions change over time. Indeed, it has been recognised that a significant change in stance has taken place since the latest recession (Mutanga, 2011). It is not, however, in the interests of this thesis to identify differences at a detailed party political level, rather to note the level of difference that exists.

Adam Smith believed that a mixture of approaches was appropriate, depending on the circumstances at the time (Henry, 2008; Sen, 2011; Laing, 2011), but the neoclassicist believed that the freedom of the market was paramount (Henry, 2008; Mutanga, 2011). Thus, there are three opinions: not to intervene, to intervene, or to choose an approach dependent on the prevailing situation. Action is moderated further by politicking, whereby the parties oppose motions put forward by other parties on principle rather than through expedience (Bongardt and Torres, 2010).

It should be recognised, however, that public policy is a product of the perception of reality held by governments and institutions (Chasek, Downie and Brown, 2010, p.30) rather than reality itself. In addition, governments vary in the manner in which they prioritise environmental issues depending upon their bureaucratic structure, ideological position and the extent to which they can benefit their constituencies (Chasek, Downie and Brown, 2010, p.56; Knill, Debus and Heichel, 2010). The impact of such difference is considered in the rest of this section, but its cumulative effect should be considered:

Bureaucratic structure: Elected governments are vulnerable to political choice. Indeed, non-elected governments are free to take an authoritative stance; however, in these instances, the governments tend to be insensitive to environmental demands (Doyle and McEachern, 2001, pp.17–18; Chasek, Downie and Brown, 2010, p.57).

Benefit to their constituents: There is a tendency to favour policies that are not detrimental to the business interests of their constituents and respond to environmental movements seen to influence the voter (Giddings, 2009, p.89; Chasek, Downie and Brown, 2010, pp.56–58).

Ideological position: As already established, sustainable development is a highly complex concept involving a myriad of interconnected factors. Parties in government rank the importance of the factors differently, resulting in a variety of ideological stances (Chasek, Downie and Brown, 2010, p.58).

It is difficult to maintain a consistent focus over a period of time because of the difference that exists between successive parties in power (Doyle and McEachern, 2001, pp.110–111; Giddings, 2009, pp.85–88; Knill, Debus and Heichel, 2010). In recent years, some countries have seen the difference between the parties reduced as they have moved towards the “centre ground” (Giddings, 2009, p.114). There remains, however, the risk that unpopular radical action taken by one party will become the electioneering platform of another that proposes reversing the action in order to attract the popular vote (Giddings, 2009, p.115).

To protect the interests of the environment, the governments of some countries have made cross-party agreements to abandon political interest when legislating on environmental issues. These include Japan, Denmark and the

Netherlands (Giddings, 2009, p.116) and facilitate not only more incisive action, but also the development of longer-term programmes (Giddings, 2009, p.116). By necessity, the agreement must be robust to be effective in supporting the action that could be received in a negative light by the voter (Giddings, 2009, p.116).

It has therefore been established that one explanation for the variation in the approaches adopted in different countries is that of political ethos, but the manner in which action can change from one period of office to another suggests that the cause is not cultural.

2.7.3 The electorate

Core to public choice theory is the politician's desire to be re-elected (Boom, 2002, p.219; Vogt, 2002, p.180; Engelen, 2007; Bailer, 2012; Ungureanu, 2013). The resultant onus on political entities to address environmental issues appropriately rests on further considerations. Firstly, the extent to which the electorate's choice is a rational response to the political situation in question, and secondly, the alignment of action with the electorate's desires.

Public choice theory would suggest that the electorate's preferences are key to political decision making. Indeed, it was traditionally believed that policies would gravitate towards the stated desires of the median voter (Holcombe, 1989; Vogt, 2002, p.179; Bailer, 2012). However, subsequent analysis of policy making undermined this claim (Holcombe, 1989; Casse, 2007), arguing that the desired focus of intervention of the electorate is aggregated (Holcombe, 1989; Ordeshook, 1997) and influences the focus of electioneering rather than government action (Ordeshook, 1997). The impact of this would be to overlook minority interests and only address issues of mainstream concern at the hustings (Yandle, 1999) which do not necessarily materialise as policy.

Literature relating to opinion polls contains a clear indication that issues such as global warming are of serious mainstream concern (Vogt, 2002, p.191; Lorenzoni and Pidgeon, 2006; Hamilton, 2011; Clements, 2012; Wagner and Zeckhauser, 2012). The USA was slower to realise the threat. However, perception of the threat itself varies from an immediate danger to something that is on a much longer timeline (Leiserowitz, 2006) and there is a tendency to rank it

very low when compared with other environmental issues (Vogt, 2002, p.193; Leiserowitz, 2006).

There is evidence that the electorate recognises the need to curb environmental degradation. However, in that democratic governments seek to respond to the electorate, it follows that governments tend to lag behind public opinion (Leiserowitz, 2006; Wagner and Zeckhauser, 2012). Two characteristics of the electorate's opinion should be noted. Firstly, opinion relating to the need to intervene rather than leave control to market forces appears to demonstrate partisan division, which itself can exert a greater influence on the electorate than their personal opinions regarding specific concerns (Hamilton, 2011; Clements, 2012), and secondly there is emerging evidence of "green fatigue" whereby a lack of interest extending to scepticism is increasing (Clements, 2012).

It is also argued that the voter is rational (Casse, 2007; Bartels, 2008); however, I have argued that the development of a fully informed rational decision is undermined by complexity (section 2.5.7) and the nature of the voting decision encompasses many dynamics that further complicate the decision. Firstly, the electorate do not have the necessary knowledge to make a fully informed decision (Somin, 1998; Casse, 2007; Bartels, 2008; Callaghan, 2009), and secondly the scope of government activity is very wide (Somin, 1998) but the average voter does not have the ability to prioritise the importance of the disparate range of issues involved (Somin, 1998; Bartels, 2008).

Research has led to a broad range of reasons to substantiate the argument that voter behaviour is not rational, from illustrating the degree of influence swayed by the visual image of the electoral candidate (Bartels, 2008; Shephard and Johns, 2008) to the inaccurate attributing to political parties of events that are beyond their control (Somin, 1998; Bartels, 2008). In addition, it is argued that the voter tends to be loyal to a particular party, but does not necessarily investigate the ideologies or policies of that party (Somin, 1998; Casse, 2007; Bartels, 2008; Callahan, 2009).

A further characteristic of some voters is to undertake "retrospective voting" whereby voter choice can be rooted in seeking a change of party because of a

general dissatisfaction with politics, including an apparent lack of action in the past, rather than demonstrating loyalty to a particular party (Söderlund, 2008).

Alternatively the choice of party is made based on past performance rather than promise of future action (Somin, 1998; Bartels, 2008; Söderlund, 2008). This has the drawback of not considering the potential advantages of alternative policies (Somin, 1998) and can be compounded by a lack of understanding relating to the cause of outcomes, including whether they originate from the government under which they emerged or the preceding one. This style of voting is likely to penalise the government under which living standards are perceived to have fallen (Somin, 1998; Söderlund, 2008). However, voters will overlook hardship if the “feel-good factor” is restored by the time of the election (Bartels, 2008; Söderlund, 2008).

It has also been shown that partisan voters can erroneously believe there has been a fall in living standards simply because the “wrong” party has been in power (Bartels, 2008). Thus the vote can be divorced entirely from the voter’s desire for specific areas of action (Somin, 1998).

The electorate is also vulnerable to the impact of campaign groups and the manner in which issues are presented. It is suggested that risk perception is not based upon scientific data alone, but also on emotional dimensions and those of experience and imagery (Leiserowitz, 2006). Indeed, it has been found that use of the term “climate change” does not consistently produce the same awareness of risk as the use of the term “global warming” (Villar and Krosnick, 2011), indicating that the manner in which problems are presented influences the level of perceived risk. However, having had its awareness of issues aroused, there is a tendency for the electorate to believe its originally preferred party would handle it appropriately (Bartels, 2008).

Thus there is a paradox. Electioneering can strike a resonance with the electorate, but does not necessarily change the vote and can potentially miscommunicate voter opinion where the electoral debate is concerned. This undermines the ability of the elected government to reflect the will of the electorate in its policies, one of the underlying tenets of democratic government (Somin, 1998; Leder, 2010).

2.7.4 Government action, the electorate and sustainable development

It has been established that governments seek to address a broad range of needs including those that are much more immediate than that of sustainable development, which is a long-term issue that involves complexity and uncertainty. To this are added the dynamics between the politician and the electorate, neither of which is necessarily expert in the subject of sustainable development. This leads to the situation whereby the ability to develop legislation or design action to support sustainable development is impaired. There are two principal issues to consider.

Firstly, voter opinion can be based on blatantly inaccurate or oversimplified understanding (Bartels, 2008; Leder, 2010), which can be accompanied by a tendency to overestimate the scope of government power (Bartels, 2008; Leder, 2010; Wagner and Zeckhauser, 2012) or the potential for a technical fix (Wagner and Zeckhauser, 2012). Whilst the public are developing an understanding that the problems of climate change are potentially serious, they are not necessarily aware of the extent to which scientists are calling for change, or the manner in which climate change will affect them at a personal level (Clements, 2012; Wagner and Zeckhauser, 2012).

Secondly, politicians are not necessarily willing to act because effective action demands a scale of intervention that is deemed unacceptable (Shafer, 2006). When politicians are unwilling to act in a manner that is apparently contrary to voter opinion, even if the politician believes such action is necessary, there is a tendency to resort to inaction (Leder, 2010) or carefully worded legislation to give it the veneer of meeting the objectives of the electorate (Leder, 2010). This has the effect of causing the democratic nature of government to undermine the desire of politicians to act proactively.

2.7.5 The role of local government

It is argued local governments and national governments should work together in order to move societies towards sustainable lifestyles (Ling, Hanna and Dale, 2009; Chasek, Downie and Brown, 2010, p.61; Corfee-Morlot et al, 2011). At national level, policies and targets can be developed for operation at local level (Corfee-Morlot et al, 2011). Within cities, the role of local governments is critical, being the first level of government in regions of concentrated communities and

economic activity (Ling, Hanna and Dale, 2009; Corfee-Morlot et al, 2011). Opinion, however, is divided regarding their effectiveness.

The usefulness of local authorities is undermined by a lack of expertise and funding (Balaguer-Coll, Prior and Tortosa-Ausina, 2010; Paterson, 2012) and it fragments development (Paterson, 2012). The added layer of government can result in unwieldy procedures such as requiring policy changes at central government level in order to validate local government action (Giddings, 2009, p.96; Daley, Sharp and Bae, 2013) or respond to changing policies or edicts that counter plans at a local level (Corfee-Morlot et al, 2011; Paterson, 2012).

In contrast to this, it is also argued that local authorities are more efficient than national government (Balaguer-Coll, Prior and Tortosa-Ausina, 2010) and their proximity to the recipient of support facilitates a more rapid and tailored approach (Balaguer-Coll, Prior and Tortosa-Ausina, 2010; Corfee-Morlot et al, 2011; Daley, Sharp and Bae, 2013), especially when a specific problem is seen to measurably deteriorate (Daley, Sharp and Bae, 2013), validating the action.

Where local authorities hold a remit to manage infrastructure development they are also better placed to manage aspects of the region that can prove fundamental to sustainable development (Daley, Sharp and Bae, 2010; Trisolini, 2010). In addition to this, the financial profitability that can be achieved through initiatives that support sustainable development is a greater stimulus to the local government, which sees it as a means to further support the region, than to central government (Daley, Sharp and Bae, 2013).

However, this benefit is undermined if the region contains a high proportion of groups who would be adversely affected (Daley, Sharp and Bae, 2013), and the proximity of local government to a broad range of issues with potentially conflicting needs can also undermine impartial action (Corfee-Morlot et al, 2011).

2.8 Modes of intervention

Intervention can take many forms, which are summarised in appendix 4. The purpose is to correct market failure caused by externalities (Heal, 2005; Mankiw, 2009; Galle, 2012), including the cost of action required for sustainable development, and the aim is to achieve the desired correction in a manner that

ensures the result provides an equitable allocation of resources (Heal, 2005; Mankiw, 2009).

2.8.1 Fiscal policy

Economic instruments are generally favoured by economists because they allow market forces to determine the final outcome (Bowers, 1997, p.71; Dryzek, 2005; Lee and Lee, 2005; Galle, 2012), because they stimulate innovation in cleaner technologies (Bowers, 1997, p.174; Lee and Lee, 2005), and because they can be structured to include exemptions in order to protect specific sectors (Denison and Facer, 2005; Bye and Bruvoll, 2008; Schofield and Manisty, 2009) or include an escalator that increases the burden of taxation through the years to apply visibly increasing pressure to change (Schofield and Manisty, 2009; Elkins et al, 2011).

However, they invariably involve monitoring, which is an added expense for governments (Bowers, 1997, pp.65–77; Sugeta and Matsumoto, 2007), and designing effective instruments that efficiently target the desired behaviours is not easy (Khanna, 2001), fraught with many of the difficulties identified in the discussion of rational decision making. The development of financial measures is further undermined by the difficulties in setting a fair valuation that have been discussed in section 2.5.6 and appendix 3.

From different perspectives, Keynes (Henry, 2010; Piereson, 2012) and Pigou (Helm, 2005; Mankiw, 2009; Henry, 2010; McLure, 2012) both argued for the judicious use of fiscal policy. Pigouvian taxes and subsidies are calculated to equal the cost of the externality being accounted for, whereas pollution taxes may include an element designed to raise further revenue (Bowers, 1997, p.46). Pigouvian taxes and subsidies are considered to be the most sensitive method of correcting market failure, leaving the market to decide which action is the most efficient way to achieve the desired results (Bowers, 1997, p.46; Helm, 2005; Mankiw, 2009; Schofield and Manisty, 2009; Galle, 2012). However, there is a need to educate the public so that they make decisions that promote sustainable development, correcting market failure (Wolff and Schönherr, 2011).

Taxation

The purpose of environmental taxes such as the carbon tax on fuel is to raise the cost of environmentally harmful products in comparison to less harmful alternatives and use market forces to deter their use (Bye and Bruvoll, 2008; Mankiw, 2009; Galle, 2012; McLure, 2012). However, such action needs to be balanced with the other objectives of government, such as maintaining a competitive trade environment and social welfare (Bye and Bruvoll, 2008; Halvorsen, 2009; Schofield and Manisty, 2009).

In suggesting that financial measures alone are sufficient, there is an inherent assumption that the cost of internalising the value attributed to environmental damage is sufficiently small not to destabilise the economy (Helm, 2005).

Referred to as the double dividend, environmental taxation raises revenue for the government that can be used to reduce other taxes or can be distributed as subsidies (Schofield and Manisty, 2009; Elkins et al, 2011) but requires careful monitoring because the revenue raised is reduced as users change their behaviour towards the desired model, thus affecting the balance of government finances (Bowers, 1997; Mankiw, 2009; Galle, 2012; OECD, 2011a).

Taxation has been shown to have effect over the long term (Schofield and Manisty, 2009; Daubanes and Grimaud, 2010; Nakada, 2010), although it is argued that the extent to which this is the case depends in part on the elasticity of demand for the goods or utility provision (Bye and Bruvoll, 2008; Daubanes and Grimaud, 2010; David and Sinclair-Desgagné, 2010; Galle, 2012). There is also a correlation between sensitivity to taxation and wealth of the subject which demonstrates an inverted U-shape (Halvorsen, 2009; Galle, 2012).

The wealthy are not constrained by financial considerations and can choose not to change their behaviour. In contrast the least wealthy purchase little more than the essentials, and cannot necessarily afford environmentally sensitive alternatives even if added outlay is offset by lower running costs. This is used as grounds to deter the use of taxation because its impact is considered to be disproportionately severe for the least wealthy who cannot necessarily afford avoidance action (Sumner, Bird and Dobos, 2011).

It is also argued that improved performances achieved in response to taxation can take the form of relocation of the activity being regulated to a country that

does not exert such pressure (Elkins et al, 2011), resulting in an inability to assess the actual impact of taxation with any accuracy (Bye and Bruvold, 2008).

When considering the acceptability of taxation, the influence of public choice theory also needs to be recognised. Those subject to Pigouvian taxes can erroneously see them as a measure to raise the tax burden, especially if the offsetting adjustments to maintain the level of revenue are not clearly ring-fenced and advertised (Helm, 2005; Geys and Vermeir, 2008; Sumner, Bird and Dobos, 2011; Galle, 2012).

People tend to resent action such as taxation that could be deemed to force them to change behaviours (Goetz, 2010; Galle, 2012). Therefore the introduction of taxation can put the party into a negative light, which deters its use.

Thus, whilst taxes are a tool that can internalise environmental costs, their effective use is impeded by a difficulty in assessing the correct level of taxation, the ability of the subject of the taxation to respond and the multidimensional role of the politician.

Subsidies and grants

Whereas taxation acts as a deterrent by increasing costs to account for externalities that are outside the market system, subsidies and grants are used to encourage desired behaviours by compensating for associated expenditure (Bowers, 1997, p.67; Green, 2006; Goetz, 2010; Galle, 2012).

These incentives can be offered to promote the installation or adoption of a technology that would otherwise be ignored due to cost implications and can cover all or part of a cost (Bowers, 1997, p.67; Bye and Bruvold, 2008). Whilst they are normally made as a one-off payment, they can be ongoing and handled through the tax system (Bowers, 1997, p.68; Bye and Bruvold, 2008; Schofield and Manisty, 2009).

Subsidies tend to be viewed more favourably than taxes by the recipient (Bye and Bruvold, 2008; Galle, 2012) but create a burden on the awarding body because they need to be funded and monitored to ensure that the monies are spent as intended. They are not considered to be as efficient as taxation in changing behaviours (Green, 2006; David and Sinclair-Desgagné, 2010; Galle,

2012). In that they may not be available to new businesses, they could become a barrier to entry (Bowers, 1997, p.68; David and Sinclair-Desgagné, 2010).

Further constraint in the use of subsidies stems from the need to ensure that they do not provide funding to remedy pollution which would contravene the polluter pays principle (Bowers, 1997, p.68; David and Sinclair-Desgagné, 2010) or World Trade Organisation regulation (Green, 2006).

Thus, whilst subsidies are considered to be politically more acceptable, they are not considered to be as effective as taxation and governments are limited in their use because of the added expense in both their provision and their monitoring.

The principle of taxation and subsidies is to adjust prices to enable the market to accommodate external costs. Taxation involves finance flowing into the government (Galle, 2012), and the major constraint on its use is the need to balance it with other political demands including maintaining a healthy economy and retaining political advantage. In this respect, however, subsidies are significantly different in that they need financing (Green, 2006; David and Sinclair-Desgagné, 2010; Galle, 2012). Governments use a variety of methods to achieve this and have also found that success is sensitive to not only the mix of incentive and penalty but also the point of intervention (Goetz, 2010).

Recycling tax-subsidy

Using a combination of taxation and subsidies, authorities tax harmful activities and use the revenue gained to provide a subsidy to help organisations adopt clean technology in order to reduce the activities (Bowers, 1997, p.68; Bye and Bruvoll, 2008; Schofield and Manisty, 2009; David and Sinclair-Desgagné, 2010). This requires careful calculation to ensure that the taxes raise sufficient revenue and theoretically could encourage the providers of green technologies to raise their prices with no ceiling, knowing that the cost to the entity installing the technology is covered by subsidy (David and Sinclair-Desgagné, 2010).

This approach is seen to be “business friendly” (Bye and Bruvoll, 2008; Schofield and Manisty, 2009; David and Sinclair-Desgagné, 2010; Goetz, 2010) but could be criticised by the public as being a waste of taxpayers’ money (Goetz, 2010). The effectiveness of this approach depends on the mix of taxation and subsidies, and care is needed that they are designed in a manner

that encourages the desired behaviours (Bye and Bruvoll, 2008; Schofield and Manisty, 2009; David and Sinclair-Desgagné, 2010).

There has been a tendency for this type of support to result in “end-of-pipe” clean-up measures rather than research into new technologies that could provide the radical solution that would help the organisation avoid the environmental damage in its entirety (Bye and Bruvoll, 2008; David and Sinclair-Desgagné, 2010). It can also encourage action to exploit the subsidy even when it is not the most expedient action, such as deliberately adopting a poor practice in anticipation of receipt of the subsidy to enable changing practice at a later date (David and Sinclair-Desgagné, 2010; Goetz, 2010; Nakada, 2010; Galle, 2012).

A slightly less extreme measure with similar economic benefit is to use the revenue from taxation of harmful activity to facilitate the cutting of taxation on a less damaging option (Schofield and Manisty, 2009). The government does not get the same level of benefit to its reputation as there is no visible subsidy.

Loans

An alternative to subsidies and grants is the option of providing a loan (Svensson, 2008; Goetz, 2010; Wolff and Schönherr, 2011; Okae-Adjei, 2012), which, involving repayment of the funds, has the advantage of minimising the financial burden on the taxpayer (Rani, 2011) and acts as a stimulus to ensure that research and development activities yield financially viable outputs (Svensson, 2008).

Careful scheduling of repayments can ensure that the resultant financial burden correlates with the benefits emanating from the loan (Guillemette, 2006; Rani, 2011; Mhamed, Kasar and Cunska, 2012). Recipients can be given further support in the form of reduced interest rates (Jennergren, 2005; Svensson, 2008; Rani, 2011; Okae-Adjei, 2012). These loans can provide finance for projects that are not sufficiently financially attractive to support a bank loan (Bickel, 2006; Rani, 2011; Coleman and Robb, 2012).

Researchers have found that R&D initiatives supported with subsidised loans resulted in poorer performance than those funded on a commercial basis (Svensson, 2008), raising questions about the efficacy of such schemes.

Revolving investment funds

Whilst loans are repaid, there is a need to secure the initial capital. This can be done through a bank loan, but these have the disadvantage of being subject to interest. A revolving investment fund involves ring-fenced funds that can be used to provide the initial finance for loans. The loan is repaid into the same fund to finance further projects (Bickel, 2006; Okae-Adjei, 2012). Provided interest rates match inflation, the value of the fund is preserved.

2.8.2 Command and control

Whereas financial measures encourage behavioural change, regulation demands it, a fact that is appreciated by the voting public (Helm, 2005). A variety of regulatory tools exist including those that proffer advantages for all concerned (Green, 2006; Goetz, 2010), especially in achieving targets to satisfy agreements such as those associated with the Kyoto protocol (Green, 2006) or with controlling dangerous processes and the use of particularly hazardous substances (Hawkins, 2000).

Although theory suggests that regulation can be effective to the extent that organisations will act in anticipation of new regulation (Khanna, 2001), it does not raise revenue for the government (Mankiw, 2009; Goetz, 2010) and it can produce undesired results.

Regulation is used by governments to ban or enforce the use of products or processes (Mankiw, 2009; Goetz, 2010; Galle, 2012) and to develop minimum standards where the performance of technologies is concerned (Mankiw, 2009; Goetz, 2010; Urpelainen, 2010; Galle, 2012; Zhang, 2012). Considered by the economists to be inferior to economic instruments (Helm, 2005; Goetz, 2010; Zhang, 2012), it can also be accompanied or preceded by fiscal policy to compensate for the cost of adopting new technologies and encourage subsequent compliance (Green, 2006; Urpelainen, 2010).

There are implications relating to business failure and job losses should the manufacturer or user of the banned substance not have viable alternatives (Mullin, 2002; Mankiw, 2009), although regulation can prove to be the stimulus for the requisite investment that enables substitutes to be developed (Mullin, 2002).

Regulation is inflexible (Zhang, 2012), unwieldy, and can lead to overregulation (Hawkins, 2000) because it focusses attention on specific technologies rather than leaving the end user the choice on how to minimise environmental damage. Taking carbon emissions as an example, individual regulations would be needed for each of the disparate activities creating emissions if regulation were to be as effective as the carbon tax on fuel (Hawkins, 2000; Mankiw, 2009). These regulations would need to be tightened to maintain control as technologies improved (Green, 2006), adding the burden of monitoring and enforcement (Helm, 2005; Urpelainen, 2010; Zhang, 2012).

Regulation can alter the ease with which nations can trade with each other. It is argued that governments adopt a strategic position when considering the standards incorporated into regulation in order to ensure they do not undermine the competitive advantage of their own industries (Antoniou, Hatzipanayotou and Koundouri, 2012) and conversely they are subject to a stipulation from the World Trade Organisation that regulation should not hinder international trade any more than necessary (Green, 2006). Thus they seek to adopt no higher standards than those of their trading partners (Antoniou, Hatzipanayotou and Koundouri, 2012) and need to be able to defend any regulation developed (Green, 2006).

2.8.3 Standards and certification

Environmental management systems (EMS)

Internationally recognised standards such as the environmental management standard ISO 14000 have achieved widespread acceptance (Samuel and Enquist, 2007; Barbu, Negulescu and Barbu, 2012), such that ISO 14000 is adopted by over 200,000 organisations spanning nearly 160 countries (Barbu, Negulescu and Barbu, 2012). Individual regions have developed their own certified environmental management systems, such as EMAS, a European standard (Samuel and Enquist, 2007; Barbu, Negulescu and Barbu, 2012).

ISO 14000 has been criticised for providing a mechanism for “green washing” whereby organisations advertising their credentials have in fact not changed their practice (Watson and Emery, 2004; Samuel and Enquist, 2007). Indeed, some empirical research demonstrates that companies have made no improvement having adopted the EMS. An explanation for this might be

revealed in a meta-analysis of case studies where the only organisations not showing improvements either had had the management system imposed upon them, suggesting a lack of management commitment, or were from tightly regulated sectors that were already observing high standards of environmental protection. In addition to this the analyst believed that the two case studies did not use sufficiently robust measures (de Vries, Bayramoglu and van der Wiele, 2012).

There is, however, clear evidence to suggest that the need for transparent reporting and the economic benefits that even cursory measurement stimulates can change the mindset and motivation of management for the better (Samuel and Enquist, 2007; de Vries, Bayramoglu and van der Wiele, 2012). This may only assist in sustainable development rather than achieving the more lofty aim of sustainability (Watson and Emery, 2004); however, research suggests that the longer the standard is in operation, the greater the impact (de Vries, Bayramoglu and van der Wiele, 2012), and, in particular, standards that require employee training demonstrate significant benefits in waste management (de Vries, Bayramoglu and van der Wiele, 2012).

The origins of voluntary standards are influential in their success. EMAS, a European environmental management system similar to ISO 14000, is fundamentally different from ISO 14000 in that it was issued by the European Union as a regulation rather than a standard. This has the effect of ensuring that all parties adopting it have to comply with the same regulations within it rather than the more nebulous imperative of a standard that leaves it to each state to decide how the standard is to be achieved (Starkey, 1996, pp.62–63). Thus EMAS ensures competitive advantage is maintained and is considered to be a more robust instrument (Starkey, 1996, pp.62–63).

Standards are recognised as a problem for the SME because of the level of expertise required as well as financial implications (Watson and Emery, 2004; Barbu, Negulescu and Barbu, 2012), evidenced further by a positive correlation between the number of employees in organisations observed and the reduction in their emissions of pollutants (de Vries, Bayramoglu and van der Wiele, 2012). However, the aggregate contribution of SMEs to environmental damage is substantial, making them an important sector to be incorporated in any action (Palmer and France, 1998; Pedersen, 2009).

Product labelling and certification

Economic theory would argue that markets can only operate effectively when the purchaser has the requisite information so that a rational choice can be made. Consumers need to be able to compare technologies using a common platform. In addition to this, one of the sensitive issues of taxation and subsidies is identifying the optimal position in the supply chain at which to apply the measure (Sugeta and Matsumoto, 2007; Wolff and Schönherr, 2011).

Regulation, however, is proving to also be an inadequate measure to encourage sustainable sourcing, product manufacture and usage (Goetz, 2010; Zhang, 2012).

Certification and labelling are devices that can combine the benefits of both instruments (Goetz, 2010) and can be used to promote the development of new technologies upstream and encourage their take-up downstream (Bye and Bruvoll, 2008).

Trading standards for individual products or attributes have been introduced that provide rating systems for products facilitating this informed choice, including voluntary “eco-labels” which can be made mandatory by governments (D’Souza, 2004; Bye and Bruvoll, 2008; Koos, 2011; Wolff, and Schönherr, 2011) and government-based rating labels (D’Souza, 2004; Koos, 2011). It is accepted that such labelling confers competitive advantage (D’Souza, 2004; Bhaskaran et al, 2006; Aguilar and Vlosky, 2008; Koos, 2011).

Consumer response to labelling is undermined by a lack of knowledge about associated regulations (D’Souza, 2004; Chen and Chang, 2013), confusion caused by “green washing” (Bhaskaran et al, 2006; Chen and Chang, 2013) and an inability to differentiate between different labelling systems (D’Souza, 2004; Aguilar and Vlosky, 2008; Koos, 2011; Chen and Chang, 2013). In addition to this, consumers demonstrate scepticism regarding environmental claims, being influenced to a greater level by the media (D’Souza, 2004).

Green and white certificates

Developed for the energy market, green certificates are issued to electricity producers for units of power produced using green technologies which are traded on a green certificate market (Bye and Bruvoll, 2008; Teiusan and Cioca, 2013). Electricity producers and providers are obligated to buy green certificates

proportional to their power consumption and that of their customers. This creates a market for the certificates which provides a second stream of funding to green power producers (Bye and Bruvoll, 2008; Oikonomou and Mundaca, 2008; Teiusan and Cioca, 2013) and is likened to an “auction-based subsidy system” (Bye and Bruvoll, 2008). Some confusion appears to exist between green certificates and tradable permits (Teiusan and Cioca, 2013).

Complementing the green certificate and making its targets more achievable are white certificates which influence the downstream side of the supply of power (Bye and Bruvoll, 2008; Child et al, 2008). As yet, only a few countries run such schemes (Child et al, 2008; Pavan, 2012). These certificates are awarded to suppliers that undertake energy reduction activities that help their customers reduce their consumption (Bye and Bruvoll, 2008; Child et al, 2008; Pavan, 2012). Organisations operating under the scheme have energy reduction targets which are met by the production of white certificates earned through undertaking relevant activities (Bye and Bruvoll, 2008; Oikonomou, 2012).

Excess white certificates can be traded, resulting in value for exceeding targets and enabling the organisations concerned to select the most cost-effective action (Child et al, 2008; Pavan, 2012; Oikonomou, 2012). The purpose of the system is to encourage the end user to obtain the better-performing appliances and innovative products that reduce overall demand for power (Bye and Bruvoll, 2008; Pavan, 2012). It is argued that the white certificate scheme should be compatible with other schemes in order to reduce the complexity of managing the existing plethora of regulation (Child et al, 2008).

Permits

Whereas financial measures manipulate a price mechanism to regulate demand for environmentally harmful activity, permits control the volume of pollutant that can be generated or the quantity of a product that can be used (Bowers, 1997, p.64; Bye and Bruvoll, 2008; Mankiw, 2009). Often at local authority level the quality and quantity of waste, emissions and effluent can be licensed (Bowers, 1997, p.64; Mankiw, 2009). Permits can be used to control activities in environmentally sensitive areas but could prove to be a barrier to entry for new businesses (Mankiw, 2009).

There are drawbacks to the use of permits. There is evidence to suggest that they are more effective in some industries than others in terms of promoting research and development activity (Perino, 2010). Without intrinsic value, they prompt end-of-pipe measures that require monitoring and enforcement to be effective (Helm, 2005; Perino, 2010) and are not viable for smaller entities (Helm, 2005).

Tradable permits

Originally used in the context of pollution, tradable permits, alternatively referred to as brown certificates, enable the holder to reduce pollution using new technologies, and excess permits can be sold to compensate for the expenditure involved (Bowers, 1997, p.64; Helm, 2005; Mankiw, 2009; Schofield and Manisty, 2009; Goetz, 2010). As such, these are also classified as economic instruments (Bowers, 1997, p.64; Hawkins, 2000; Bye and Bruvoll, 2008) and theoretically considered to be as effective, although maximum effectiveness is difficult to attain (Bye and Bruvoll, 2008). The revenue does not go to the government and consequently tradable permits do not put political parties in a negative light (Schofield and Manisty, 2009).

Tradable permits are most effective when introducing new control measures where the cost of improved performance can rise exponentially (Schofield and Manisty, 2009). Their tradable nature does mean that the authority granting the permit may not benefit from a reduction in the related activity because organisations could buy further permits rather than modify their processes. This renders them ineffective as a control measure for activities in environmentally sensitive areas (Bowers, 1997, p.73). Uncertainty in their value can be a deterrent to research and development activities (Perino, 2010).

EU Emissions Trading Scheme (ETS)

In an effort to comply with the Kyoto protocol, the EU initiated the Emissions Trading Scheme that imposed emissions allowances on sectors of industry, operating in much the same way as the American tradable permits scheme (Ehrhart, Hoppe and Löschel, 2008; Kettner et al, 2008; Skjærseth and Wettestad, 2008; Clò, 2009). For ease of administration, it focussed on larger organisations, not including land and waterborne transport, farming activities and individual households (Kettner et al, 2008; Clò, 2009).

The scheme was somewhat limited in scope, only addressing around 40% of the EU's emissions (Kettner et al, 2008; Parker, 2011), with provision for companies to voluntarily opt into the scheme or, if an organisation was regulated under another scheme, opt out (Kettner et al, 2008). The scheme consisted of three phases with the allowances tightened in the later stages (Clò, 2009). The governments of individual member states were free to choose the precise details relating to its administration (Kettner et al, 2008).

The two principal difficulties with the scheme stem from its partial application, which undermined the ability to control total emission levels (Clò, 2009) and to identify realistic allowances (Clò, 2009). Indeed, in the initial stages, overallocation occurred in a manner that undermined the competitive position of some nations involved (Kettner et al, 2008; Skjærseth and Wettestad, 2008; Clò, 2009; Parker, 2011), stemming partly from the difficulty in identifying the requisite information for calculating appropriate allowances in the initial stages (Kettner et al, 2008; Skjærseth and Wettestad, 2008) and potentially from a desire to maintain competitiveness through relatively lax regulation (Skjærseth and Wettestad, 2008). In spite of this, emissions fell during the period (Clò, 2009; Parker, 2011), suggesting that the scheme did have some effect even in its first phase. However, it is reported that some organisations are identifying loopholes in the scheme which they are exploiting, thus undermining its impact (Ehrhart, Hoppe and Löschel, 2008).

The target is to achieve a 20% reduction in carbon emission by 2020 (Parker, 2011). This falls significantly short of the radical change needed for sustainable development and is barely sufficient to ensure Kyoto targets are met.

2.8.4 Knowledge exchange and partnerships

Regardless of decision-making style, the individual is expected to have broad knowledge of the implications of his actions (Heracleous, 1994; Henry, 2008; Alvesson and Spicer, 2012; Ritov and Mellers, 2013). The individual will also need to know about potential alternatives including groundbreaking technologies (Corfee-Morlot et al, 2011; Galle, 2012). Therefore the education of the individual is an activity that should accompany the provision of facilities that support more sustainable lifestyles (Bickel and Blaine, 2006; Trisolini, 2010; Corfee-Morlot et al, 2011; Galle, 2012).

In addressing sustainable development initiatives, the role of the small to medium sized enterprises should be considered. The SME forms the backbone of many nations (Gadenne, Kennedy and McKeiver, 2009; Ciurariu and Cîndea, 2011; von Weltzien and Shankar, 2011) but individually such enterprises do not consider their contribution to environmental damage significant (Gadenne, Kennedy and McKeiver, 2009). Thus the need to encourage the sector to adopt sustainable practice is paramount.

Using the EU definition of having fewer than 250 employees (von Weltzien and Shankar, 2011; Hansen and Klewitz, 2012) and a turnover of less than €50 million with a balance sheet total of no more than €43 million (von Weltzien and Shankar, 2011), their size impedes their ability to manage their environmental footprint (Gadenne, Kennedy and McKeiver, 2009; Hansen and Klewitz, 2012). On the other hand, their small size and associated lack of bureaucracy lend them to innovation and rapid change (Ciurariu and Cîndea, 2011; von Weltzien and Shankar, 2011; Hansen and Klewitz, 2012), potentially making them instrumental to sustainable development. Thus there is an imperative to include education of decision makers within SMEs (Hansen and Klewitz, 2012). The variety of approaches used to this end is broad (Vega, Brown and Chiasson, 2012) and is summarised in table 2.5 below.

Table 2.5: A summary of knowledge exchange strategies

Strategy	Comment	Source
Permanent or temporary exhibitions	Can require extensive promotion and take-up. Timing of temporary exhibitions may not attract the desired audience and the content may be forgotten.	Vega, Brown and Chiasson, 2012
Clinics, mentoring, workshops and helplines	Best achieved with partnerships; the input of NGOs and environmental champions equips local decision makers with knowledge and tools.	Corfee-Morlot et al, 2011; Vega, Brown and Chiasson, 2012
Creating clusters (virtual or physical)	Fosters collective learning and ideally suited for SMES. Requires a champion to co-ordinate activities. Can prompt innovation.	Mason, Castleman, and Parker, 2008; Vega, Brown and Chiasson, 2012; Capó-Vicedo, Mula and Capó, 2011
Public-private partnerships	Facilitate transfer of knowledge from researchers to practitioners.	Khanna, 2001; Vega, Brown and Chiasson, 2012
Voluntary pledges	Provide advertisement for participating organisations and can be supported through the provision of technical and financial support.	Khanna, 2001
Information provision	In the form of technical data and publication of lists of “environmental offenders” or firms electing to opt out of voluntary initiatives.	Khanna, 2001

Regardless of technique, the success of these ventures depends largely on the underlying context (Tavares and Mamede, 2011; Vega, Brown and Chiasson, 2012) in that any element of accountability or compulsion tends to discourage take-up (Vega, Brown and Chiasson, 2012).

It is clearly evident that local authorities can play a critical role in acting as a catalyst, but need not invest the time and effort in the organisation and running of events (Tavares and Mamede, 2011; Vega, Brown and Chiasson, 2012).

2.8.5 Urban design

A further action that can influence the behaviour of organisations within their district is the provision of infrastructure that takes choice away from the end user. This ranges from building design to traffic controls (Ling, Hanna and Dale, 2009) and can include provision of district heating and cooling (Lofstedt, Sepp and Kelly, 1996; Chinese, 2008; Magnusson, 2011).

Many of these activities are long-term in nature and can result in unforeseen consequences. Population density influenced the energy required for both transport and domestic heating (Hoyer and Holden, 2003; Holden, 2004; Croci, Melandri and Molteni, 2011; Fuller and Crawford, 2011). However, the more fuel-efficient pattern was to develop small areas of self-contained high-density living (Holden, 2004; Croci, Melandri and Molteni, 2011; Fuller and Crawford, 2011), suggesting that their implementation should be carefully considered.

Other activities, however, such as the provision of district heating, can be controlled in such a way that they respond proactively to new technologies (Chinese, 2008; Magnusson, 2011) and are more energy-efficient than the provision of individual heating systems for each user (Lofstedt, Sepp and Kelly, 1996; Chinese, 2008) especially when combined with the provision of power (Chinese, 2008).

Adaptation to climate change is seen to be as pressing as action to minimise environmental damage (Ling, Hanna and Dale, 2009; Corfee-Morlot et al, 2011). This involves predicting the impact of anticipated climate change, and accommodating design in urban areas to mitigate its effects. It also involves the maintenance of favourable trading conditions (Ling, Hanna and Dale, 2009; Henry, 2010), and investing in public projects (Henry, 2010). Indeed it is argued that oversight for such projects is required to ensure that synergies between

facilities are developed and exploited (Ling, Hanna and Dale, 2009; Tavares and Mamede, 2011), something that cannot occur when individual organisations make choices simply to serve their own ends (Tavares and Mamede, 2011). This leads to an overview of the “whole picture”, which supports the development of appropriate infrastructures that can support a more sustainable development.

It is therefore evident that governments are a critical factor in the supporting of paradigmatic change. However, theory would suggest that their ability is tempered by numerous factors. Firstly, there is the need to maintain social welfare and economic stability, and secondly, the characteristics of the role of the politician in seeking to ensure re-election would temper any onerous measure considered. There is also evidence to suggest that the public do not have sufficient knowledge or willpower to lobby their politicians into action.

Thus the political system is poorly placed to stimulate action of the required magnitude. When this is taken in conjunction with the difficulties identified in the decision-making process, it would be reasonable to argue that there might be no instances of appropriate action. It has also been shown that there are grounds to suggest that local authorities are better placed to take appropriate action than central governments, including influencing critical infrastructure decisions.

This review of literature has concentrated on theories that affect all decisions equally, but it also needs to consider issues that could point to differences. The two subjects that this literature has revealed that could be instrumental relate to the ethos of political parties and to cultural difference.

2.9 Conclusion

In this review of literature I have revealed that business prosperity should not be at the expense of undermining the capacity for business to flourish in the future and this creates an imperative to accommodate sustainable development in all decisions. Historically, there has been a divide between those who believe in weak sustainability, whereby depletion of resources is acceptable provided an alternative capital, that need not be proved to be a direct substitute, is left for future generations, and those who believe a strong approach is required and resource use must be reduced to ensure that supply matches demand.

I have shown the breadth in opinion relating to the entities that should be attended to in order to achieve sustainable development. There appears to be general consensus that environmental care, societal welfare and economic prosperity are needed, and a strong case has been made for the inclusion of culture, although this is moderated by the need for the right type of culture.

In considering the models that depict the relationship between these factors, I showed how they maintained the differing opinions in that some embody the weak interpretation of sustainable development, whilst others depict the strong. My assessment of the criticisms levelled both at an analysis of weak and strong sustainability and at the models supporting it revealed that few criticisms are levelled at the strong representations, whereas many are levelled at the weak. I exposed a recognition that “business as normal” will not facilitate change of the magnitude required and there is a need for change that is argued to be in the order of paradigmatic change.

It is clear that some nations differ considerably in their attitude to the environment and the steps necessary to effect change from others, prompting a review of literature relating to cultural difference. There is sufficient evidence to suggest that national cultures do exist and four studies have developed frameworks with which to categorise cultural tendencies. These have identified characteristics that govern attitudes to the manner in which regulation is developed and observed, levels of social and environmental awareness, and willingness to act for the greater good at the expense of individual gain. I have provided evidence to suggest that these characteristics are influential in the style in which and extent to which nations embrace the challenge of sustainable development.

Incremental change can yield significant degrees of change and aid societies in their quest for sustainable development, but there comes a time when a technology can be improved no further and a radical change is needed. This would suggest that sustainable development is likely to involve the radical decision, which by its nature is high-risk, because it demands significant change without knowledge of all the requisite facts in an ever-changing environment.

My examination of decision-making theory found that the demands of strong sustainable development add complexity to the decision-making process that

undermines its capacity to make the radical decision. Decisions are made on a continuum between rational and intuitive. Both approaches require a good understanding of the parameters of the decision and can provide equally robust decisions, but when complex issues are in question, the rational model is frequently found to be too cumbersome. The decision in these cases is the fruit of bounded rationality using other models that achieve the decision with less effort, and the underpinning issues are not examined in full.

The nature of sustainable development presents potentially conflicting data that render analysis difficult because the different factors cannot be compared on a common platform. The most favourable outcome of different actions cannot be easily determined. Similarly, the intuitive decision demands understanding of the same data and is thus undermined. Consequently decisions relating to sustainable development are likely to be incremental in nature and potentially undermined by other forms of failure including hidden agendas or an unwillingness to embrace the challenge.

Voluntary agreements and guidelines exist that can encourage sustainable development. However, these can become structures that hinder the thought process from breaking away from the status quo to the detriment of finding the truly novel solution. Some, such as the precautionary principle, include constructs that could potentially render businesses uncompetitive, leading to a reluctance to embrace them. Without a global control mechanism, agreements such as the Kyoto protocol are purely voluntary and can be undermined through free riding.

Human nature would also tend to opt for the safe decision and avoid the decision that is of the magnitude required. Self-interest and profit are the most obvious motives, but there are also influences such as the need to preserve reputation. This can work in the interest of the environment when the decision is in the public eye and believed to gain recognition for altruism, rather than being made in private. When faced with a high-risk decision, the decision maker can resort to a variety of behaviours that undermine the ability for the levels of clear thinking required to make a well-judged decision. Moreover, when seeking a decision in a group setting, further dynamics undermine the capacity to make the radical decision. Whilst some decision makers have the capacity to address the high-risk decision, the capacity for others is thus diminished.

With the need for competitive advantage a constant priority, it has been postulated that governments are better placed than the market forces to create the framework that supports the sustainable decision. However, a different set of dynamics exists in the political arena. Of paramount importance is the need to deliver social welfare, for which governments need a buoyant economy.

Politicians are not necessarily experts in the complexity relating to sustainability and can adopt a naïve view with respect to suitable measures, depending on the source of their advice and ethos of their party, which could range from laissez-faire to proactively interventionist. Politicians are subject to the same stress responses identified above, heightened by the need to maintain an image that would aid re-election. Thus the electorate becomes a significant factor to consider.

Whilst the public could influence political controls to support sustainable development, I have revealed that this rarely occurs. Few members of the public understand the issues at stake or the steps that any party would take to remedy them. Personal preference for the individual or party could override the rational choice and electioneering is such that the policies espoused by politicians prior to the election do not necessarily match resultant action. The electorate are frequently influenced by past performance and cannot always attribute policy change to the correct party. Thus voting is rarely the result of rational thought based on correct information and the power of the electorate to persuade the government to legislate is undermined.

A review of the instruments and tools available to governments reveals that whilst significant steps can be encouraged, their efficacy in encouraging radical change is constrained. Financial instruments have the capacity to undermine economic and social welfare, and require valuation of environmental goods, something that is fraught with difficulty. Subsidies and loans are politically more acceptable but need to be funded.

Legislation requires enforcement, tends to be inflexible, is unwieldy and unsuitable for controlling disparate issues embodied by the need for sustainable development, and has the potential to undermine competitive advantage. Voluntary standards and actions such as product labelling to facilitate recycling focus the attention of decision makers, but do not necessarily achieve change

of the radical nature required. Less problematic is the provision of an urban infrastructure that supports sustainable development, removing the need for some choices at business level, and governments can facilitate knowledge exchange, a prerequisite for decision making.

I have identified many constraints on businesses and governments in developing policies and actions that lead towards strong sustainable development. Globalisation has made the task more complex with the development of multinational companies facilitating the movement of activities banned in one country to one where they are permitted.

Chapter 3. Methodology

When carrying out any research it is necessary to identify an approach that enables the researcher to achieve the declared objectives effectively. The purpose of this chapter is to explain the thinking behind the approach adopted for this thesis, relating the choices to the nature of the subject and the demands of the objectives.

The first part of the chapter is a brief review of the objectives the thesis seeks to fulfil and an assessment of the extent to which the review of literature has achieved this end in order to define the objectives sought through the process of primary investigation. The second section reviews the positions of technological determinism and social constructionism to ascertain perceptions relating to the forces that underpin paradigm change at a philosophical level.

The remainder of the chapter will explain the methodology at the levels suggested by Saunders, Lewis and Thornhill (2000, p.85) in that the research philosophy is identified before exploring approaches and strategies. Finally, data collection methods are explained and justified.

3.1 The extent to which the objectives have been satisfied by the review of literature

The purpose of this thesis is to develop understanding of the cultural contexts that surround activities that support sustainable development in order to assess the extent to which nations are “locked in” to an unsustainable paradigm. In the review of literature I have addressed many of the issues comprehensively, including those relating to the demands of sustainable development and decision making. I have shown that for the developed world, the magnitude of the change demanded in order to achieve a sustainable paradigm is such that “business as usual” is no longer tenable. In the review of literature I revealed some of the difficulties that hinder a move towards “sustainability as usual” whereby resource use, pollution and emissions are dramatically reduced. There was, however, little found that revealed the extent to which this has been accepted at government level.

To a certain extent, I drew negative findings, revealing that whilst there appeared to be tacit agreement that paradigmatic change was required, action appeared to support the idea of “business as usual”. A study of decision

making, behavioural science and environmental economics identified a clear tendency for the complexity of sustainable development, along with the parameters of decision making, to militate against the resultant decision facilitating the type of radical change required to achieve a sustainable lifestyle, especially in terms of managing the environmental footprint when that management also involves any loss of facility.

Similarly, a study of public choice theory and examination of the freedom for politicians to act in favour of environmental protection, which included a review of the tools and instruments that could assist, evidenced factors that exerted pressure to attend to the needs of business and society at the expense of the environment, eroding the balance required for sustainable development. Thus examination of the literature emphasised the manner in which the “three P’s” (people, planet and profit) competed with each other, revealing a tendency to prioritise the immediate needs of society and business above the longer-term issues posed by the environment.

As more issues relating to decision making were examined, so it became more evident that the current paradigm exerted an almost magnetic force to encourage the making of decisions that shied away from change that would sufficiently address the environmental aspect of sustainable development. When examining the literature relating to paradigm change, I found that it involves a wide range of entities, but what is not so evident from literature is the relationship between those entities, information which would assist in identifying the potential scope of action.

Variation was revealed in the manner in which societies addressed sustainable development due to cultural difference. In the review of literature I exposed evidence to suggest that some cultural characteristics lend themselves to greater sensitivity to certain aspects that relate to sustainable development than others. These aspects included the ability to embrace the risk that is associated with radical decisions.

The review of literature included studies that have identified broad cultural difference between nations. Whilst it was noted that culture changes over time, the studies do give weight to the need to consider the impact of culture in greater depth. Thus the focus for the empirical element of this thesis is that of

examining different approaches to promoting sustainable development among nations with significantly different cultural heritage, in order to develop understanding of the breadth of underlying factors that hinder or contribute to meaningful change.

The fact that Caprar and Neville's meta-analysis of papers seeking to bring these disciplines together found only a few papers in 2012 shows that whilst both culture and sustainable development are areas of research with a long history, bringing them together in an interdisciplinary study is a much newer line of investigation.

There are three fundamental questions emanating from the review of literature that I am seeking to address:

1. To what extent can paradigm change be controlled? This will entail developing a deeper understanding of the interrelationship between the factors that are involved in change of that dimension and exploration into whether the outcome of change can be controlled.
2. Caprar and Neville's meta-analysis (2012) suggests that certain cultures influence behaviours that can support sustainable development. I am seeking to validate these findings through empirical investigation.
3. There is evidence to suggest that cultural characteristics that underpin recognition of ethical behaviour do not always translate into action. I am seeking to identify other drivers that should be taken into account when assessing the cultural impact on sustainable development.

The answers to these questions should help develop further understanding of the extent to which culture influences the ability for a nation to undergo paradigmatic change

3.2 Technological determinism or social constructionism

There are opposing schools of thought regarding the manner in which societies change over time, namely technological determinism and social constructionism. It is necessary to consider the extent to which societies are considered subject to technological determinism, because this thesis is seeking to establish the impact of culture, a characteristic that is rooted in society. If it is shown that change is totally controlled by technological determinism, then there is no place for this work.

The concepts are two ends of a continuum between which there are a range of positions represented in figure 3.1. Social constructionists argue that society controls choice and thus constructs the technology that is adopted and the manner in which it is used (Mackenzie and Wajcman, 1999). Critical of overgeneralisations, Hacking (2000) identifies flaws in social constructionism. He argues that the abstraction of a theory from empirical evidence when it does not appear to be substantiated with evidence of applicability at a general level is unsound, and suggests that social constructionism can only be useful in particular instances where it can be seen to operate.

Hacking (2000) argues that the role of technology in shaping societal change must be identified. He recognises that the artefact is the “product of human knowledge” and links that knowledge to the priorities and choices made within the arena of research. However, he argues that once developed, technologies have a limiting effect upon the scope of further research because, firstly, the dominant technology can blind the researcher to viable alternatives, and secondly, new technologies spur the development of new materials that materially alter the environment and knowledge construction.

At the other end of the continuum from social constructionists are those who believe societal structures are determined by technology, claiming that the development of technology is autonomous and causes societies to adapt accordingly (Chandler, 2000), pointing to technology itself as the driver of change. Taken at an extreme level, proponents of the concept refer to the “technological imperative”, claiming that there is both a moral duty and a competitive necessity to advance new technologies in order to extract the maximum possible level of benefit from them (Chandler, 2000; Quint, 2003). The technological imperative would consequently augment the autonomy ascribed to technology. If the concept of technological determinism is upheld, any societal attempt to change would be considered futile because, in doing so, society would be attempting to limit the autonomy of technological developments.

In seeking to assess the role of technology in paradigm changes, De Bresson (1987) and Hacking (2000) ascribe much development as driven by governments protecting their national interests. These technologies, however, are transferred to the business sector, where they may not be the best solution

for the role they fulfil. Technology transfer is also a key issue when assessing the scope of change in developing countries. The developed world is reluctant to transfer expertise to emerging economies because of the competitive advantage attributed to technologies that minimise the use of resources including labour. This forces emerging nations to either use more inefficient technologies or delay their development.

Between these contrasting views of social constructionism and technological determinism are numerous other positions, which highlight alternative drivers to change. De Bresson (1987) and Heilbroner (1994) maintain that whilst technology is a core driver, it is itself shaped by social and economic forces. Mackenzie and Wajcman (1993) identify empirical evidence that highlights the manner in which social structures such as the perception of value and risk determine what is considered to be economically viable and thus produce markedly different technological solutions in different cultures. They also consider it essential to recognise the role of political intervention in the shaping of technology. There is a wealth of empirical evidence to support this, from the implementation of the Kyoto protocol to the governmental decision to focus industry in Singapore onto tourism in order to enable the country to compete in the international arena (Mehmet and Tahiroglu, 2003).

Society can influence the shaping of structures at a grassroots level. Bruland (1985, in Mackenzie and Wajcman, 1993) argues that machinery was introduced to replace manual labour as a direct result of labour disputes. Grassroots activities also shape technological progress and employ new technologies to wage successful campaigns (The Economist, 2008). These stimuli are not always evident. Engdahl (2007) identified that the published explanations underpinning action emanating from the US government were at variance with the facts, revealing the role of hidden agendas in the shaping of innovation. Whilst such agendas could be fuelled by financial expedience that is deemed unpalatable and thus not politic for publication, they could also be fuelled by self-interest rather than the public good.

The use of the media is a further determinant in shaping societal structures. In this case, the identification of causality is not so straightforward. Whilst it is clearly possible to impart information using the media, either in the form of advertisement or more subtly with the message embodied in programme

content, measuring the impact on desired behaviour is less clear (Meirick, 2006). It has been found that media influence will entrench prior opinion rather than persuade the viewer to adopt a new perspective (Oliver et al, 2008). Thus, on its own, media coverage devised to orchestrate a change in societal attitudes and practices is not sufficient, but it can add impetus to change that is initiated by other factors. It should also be recognised that media may involve inaccuracies that are nevertheless influential, for example in creating hype when reporting the cause of the recent rise in both oil and grain prices (BBC, 2010).

It has been argued that technology and numerous factors within society influence societal change. However, Gendron (2003) argues that technology and society are no longer the only determinants of social structures. She identifies an increasing awareness of the threat posed by environmental degradation that is beginning to influence business managers in their choices. Latour (2005) suggests that, as illustrated in figure 3.1, the factors that have the capacity to shape structures within society form an interconnected network and thus should not be viewed in isolation of each other.

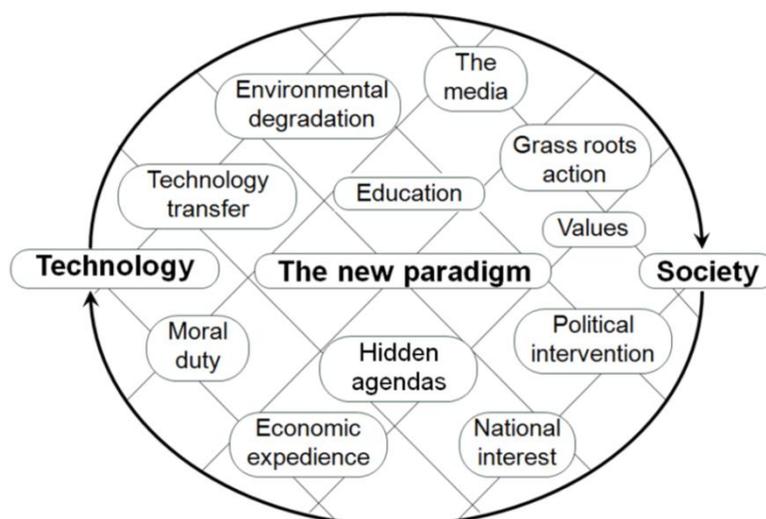


Figure 3.1: The web of factors that can determine the manner of change

This substantiates the need for an interdisciplinary approach to my research. It validates the need to assess the breadth of factors seen to be influential in paradigm change because this can help to reveal the extent to which society is technologically determined or socially constructed and, importantly, the extent to which societies can engineer paradigm change.

(Section 3.2 in its entirety was adapted from Sandland (2009).)

3.3 The focus of the remainder of this research

In reviewing the literature, it became clear that the management of sustainable development is highly complex, involving decision makers at all levels of business and society. As demonstrated in section 3.2, this is further complicated by underlying characteristics that shape human action, including culture, and behavioural science. Recent moves in the focus of research have started to reveal these underlying forces. Whilst the impact of individual cultural characteristics has been identified, this research seeks to take a more holistic approach, in an attempt to understand the broader picture.

Theorists have posited that the principal role of business is to make a profit whilst the central role of government is to support the needs of society, business and the environment. However, to anticipate the findings of the analysis presented in chapter 4, it is clear that governments could potentially be highly influential in enabling a nation to move towards a sustainable position.

Theorists developing models of sustainability all placed “business” as one of the components that had to be kept in balance. Examination of public choice theory also revealed that governments lag behind public opinion, meaning that using government action as a focus of investigation will reveal action that reflects the understanding of the nation including business, providing grounds for examining the role of governments rather than that of business itself.

There is also recognition that the small to medium sized enterprise is particularly vulnerable because its small size limits the availability of both expertise and finance. Thus, a point where the actions of governments can be observed is the manner in which support is offered to small and medium sized enterprises in addressing their need to adopt practices that minimise their environmental impact.

Any analysis of the impact of activities of one entity on a concept that is as complex as paradigm change is potentially flawed, because it may overlook other factors that are of greater relevance, promoting or constraining activities. For that reason I believe it necessary to consider the different factors that are influential within paradigm change in order to situate the findings and facilitate deeper understanding.

Indeed, Rogge, Dessein and Verhoeve (2013) caution against reducing complexity, explaining it should be clarified rather than simplified. To achieve this they propose that three phases should be undertaken. Firstly, the subject should be explored so that the parameters are fully understood and, where possible, concepts that are similar in nature are clustered together.

The second stage involves exemplifying the issues involved. This suggests the need for case studies to illustrate the issues involved and enable the researcher to move away from the ideological concepts and philosophies that could result in oversimplification. Finally, Rogge, Dessein and Verhoeve (2013) argue that the researcher is then in a position to develop a conceptual framework around which conclusions can be drawn.

It is thus apparent that three activities are required in order to develop robust findings:

Exploration

The two lines of exploration that are required in this case are into paradigm change and into culture:

- An investigation into the factors that are involved in paradigm change in order to establish relationships and assess the facility of democratically elected governments to operate as key agents of change.
- An exploration of the extent to which cultural difference is evident within developed nations in order to establish a basis for subsequent analysis.

Exemplification

- Identification of the activities undertaken by governments to support small to medium sized enterprises in developing practices that minimise their environmental impact.

Development of a conceptual framework

- This aspect of the activities recommended by Rogge, Dessein and Verhoeve (2013) will be undertaken in the subsequent analysis.

When considering the nature of these objectives, significant difference is apparent. The first activity, that of exploring the relationship between the entities involved in paradigm change, is seeking to establish objective theory. The

second, whilst also focussing on establishing a theoretical position, is seeking to identify difference. In contrast, the exemplification will form a substantial part of the work in seeking to look at the action within communities, an activity that involves much more subjectivity.

In broad terms, the different parts to this research will fit together as shown in figure 3.2.

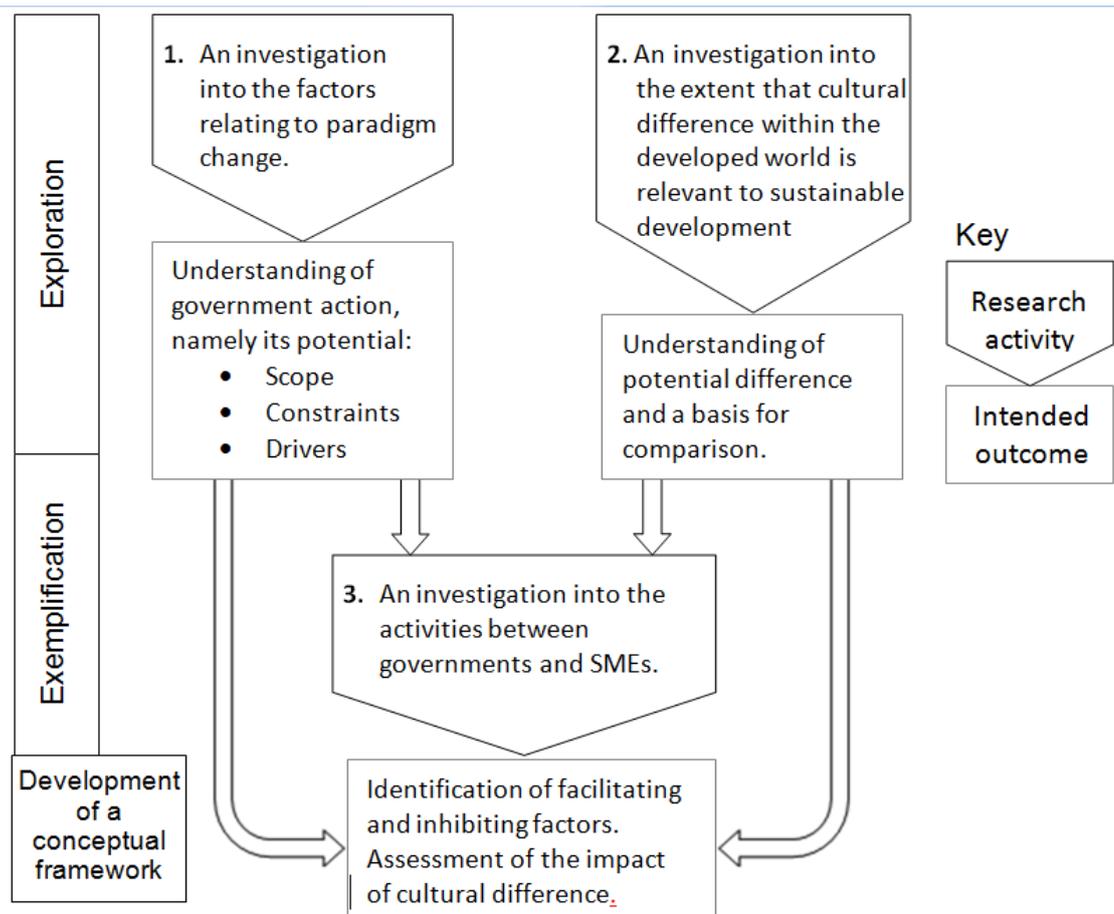


Figure 3.2: The structure of the research

The remainder of this chapter is a summary of current opinion regarding the extent to which the adoption of a mixed methodology can be considered robust, starting with section 3.4, which explains the nature of bricolage. It will then explain the methods adopted using the structure suggested by Saunders, Lewis and Thornhill (2000, p.85) and represented in figure 3.3. The authors consider the choices made in developing a methodology to be represented by an onion whereby the outer layers relate to the overarching philosophical considerations, moving inwards to the detail of data collection. A systematic consideration of each level can help ensure that a robust methodology is demonstrated.

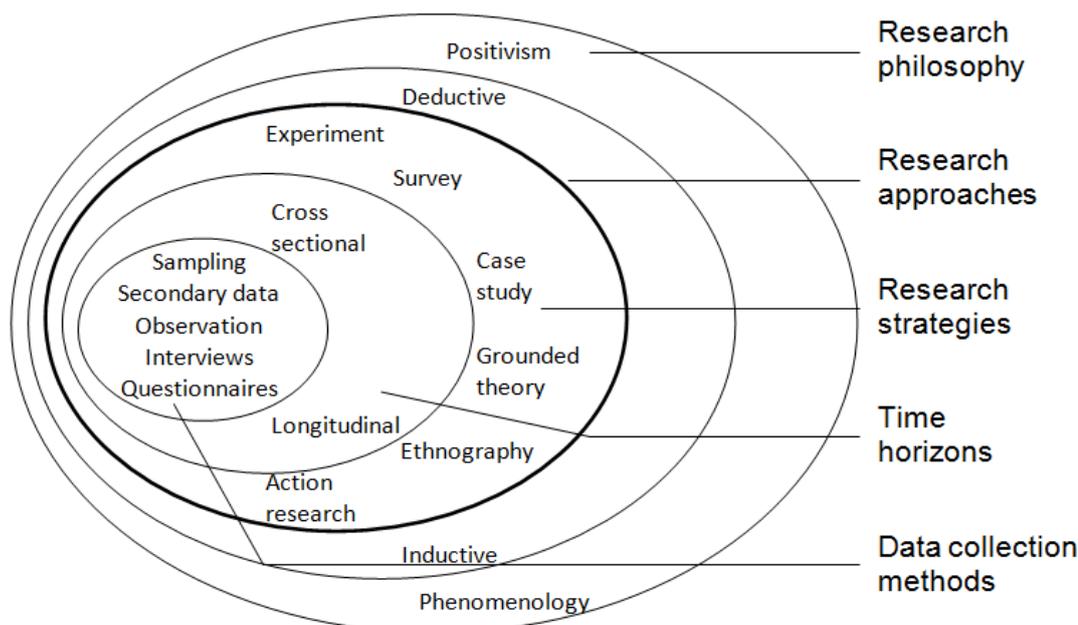


Figure 3.3: The research process onion (Saunders, Lewis and Thornhill, 2000, p.85)

3.4 Bricolage

There is a growing trend of accepting that the strengths of bricolage make it an ideal method for handling complex situations (Creswell, 2011; Kincheloe, McLaren and Steinberg, 2011, p.168; Teddlie and Abbas, 2011; Lambotte and Meunier, 2013). Critically, its mixed methodology frees the researcher from constraints embedded in any particular discipline (Mingers and Brocklesby, 1997; Kincheloe, McLaren and Steinberg, 2011, p.168), enabling a more accurate portrayal of understanding to be developed and communicated because the process allows the bricoleur to blur boundaries that are imposed by disciplines but are not evident in practice (Kincheloe, McLaren and Steinberg, 2011, p.168).

Bricoleurs are seen to be seeking understanding of social forces such as race and class and marry these to world views (Kincheloe, McLaren and Steinberg, 2011, p.169). The eight characteristics of the process are described by Teddlie and Abbas (2011, p.287) as:

- Methodological eclecticism.
- Paradigm pluralism.
- Emphasis on diversity at all levels of the research enterprise.
- Emphasis on continua rather than a set of dichotomies.

- Iterative, cyclical approach to research.
- Focus on the research question (or research problem) in determining the methods employed within any given study.
- Set of basic “signature” research designs and analytical processes.
- Tendency toward balance and compromise that is implicit within the “third methodological community”.

The concept of bricolage was introduced by Lévi-Strauss (1978, pp.16–17) and described as a process of using the materials “to hand” to create something new. The metaphor aligns with a mixed methodological approach, with the added flexibility of facilitating action research. Activities of the bricoleur are such that precise decisions about research strategy are not made at the outset because the demands of the subject only become apparent as the study is undertaken and as circumstances dictate (Kincheloe, McLaren and Steinberg, 2011, p.168; Teddlie and Abbas, 2011, p.285). The methodology therefore becomes a defence of the choices made during the process of undertaking the research rather than a blueprint developed prior to commencement (Kincheloe, McLaren and Steinberg, 2011, p.169).

The core difference between bricolage and a scientific undertaking is that the scientist seeks to extend the body of knowledge by moving beyond the realms of current knowledge, whereas the findings of the bricoleur remain within the body of knowledge (Lévi-Strauss, 1962; Johnson, 2012). This does not mean that the bricoleur does not create anything new. Lévi-Strauss (1962) differentiates between the two by referring to the “message” that is sought. The scientist seeks to extrapolate a message outside the scope of the material used in the research, whereas the bricoleur is looking for the messages within the body of the materials that are to hand.

Bricolage is appropriate for this research in that, rather than aiming to extend knowledge in a narrow field, it seeks to draw it together from a range of different fields and create new knowledge in the development of an understanding of the relationships between them. Thus it is suggested that robust research could be conducted using a judicious mix of methods, selecting the most appropriate methodology for each element of the undertaking.

3.4.1 Scope

There has been debate regarding the appropriate scope of methodologies required to make the research robust. The key question has been whether the work should include both qualitative and quantitative approaches (Creswell, 2011, p.270; Teddlie and Abbas, 2011, p.286); however, it is generally recognised that there is a need for pragmatism (Mingers and Brocklesby, 1997; Creswell, 2011, p.280; Kincheloe, McLaren and Steinberg, 2011, p.168; Teddlie and Abbas, 2011, p.286; Johnson, 2012) and there is a strong argument for retaining a purely qualitative approach (Teddlie and Abbas, 2011, p.286), which is deemed more appropriate for interpretive studies (Creswell, 2011, p.278). Pragmatism, however, should not be interpreted as lack of rigour.

Further questions have been raised about the scope to mix paradigms. Again, it appears to be generally accepted that this can be the choice of the researcher (Creswell, 2011, p.275; Kincheloe, McLaren and Steinberg, 2011, p.168; Teddlie and Abbas, 2011, p.286) with Creswell (2011, p.275) providing the strongest guidance, namely that of ensuring all assumptions embedded within paradigms are clearly acknowledged.

3.5 The research philosophy

Philosophy underpinning methodologies has changed over time. The first social scientists sought to emulate physical scientists and establish truths in the form of meta-theory, but later philosophers such as Kuhn recognised that established “truths” can only operate within the paradigm in which they are revealed (Smith, 1998, pp.193–197). Kuhn argued that research practices could only inhabit one paradigm. However, Feyerbrand subsequently considered that the development of knowledge could be more eclectic, maintaining that there was at any time more than one way of developing understanding (Smith, 1998, p.206).

Feyerbrand’s acceptance of a pluralistic approach to research is supported by proponents of bricolage who believe that it is possible to mix paradigms, allowing the researcher to balance assumptions operating in one paradigm with those that operate in a different one and produce a broader picture (Mingers and Brocklesby, 1997; Creswell, 2011; Teddlie and Abbas, 2011, p.285). Indeed, it is argued that a purist approach precludes the researcher from selecting the most appropriate methodology and thus pragmatism should be

adopted in order to select the best approach for each part of the research being undertaken (Ritchie and Lewis, 2003, pp.17–18; Simon-Solomon, 2009).

Doubt in the ability of social scientists to identify universal truths led to the realisation that at best they can reveal meaning and enhance understanding (Smith, 1998, pp.193–197), although this was not seen as reason to be any less rigorous with the development of research. Kuhn's recognition that "universal truths" only held true in a specific paradigm was responded to by Mises with the concept of limiting findings to situations where the circumstances in which they were developed were the same (Smith, 1998, p.157; Zwirn, 2009) and the maxim that, when mixing methodologies, the researcher should acknowledge the paradigms being observed and accept multiple interpretations rather than look for a converging trend (Creswell, 2011, p.275).

Lukes (2009) argues that values themselves are relative, claiming that rationality itself is cultural and thus issues conceived in one culture to be logical could be incomprehensible in another. This introduces the concept of relativism, which predicates a need for sensitivity when drawing meaning from data, and apparently contradictory conclusions can be considered a robust representation of cultural issues (Esikot, 2009).

The subject of relativism is linked to that of subjectivity, in that it opens the way for differing opinions. The impact of subjectivity on research must be understood. In seeking to copy methods used by physical scientists, the original researchers in the social sciences sought to eradicate subjectivity from their work in order to preserve objectivity and thus develop universal laws (Lukes, 2000), a position that proved to be idealistic rather than one of understanding reality. However, it has been noted that there is a growing trend in research embodying realism (Steinmetz, 2004).

Subjectivity introduces a level of complexity that enables a more accurate representation of the real world to be developed (Lukes, 2000), but this level of realism is at the expense of relinquishing the idealistic aim of establishing laws within the social sciences (Steinmetz, 2004). Thus in recognising that cultural issues involve subjectivity, it must also be recognised that the material will reveal the breadth of experience rather than converge into overarching theories.

The recognition of the need to address subjectivity led to the development of phenomenology, a discipline that was rooted in the understanding that universal truths and assumptions should be questioned (Smith, 1998, pp.193–197; Woodruff Smith, 2008). Early phenomenologists believed that rigorous attempts to avoid subjectivity would enable the social scientist to unravel truths. It has since emerged that truth is an elusive concept, and at best the social scientist can hope to develop a perspective on an issue that can be justified (Smith, 1998, p.164). Phenomenologists, however, accepted the reality of perceptions and recognised that they were an intrinsic part of examining the social sciences (Waugh and Waugh, 2004; Abawi, 2012), rendering the philosophy ideal to underpin studies into public administration (Waugh and Waugh, 2004).

Of relevance to this research is that acceptance of perceptions involved contextualising phenomena in order to assess them alongside other events that could influence their perception (Waugh and Waugh, 2004), and it is argued that it should also involve developing an understanding of the workings of the conscious and unconscious mind (Woodruff Smith, 2008). Such understanding would enable the analyst to identify unconscious motives that caused phenomena, facilitating the identification of underlying issues (Mann, 1999; Woodruff Smith, 2008). Thus phenomenology is an appropriate philosophy to underpin research on the impact of culture, which, as established in the review of literature, involves the unconscious stimulus to act in specific ways.

Research rooted purely in phenomenology would seek to produce a vignette which by nature is highly descriptive of the observed events. Heidegger contributed the addition of hermeneutics, which conferred the ability to derive meaning for the elements in question from the whole, and similarly to derive meaning for the whole from the individual elements (Smith, 1998, p.161; Wilcke, 2002; Abawi, 2012). This philosophy clearly underpins the objective of understanding the relationships between the entities involved in paradigm change as well as seeking to understand the activities of local authorities in consideration of the prevailing culture. It is also seen to be a quality that is intrinsic to bricolage (Kincheloe, McLaren and Steinberg, 2011).

The philosophy of refractive phenomenology builds further on that of hermeneutic phenomenology by introducing the concept of considering a variety of types of evidence, including visual forms as well as the written or spoken

word (Abawi, 2012). It enables the researcher to examine complex systems in multiple ways that facilitate deeper understanding of the system in question (Abawi, 2012). Public administration is by character complex, with few theoretical frameworks to provide structure (Rhodes, 1991). Thus considering the variety of texts with which communication occurs could enable greater meaning to be distilled from the research, and could be a vehicle that helps to reveal the unconscious stimulus underpinning actions referred to by Woodruff Smith (2008).

This review of philosophies suggests that the concept of adopting a mixed methodology is considered to be acceptable at a philosophical level. A clear delineation is evident between the idealistic approach that develops normative universal truths and the realistic approach that seeks to understand reality that is bounded by a specific paradigm. Both of these approaches are relevant to this work. In seeking to develop a greater understanding of the agents of change and assessing the breadth of cultural difference that is relevant to sustainable development, the first element of this work will be adopting a normative approach. The subsequent examination of actions is best suited to refractive phenomenology.

3.6 The research approach

Alvesson and Deetz, professors in business administration and communication respectively, have written extensively on research methodology. They provide a useful guide to aligning research approaches with the purpose of the researcher, which is summarised in figure 3.4. Their argument will be summarised before the influence of their analysis on the potential choices for this research is discussed.

Alvesson and Deetz (2000, pp.24–28) recommend that proposed research be assessed in two dimensions. Firstly the purpose of the work should be considered. The research could be seeking either “dissensus” or “consensus”. If the object is to seek dissensus, the focus will be to enhance understanding by identifying a new way of interpreting evidence, with an underlying assumption that any order apparent within an argument is a result of suppression of the variety that really does exist. It is the identification of these assumptions that

shapes the resultant theory. Whilst it is not the primary intention, this approach can also reveal consensus.

Conversely, where the primary intention is to show consensus, the researcher looks for order. A characteristic of this approach is that anything that does not fit into the perceived order is either sidelined or made to appear of little importance. If disorder is too great to be brushed aside, then it is legitimised by a rule or new category. Thus dissensus and consensus are at opposite ends of a continuum.

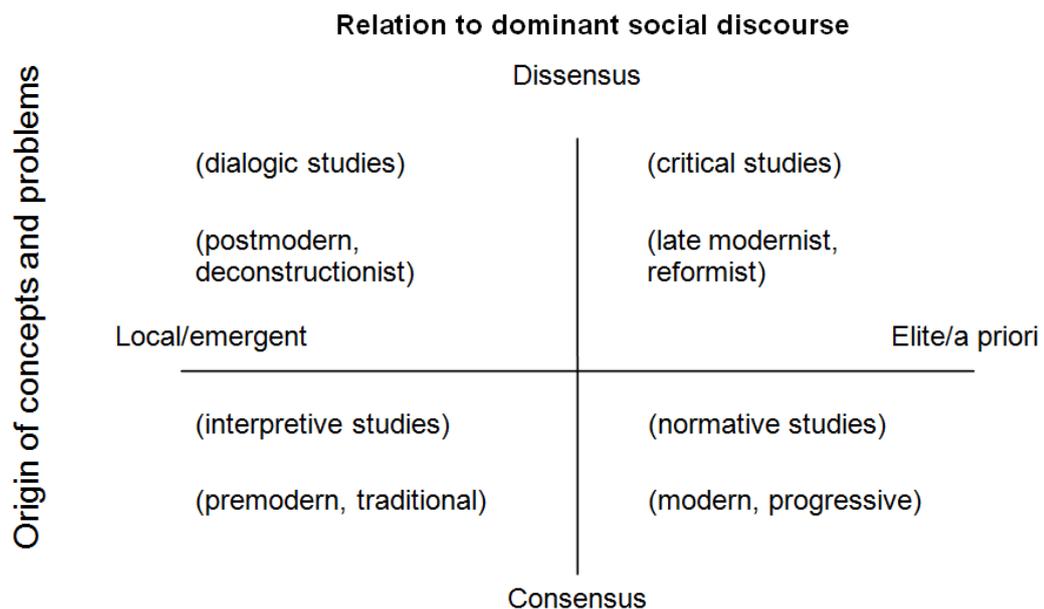


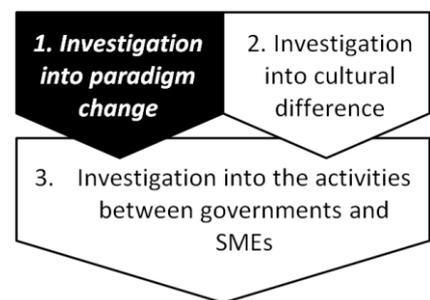
Figure 3.4: Contrast in dimensions from the meta-theory of representational practices (adapted from Deetz (1994) in Alvesson and Deetz (2000), p.24)

The other dimension that Alvesson and Deetz (2000, pp.28–31) consider relevant to the choice of any research approach relates to prior perceptions that might be held by the researcher. “Elite/a priori” describes a position whereby the researcher recognises existing theory and structures, which are carefully defined as understanding at the outset, and seeks to objectively build on to the body of knowledge and develop new theories. Conversely, the position they describe as “local/emergent” is situated at the other end of the continuum, and in this case the researcher approaches the task with no prior assumptions and seeks to question anything that would appear to be a structure or assumption. The objective of this style of research is to develop greater practical understanding rather than establish any universal “truth”.

Saunders, Lewis and Thornhill (2000, p.88) argue that the research approach should be founded on either deductive or inductive reasoning. Inductive reasoning is “bottom-up” and appropriate for the social sciences, being concerned with the context in which phenomena are observed. Whilst not seeking to create the meta-theory, Saunders, Lewis and Thornhill maintain that induction should lead to the development of understanding and meaning. Deductive reasoning, however, involves the creation of a hypothesis and subjecting it to rigorous testing to establish its validity (Saunders, Lewis and Thornhill, 2000, p.87).

3.6.1 The choice of approach for this research

Both inductive and deductive approaches will be used in this work. This is an expectation of bricolage, and its iterative nature facilitates integration of the two processes (Teddlie and Abbas, 2011, p.288).



The initial activity undertaken in this work, investigating the factors relating to paradigm change, is a normative study, where the focus is that of identifying patterns that can be generalised (Schultz and Leidner, 2002; Tronvoll et al, 2011) and depends largely on rational objectivity (Smith, 1998, p.72). Thus it will take a deductive approach with an underlying assumption of “all things being equal”. Whilst this is at variance with the proposition that culture creates variety, the purpose of this part of the work is to question whether there is a system that responds to intervention in a predictable manner. It is the intervention itself that is acknowledged to be diverse, not necessarily the underlying system.

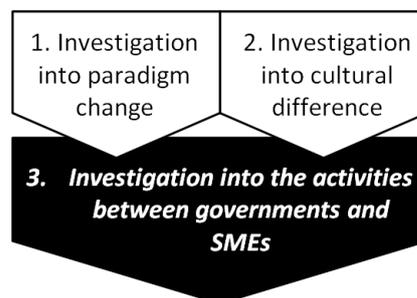
Similarly, the second activity, investigating the extent to which cultural difference within the developed world is relevant to sustainable development, is also building on established concepts. It is seeking to identify and describe difference that is pertinent to this study, and



create a benchmark against which to evaluate performance in the later stages of the work. Thus this small but important element of the work would be classified as critical and also normative.

The final part of this research falls into the region of “dissensus” because it is seeking to expose the extent of variety rather than prove similarity.

The work also fits the characterisation of the “local/emergent” end of the continuum rather than “elite/a priori”, because the research is seeking to identify activities situated in specific circumstances rather than develop a broad overarching theory. Thus the core focus of this research approach falls into the category of dialogic studies.



Dialogic studies stand up to the criticisms emanating from post-structuralist and deconstructionist schools of thought that undermine the credibility of more traditional research approaches depending on quantitative studies and the development of theories and laws. Post-structuralists and deconstructionists argue that observed events are influenced by their context to the point that there can be no replication. This leads to the belief that overarching meaning should not be the desired end of research (Schultz and Leidner, 2002; Ritchie and Lewis, 2003, p.9). This belief validates the credibility of this research, which is seeking to identify the breadth of experience rather than develop overarching theories. Only when variety of experience has been accounted for will it be possible to determine whether any generalisation can be drawn.

Whilst this work is also seeking to assess whether cultural difference could influence the experience, the review of literature identified the manner in which culture can change over time. Taken with the criticism that the passage of time is a contextual influence which would prevent the replication of phenomena, it is clear that caution is required in the identification of any patterns that might be observed.

In discounting the output of a deductive approach which would tend towards creating theories, it follows that an inductive approach is appropriate for the final part of this study. Only the initial activities of identifying the relationships between entities and identifying areas demonstrating cultural difference require

a deductive approach, because of the aim of producing a more generalised theory.

The situating of the final part of this research at the local/emergent end of the continuum relating to the research objectives, and the identification of an inductive approach, influence subsequent decisions. Typically research of this nature is qualitative because the richness and variety of the human experience is reduced when confined to statistical analysis (Saunders, Lewis and Thornhill, 2000, p.89; Tronvoll, 2011).

The types of information that quantitative research produces are naturally limited to those that stem from an examination of number, generally by showing how the value relates to variables such as trends, proportions, distributions or frequency of occurrence (Saunders, Lewis and Thornhill, 2000, pp.339–372). However, the purpose for the majority of this research is to identify variety that could be masked in the coding process. Quantitative methods are therefore not considered appropriate for the majority of this work. Statistical methods, however, will be employed to establish whether any cultural differences identified should be considered to be of note.

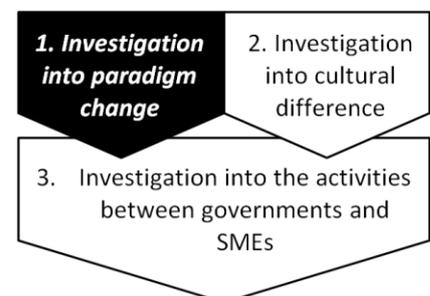
3.7 Investigation into paradigm change

3.7.1 Desired outcome

The aim of this part of the work is to develop understanding about the relationship between entities in order to assess whether or not they could be manipulated to stimulate a paradigm change. This will require consideration of the characteristics of the stakeholders involved.

3.7.2 Data

For this part of the work the approach will be that of secondary analysis of existing data (Irwin, 2013). The data for the first activity consequently exist in literature. This approach is accepted as a valid activity where quantitative work is concerned, but is not so common when the data concerned are qualitative (Heaton, 1998), where it is referred to as qualitative secondary analysis (Gladstone et al, 2007). Precedence for this approach can be found in the work of Böschen (2009), Gillard et al (2013) and Brown and Gillespie (2015).



An important characteristic of this approach is that the question being asked of the data is different to that posed in the original work (Heaton, 1998; Gladstone et al, 2007) and the effort that would have been required to obtain primary data is redirected to the process of restructuring the data to facilitate the new analysis (Kluwin and Morris, 2006). The secondary analysis of data is also shown to be an appropriate precursor to the application of the findings of further study undertaken by the researcher (Gladstone et al, 2007), which is its purpose in this work.

Kondratieff's revelation of long wave theory attracted discussion whereby theorists postulated about the content of the system. Of interest is the fact that the theory involved paradigm change, a core subject of interest in this work. The contributors to the discussion did little more than justify their opinion that the interrelated entities they identified should be included in the system, which, as they added each consideration, grew in complexity to include governments and society, as well as business and economic prudence.

The focus of Kondratieff's long wave theory, including subsidiary contributions from other theorists, is economic welfare. Paradigm change was part of the larger economic system. Economic welfare is not the focus of my work. I am using the same material to identify the components of paradigm change itself. Hence my use of literature as the data for this part of my work fits the criteria of secondary analysis of existing data.

Critics of secondary analysis of data primarily refer to ethical issues, specifically the risk to respondents and the style of permission given for the use of the data (Irwin, 2013). In this part of the work the original material consists of theoretical insight rather than the result of referring to a body of respondents and the criticism is therefore not pertinent to this thesis.

Similarly, using data produced by a third party could produce a flawed analysis because of a lack of understanding of the processes involved in gathering the data (Heaton, 1998; Irwin, 2013). Mauther et al (1998) caution against a "naively realistic position" that this can produce that could potentially undermine the quality of the resultant analysis. These criticisms do not apply to the investigation into paradigm change because it is based on the arguments of theorists at a conceptual level. To ensure that bias does not result, I undertake

a broader secondary research to facilitate a critique of the analysis as it is developed.

Critics of secondary data analysis also point to the ease with which the secondary analyst could obscure the originator of concepts emanating from analysis of the data (Heaton, 1998). This is more of a requirement of the reporting style than of the analysis itself. I have been careful to clearly attribute insights to their originator, using the first person when they are my own.

3.7.3 Research strategy

For this part of the research, a systems approach is adopted. This entails viewing the subject of study from a holistic perspective and gaining understanding through the systematic asking of questions. Relationships can be established at different levels within the system through the use of diagrammatic tools (Jackson, 2000).

A system is defined as “a complex of interacting elements” (Bertalanffy, 1968, p.7), and the review of literature has revealed that the change required in order to move towards sustainability is a highly complex issue, involving action that is influenced by culture and behaviour, as well as decision making on behalf of both individuals and governments.

These entities are interdependent. For instance, if economic prosperity is not achieved, then the ability for social objectives to be attained is further jeopardised, and culture permeates the entire system.

Systems analysis is an appropriate choice, because one of its core strengths lies in its ability to address complex and poorly defined situations in a manner that facilitates the development of understanding of relationships, causal effects and interdependencies at a holistic level (Bertalanffy, 1968, p.7; Seiler and Kowalsky, 2011). It involves the employment of diagrammatic tools that aid the development of a deeper understanding of the system in question (Bertalanffy, 1968; Flood and Jackson, 1991). One strength is that it enables the development of models that facilitate the identification of potential intervention points as well as predicting the potential impact of intervention (Jackson, 2000).

In seeking to develop understanding of the manner in which a system operates, it could be argued that systems analysis works towards consensus. This could

be perceived to be problematic because consensus and dissensus are two ends of a continuum. However, any overarching theory established will be at a holistic level. What is sought is the breadth of experience along with a general set of principles that can be seen to operate, in order to identify the realms of possibility.

The choice of a systems method is in part dictated by the complex interrelated nature of the data which are framed within the approach. Another approach that deserves consideration for the development of theory from observed events is that of grounded theory. However, this is not optimal for the data that are to be used. Grounded theory includes rigorous processes that are used to develop theories that challenge existing understanding and in doing so would include redundant activities and outcomes.

Core to grounded theory is its inductive approach whereby the theory emerges from the process (Matavire and Brown, 2013). This work, however, is seeking to understand the components of an established theory in order to identify relationships between its component parts and the principles that govern the system, and to establish and question whether they can be manipulated. This is not a natural outcome of grounded theory, but systems analysis lends itself to the process and, indeed, the extent to which it is a good fit renders it a more appropriate approach.

A precedent for using a systems approach has been set by other researchers seeking to understand the dynamics of a complex situation, including the Club of Rome (Flanagan et al, 2012; Furtado, 2012). The book *The Limits to Growth* published the results of a significant piece of research into the carrying capacity of the earth based on a systems analysis conducted by Dennis Meadows, a professor in systems (Meadows, Randers and Meadows, 2006; Flanagan et al, 2012). Systems theory has also been used to investigate stakeholder theory (Emerson, Alves and Raposo, 2011).

The investigation into paradigm change starts with reviewing the work of Kondratieff, who identified its association with the cyclical nature of economic prosperity and recession. Kondratieff and subsequent theorists saw the interrelated pattern of events as a system and their work related to identifying its components. Thus it has already been established that the material lends itself

to a systems approach. These theorists focus on economic change and paradigm change is seen to be part of the system. This analysis will model the system and then change the focus to paradigm change itself.

Systems analysis traditionally falls into the school of hard systems or soft systems (Flood and Jackson, 1991). The hard approach is suited to systems with mechanistic qualities and facilitates establishing optimal performances (Checkland, 1985) and is ideal for issues that can be reduced to mathematical models (Kirk, 1995). Checkland developed a complementary soft systems approach that was touted as more appropriate for the analysis of problematic situations that could include irrational action (Checkland, 1985). Its strength lies in its ability to handle fuzzy qualities, which is more appropriate to much of the lived experience (Kirk, 1995).

Soft systems were criticised for being inadequate in the following respects:

- The analysis of situations where there were power imbalances (Flood and Jackson, 1991, p.4).
- Explaining how opinions are formed (Schechter, 1991, p.216).
- Examining the role of social influences (Schechter, 1991, p.216).
- Developing a robust interpretive systems methodology (Schechter, 1991, p.217).

Checkland's methodology has been criticised for being a tool used in the management of businesses in that it reflects personal understanding and is therefore highly subjective and useful for mapping and demonstrating ideas rather than facilitating a more objective overview (Thomas and Lockett, 1979, p.99). This in part is more of a critique on its usage than on its usefulness.

The seven steps to a soft systems approach (Jackson, 2000) are tabulated in table 3.1 below along with the manner in which they fit in this thesis.

Table 3.1: The fit of soft systems methodology with the elements of this thesis

Stage	Application in this thesis
Identification of the problematic situation	Introduction The discussion of paradigm change in section 2.5.2
Explanation of the problem	Revealed throughout the literature review
Components of the system defined	Reference to the theories relating to Kondratieff's waves preceding the development of models in chapter 4
Development of conceptual models	Carried out in stages throughout the first part of chapter 4

Comparison of the models and the real world	Undertaken in chapters 6 to 10, examining the relationship between local authorities and SMEs
Models refined in the light of comparison	This iterative step is undertaken in chapter 11
Appropriate action identified	This was not the purpose of the development of the model. The aim was to develop and test the model

3.7.4 Required transformation

I will take the individual contributions and develop influence diagrams that build into a holistic view of the entire system. Once this full view is obtained, further manipulations will be undertaken:

1. A multiple cause diagram will be developed, mapping the change mechanisms in place that can lead to paradigm change.
2. Any feedback loops will be identified. These can either be self-regulating or be virtuous/vicious circles. It is important to identify this characteristic because it dictates the impact of change. This is undertaken through the use of sign graphs.
3. The power of the entities involved should be investigated. This has already been considered in section 2.6.3 of the literature and will be applied to the system in order to identify further the scope and locus of effective change.

3.7.5 The systems approach as part of bricolage

Ulrich (1988) developed a critical systems methodology that took the shortcomings of systems analysis into account. He considered it necessary to take the following steps:

- Identify the limitations of the tools being used.
- Identify the assumptions adopted when using the tools.
- Recognise the subjective nature of the tool.
 - Seek to balance subjectivity by using multiple sources of information.
- Identify the normative constraints of the set of tools used.
- Debate the conclusions.

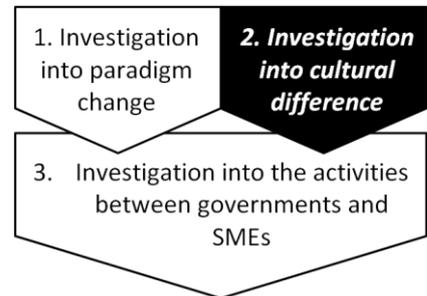
A more fundamental limitation of systems analysis is that it can only accommodate issues that belong to a system and is thus not comprehensive (Ulrich, 1988). Ulrich's advice to debate findings is an appropriate remedy for this shortcoming and it would suggest that this multimethodological approach is

itself a potential solution. This suggests that using a systems approach as one strand of bricolage is accepted practice, and where systems analysis is used, a multimethodology becomes a necessity.

3.8 Identification of cultural difference

3.8.1 Desired outcome

This part of the research seeks to identify the extent to which cultures vary in terms of their influence on the manner in which sustainable development is addressed and to substantiate the differences in terms of the types of behaviours that they influence. The approach is descriptive statistics.



3.8.2 Data

This part of the work also involves secondary analysis of data as discussed in section 3.7.2. The nature of the data is fundamentally different, involving responses to questionnaires and quantitative data, and precedence can be found in the work of Bottomley and Hoden (2001), Van Wave and Decker (2003) and Dawson and Henley (2012).

As with my research into paradigm change, the work undertaken in this part of my research is a necessary precursor to the principal focus of the investigation, in this case facilitating the selection of a purposive sample of case studies and subsequent evaluation of behaviours. Whereas the initial research undertaken was to establish measures with which to rank the cultural characteristics of a nation, my work focusses on collating a comparative measure using a different framework. The responses to the criticisms of the approach also differ from those provided in section 3.7.2.

1. The ethical need where use of data was concerned. This argument was raised in the context of research into health-related topics, where there is a need for privacy and a greater likelihood that a sensitive subject matter is involved, creating a critical need for it to be impossible to trace the findings back to the respondent (Mauther et al, 1998; Gladstone, Volpe, and Boydell, 2007). The data I used have all been published, the subject matter is not as sensitive as that of health, and there is no evidence of the identity of the respondents.

2. A lack of understanding relating to the processes used could produce flawed results (Heaton, 1998; Irwin, 2013). The data have been developed from the use of questionnaire rather than interview. This is an important consideration because the resultant conclusions are not so dependent on the perspective of the analyst and data are more likely to be complete. The data that I have used have been published along with a description of the underlying concepts being tested.

There is no description regarding the weight given to different elements of the research. For this reason I have tested different weights and cross-checked my findings with those of other researchers.

Four large-scale works on national culture have been undertaken, each producing profiles of nations delineated by characteristics that are measured along dimensions such as masculine/feminine. These studies, undertaken by Klukhohn and Strodbeck, by Hofstede, by a team led by House (the GLOBE) and by Hampden-Turner and Trompenaars, were conducted between 1960 and 2004. Hofstede has subsequently reviewed his work and determined that in many respects, little has changed over time (Hofstede, Hofstede and Minkov, 2010).

Most appropriate for this work is that of Hampden-Turner and Trompenaars.

There are three reasons:

- In addition to measuring specific dimensions, it includes an assessment of the manner in which nations relate to the future, a critical characteristic underpinning sustainable development, along with an identification of the extent to which the culture includes a stated aim to care for the environment (Hampden-Turner and Trompenaars, 1994).
- In contrast to the publication of Hofstede, where only the final performance and rank of countries is provided, Hampden-Turner and Trompenaars provide many more data, enabling examination of subsets of their dimensions.
- Hampden-Turner and Trompenaars use a much broader-ranging assessment tool, providing a finer delineation between the cultural behaviours.

A meta-analysis undertaken by Caprar and Neville (2012), reviewing findings from research into the impact of culture, showed that some cultural characteristics had no bearing on the extent to which sustainable development was promoted. This is a useful starting point. Most of the research referred to had been conducted using the frameworks provided by Hofstede and the GLOBE. This part of my work facilitates establishing the extent of difference between the cultures of countries along with the dimensions of the characteristics that influence their ability to move towards sustainability.

3.8.3 Research approach

The investigation into cultural difference requires a more statistical approach. This is because rank order is insufficient in determining the degree of difference between countries. There needs to be consideration of the range of difference in order to demonstrate that cultural difference is sufficiently significant. This entails:

1. **Summarising the relationship** between specific dimensions of culture and associated behaviours towards the environment through collating the data provided by Caprar and Neville (2012).
2. **Correlating the cultural dimensions** referred to in the research identified by Caprar and Neville with associated classifications and indicators established by Hampden-Turner and Trompenaars. There is not an exact match for all of the dimensions referred to. This means it will be necessary to examine the elements of the cultural dimension in question and identify appropriate elements from those in Hampden-Turner and Trompenaars' work to use as a substitute. The outcome of this section is an identification of the range of characteristics that influence specific actions.
3. **Identifying cultural difference** in the context of the dimensions that influence sustainable development.
 - a. Using the data published by Hampden-Turner and Trompenaars in both their publications *The Seven Cultures of Capitalism* (1994) and *Riding the Waves of Culture: Understanding Cultural Diversity in Business* (1997), the responses will be classified by quartiles.

The nature of dimensions is influential in believing that the classification of data by quartile is acceptable. The dimensions are generally a continuum between two opposing characteristics and are commonly appended with the terms “high” or “low” to indicate the characteristic demonstrated by a nation. In the GLOBE study, the nations were grouped into four bands, which would differentiate between a high and low tendency towards both ends of the continuum. This has therefore been considered an appropriate degree of attention for this study.

- b. Collating the responses given in order to reveal the national profiles for each relevant dimension.
- c. Clustering the relevant dimensions of national profiles in order to reveal the extent to which the country displays cultural characteristics that potentially support specific actions.

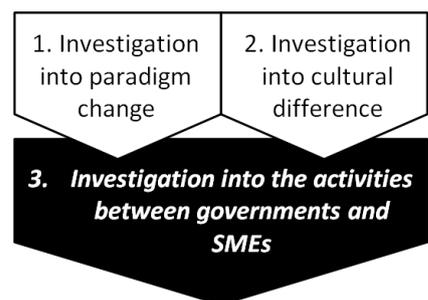
The findings from this element of the work will enable benchmarks to be developed relating to national behaviours against which to compare behaviours. The findings will also be used to identify a sample that will be tested.

Details relating to the manner in which missing data have been imputed are provided in chapter 4.

3.9 Investigation into the activities between governments and SMEs

3.9.1 Desired outcome

This final element of the research involves the development of case studies with the purpose of testing the findings of the investigation into cultural difference. This will focus on developing an understanding of the impact of culture on the activities undertaken by governments that assist SMEs in overcoming the hurdles of sustainable development. This includes necessary background such as the government structure and consideration of the cultural characteristics of the nation. This understanding is then used as a basis of comparison with a view to finding out the extent to which cultural issues influence sustainable development.



3.9.2 Research approach

In the general review of research approaches, it was argued that, in seeking to expose behaviours rather than draw conclusive theories, this work is situated under the classification of dissensus. Whilst recognised theory relating to culture underpins some of the work, there is also a recognition that as yet theory relating to its impact on sustainable development is largely unexplored, hence this work tends towards the “local/emergent” sector. According to Alvesson and Deetz (2000, pp.28–31) it follows that this study will tend towards the dialogic.

A range of strategies exist that are appropriate for dialogic studies, and the nature of bricolage is such that a variety can be blended together. One of the more common approaches to qualitative research is case study (Stake, 1992, p.134). However, Stake argues that this is not a choice of methodology, rather a choice of subject. A range of methodologies can be used to develop the selected case.

The complex nature of sustainable development, and the need to investigate not only the impact of culture but also political choice, means that the cases are developed to different levels. It is possible to ask more questions when studying events in England than it is when studying those of other nations where English is not the native language. This is because the data that are available and accessible are significantly different. It is also wrong to assume that the different subjects of study will produce comparable data. The strength of bricolage is that it allows the researcher to be sufficiently flexible to gain maximum learning from the available data.

3.9.3 Justification for electing to develop case studies rather than to concentrate purely on an alternative approach

A summary of commonly used methods is provided in table 3.2 and this reveals the extent to which case study, whereby a detailed examination is made of a limited number of cases linked by a common theme, is the approach that best meets the requirements of this research. These methods range from discourse analysis to ethnography. In that this is seeking to establish dissensus, approaches that work towards developing overarching theories are not appropriate. Therefore grounded theory, an approach that seeks to develop

theory from observed events (Strauss and Corbin, 1989, p.160), is not considered.

It has been argued that any research that involves observation includes elements of ethnography (Denzin and Lincoln, 1998, p.111). However, this relates more to the unstructured nature of ethnography than to mixing methodologies. Typically, ethnography involves observation over a period of time that enables the researcher to draw a verbal picture of the phenomena being observed. There is no effort to draw overarching theories and in this respect it is appropriate for the dissensus nature of this work. However, the discipline demands becoming a participant in the arena of observation (Tedlock, 2003; Zikmund et al, 2013) and results in a very limited number of events that are observed, whereas this research is seeking to establish a broad understanding at a holistic level rather than the depth that ethnography is more suited to.

Table 3.2: A summary of the useful application of different approaches

Method	Characteristic	S/W ¹	Comment
Grounded theory	Iterations of analysis and data collection that lead to the development of theory	W	The paradigm of dissensus underpinning this research does not seek convergence into theory
Case study	Good for developing understanding of phenomena contextualised by its environment	S	This thesis seeks understanding contextualised by culture; a good fit
	Goes beyond the descriptive, addressing causal relationships and motivations	S	
Discourse analysis	Analysis of text in order to establish underlying motivations and characteristics	S	Outcomes are a good fit
	The need to analyse the native language	W	Language is a barrier
Ethnography	Participant observation that is good for exposing phenomena rather than testing hypotheses	S	A good fit
	A very limited sample base	W	Would not facilitate the required breadth

Discourse analysis involves the analysis of text emanating from the subject of research in order to identify underlying motivations and priorities from its structure, including the use of rhetoric (Norris, 1991). Regardless of the debate between structuralists and post-structuralists relating to the nature of the

¹ S/W indicates strengths or weaknesses with respect to aligning with the demands of this research.

analysis, the demand of studying the original language places this approach beyond the scope of the researcher.

The case study approach is particularly appropriate for this research because of the intention to identify the existence of phenomena rather than their prevalence. Bromley identifies the motivation of conducting a case study as “the desire to derive a(n) (up-)close or otherwise in-depth understanding of a single small number of cases set in their real world contexts” (Yin, 2012, pp.4–5), echoing the motivation of this thesis.

It is also appreciated that the case study approach reveals deeper understanding about behaviours contextualised by the locus of the case study (Yin, 2009, pp.3–18; Yin, 2012, p.4) and is suited to the demands of developing new insights and theories (Meredith, 1998). This is the very outcome sought, because it is the different contexts created by national culture that are of critical interest to this thesis, and the case study is instrumental in identifying these (Silverman, 2005, p.127).

Yin argues that case studies are an appropriate choice when seeking description or explanation of phenomena, and the real world context ensures that the complexity experienced in real life is embodied in the case study more so than in an experimental approach that seeks to isolate variables (Yin, 2009, pp.3–18; Yin, 2012, p.4).

The first design question about the approach relates to the number of case studies involved. Case studies take four forms; they can focus on single cases or multiple cases, and both of these variants can be holistic or contain multiple units embedded within the analysis (Yin, 2009, p.46). In that this thesis is seeking to identify whether culture is influential, it will be necessary to concentrate on more than one case study. Thus the single case study variant is not appropriate.

Multiple case studies are considered to be a more rigorous approach because they can be used to validate the findings within each other (Yin, 2009, p.53). Random selection of countries is not appropriate because the purpose of this thesis is to identify the extent to which culture is influential. This means undertaking purposive sampling (Silverman, 2005, p.129), namely selecting countries that have overtly different cultures. However, validation will not be

achieved by simply choosing two countries at opposite ends of a continuum. The choice of country will need to consider the spread of cultural characteristics with care.

Whilst the choice of two countries is insufficient, there is a need to constrain the total number of countries included in the selection to ensure that sufficient attention can be given to the development of comprehensive case studies. It is therefore believed that four countries will provide sufficient variation and correlation of characteristics. Yin argues that where a limited number of case studies reveal predictable behaviours then it is reasonable to suppose that the prediction emanated from a robust theoretical framework. Whilst four countries are sufficient to suggest grounds for accepting or rejecting the concept of cultural influence in sustainable development initiatives, further examination will be required in subsequent studies of other cases.

The other characteristic of the case study approach to be identified is that of whether each case study takes a holistic view, or contains subsets with an examination of different areas of interest within the case study. Of necessity, the case studies developed in this thesis contain embedded case studies. These are necessary in order to provide a full basis of comparison.

The nature of the case study approach supports the desirable characteristics for the majority of this work already outlined. Indeed, Lewis and Ritchie (2003, p.52) summarise the approach's critical features as follows:

- Focus is maintained on a limited number of cases.
- Case study development should be rigorous, attending to details.
- The context is embedded in the study.
- Data collection can be varied and multiple.

The use of multiple case studies enables the gathering of different perspectives that enrich the understanding that can be gained.

I believe that development of the four case studies is sufficient to contribute significant findings to literature. Whereas previous literature has established a link between cultural dimensions and behaviours, the case studies will provide substance at a level not previously achieved. In addition, these case studies facilitate the introduction of considering the influence of politics and behaviour

along with culture when assessing the role of culture. This is an important consideration because, whereas cultures change slowly over time, it is feasible to suggest that significant governmental choices can be made in the short term.

3.9.4 Case study development data and approaches

It has been established that the empirical work for this thesis will involve the development of four case studies, purposively selected to ensure that this sample embodies appropriate cultural difference and similarity. Each case study will consist of the following elements:

An overview of the nation

In order to situate the case study, the first section is a brief summary of the nation and its people, including geographic and economic constraints as well as population size and density.

An explanation of the political scene and governmental structure

Using data provided by the United Nations and the OECD, this relatively short descriptive section is necessary in order to contextualise government action.

A description of government support for SMEs in the quest for sustainable development

This section forms the heart of the case studies. Data collection varies through necessity, in part because of the language barrier, but also because of the diversity in governmental approaches. The data are obtained from United Nations and OECD reports and from reports created by the nations themselves and sustainable development groups. In addition, the activities carried out in the United Kingdom are identified through the use of direct observation and physical artefacts, namely support pages provided on the web.

This element of the case study is largely descriptive, although its creation involved three analytical processes described by Yin (2009, pp.127–166; 2012, pp.15–17) and explained below. The aim was to create a comparable case study from data that contain different levels of detail and are constrained by language.

1. Pattern matching. As the case studies are developed, so trends start to become evident. These are within case studies where a dominant characteristic

is seen to govern behaviours. Each case study is developed around the same framework, enabling patterns between them to emerge.

2. Explanation building. Stemming from the first exercise, relationships between the evident patterns and the subsets within the case study are used to suggest reasons for the evident action.

3. Cross case study analysis. The findings from the four case studies are compared and an attempt to map the findings to a cultural framework will be made.

An assessment of progress

Using data from the UN, the extent to which each country has managed to achieve its targets under the Kyoto protocol and in effect moved towards a sustainable position will be assessed.

3.9.5 Completeness

Yin (2009, p.186) states that to be considered rigorous, a case study must demonstrate that it is complete. I have made every effort to ensure that nothing has been omitted, and have included a control study in order to test alternative drivers of change against a common cultural backdrop. This subsidiary case study focusses on London at local authority level using a sample selected to ensure that a variety of factors that could influence outcomes are included.

Every local authority in London within the sample has been examined from the perspective of the manager of an SME seeking support. Firstly the local authority webpages were visited, and secondly a general Internet search was undertaken to find material that could not be found through following links and search engines within the local authority's pages. Thus every effort was taken to ensure that all activities were identified.

The material relating to Japan, Denmark and Sweden again focussed principally on their capital cities, starting with their local authority webpages. However, when investigating their activities involved actions within other regions, these were also registered in the database. Because the language barrier prevented the same level of detail in the research, further web searches were undertaken in order to reveal other sources of information. Research was only considered complete when searches revealed nothing new.

3.10 Drawing the threads together

Having produced the case studies, there is a need to situate the findings against the findings of the first two stages of this research. The case studies should reveal evidence that the scope, constraints and drivers of change that are identified in the systems analysis have been accurately mapped. Similarly, the activities undertaken are compared with the cultural characteristics that have been determined in chapter 5 and described in section 3.8. This will facilitate appreciation of the extent to which culture can be considered to be influential in driving action that supports sustainable development.

3.10.1 Time horizons

Most of the material in the case studies presents a cross-sectional perspective. However, in assessing capabilities of the nation, reference to historical development will be made. This is because a snapshot in time will not be sufficient to explain some of the differences or similarities observed, and thus there will be reference to prior events which could prove to be significant in assessing the impact of factors shaping current activities.

3.10.2 Data gathering

The source of many of the data for this research has already been established. The principal data set that will undergo secondary quantitative analysis is that of the OECD. Klewin and Morris (2006) justify such action because it gives access to a body of data that is both larger and more robust than I could gather independently. The rest of the data are from government websites and reports, and where these do not appear to provide the desired detail I resort to searches using Google to check that nothing has been missed.

3.10.3 Limitations

Research is rarely complete. The greatest limitation with this work is the reliance on national cultures that were identified some 15 to 20 years ago, and it is established that cultures change over time. However, updated versions of the work have been used (Hofstede, Hofstede and Minkov, 2010) and research as recent as 2012 (George, Owoyemi and Onakala) confirms that culture only changes very slowly over time. There is evidence that the national cultures identified in these studies are still associated with specific styles of action.

This is accommodated in the analysis which includes reference to reported stimulus for change and, with each nation, considers the time at which sustainable development became a subject of interest. Efforts are also made to establish whether observed actions suggest the cultural characteristic is still dominant.

The language barrier prevents access to the same level of documents in all countries, but this will be addressed by ensuring that extensive research for other sources is undertaken.

The data relating to culture that have been used for the investigation into the breadth of cultural difference are somewhat limited. However, this research is seeking to identify extremes and trends that should be apparent with this limited dataset, and conclusions will bear this in mind.

The nature of the data used has provided a rich picture of the extent of activity undertaken. However, there is no attempt to consult participants. I considered this approach to be the more robust because actions provide tangible evidence which substantiates research at this breadth. Interview would be too individual to inform research of this holistic nature.

It has not been possible to create parallel case studies in which the same level of investigation has occurred for each one, because material that had been published by the Danish government at the outset was removed by the time the case study was finalised. Alternative sources of material were found, including documents prepared by the OECD and the European government. However, this has not impeded the ability to develop a case study using the same framework as that used for the other countries and draw conclusions that can be substantiated by the data.

3.11 Conclusion

It has been argued that the change required in order to achieve sustainability is that of a change of paradigm, but the review of literature indicated that a change of this magnitude is only likely to occur following a trauma. However, some nations claim to have made greater progress than others. This thesis is thus addressing a multidisciplinary topic involving complexity and diversity.

I have shown that a mixed methodology is appropriate, which in summary involves a systems analysis of issues surrounding paradigm change and an analysis of cultural difference in order to identify the spread of difference with respect to environmental management. In order to identify and deepen understanding of the factors that influence this variety, case studies of nations that are significantly different will be developed. The case studies will be developed through the use of both primary and secondary data, including a variety of perspectives, in order to develop detailed vignettes.

Chapter 4. Understanding Paradigm Change

Together with chapter 5, this chapter provides a basis for chapters 6 to 10 in which case studies of four nations are developed. In this chapter I use systems analysis to expose the components and dynamics of paradigm change. In chapter 5 I explain how I selected these nations based on their cultural difference identified in the initial sections of the chapter. These strands of research are brought together in chapter 11, where the findings of the four case studies are compared and contrasted with the intent of ascertaining the influence of the cultural characteristics established in the first half of chapter 5. This will facilitate validation and revision of the work undertaken in this chapter, developing a greater understanding of the process of paradigm change with the consideration of the impact of culture.

Underpinning the work in this chapter is a need to understand the mechanisms that cause paradigm change, a subject that has received attention from a holistic viewpoint in considering whether societies are socially constructed or subject to technological determinism, but has received much less attention at the detail level of identifying the causal factors and the characteristics of the entities involved.

In the first section of this chapter, I explain the methodology of systems thinking including the use of associated tools. I then bring together current understanding of the system in which paradigm change is seen to reside with characteristics of the entities involved viewed from a business perspective. The system that will be examined is established in long wave theory initially established by Kondratieff and subsequently debated and refined by theorists.

In both this and the following chapter I use the theories and subsequent discussions in literature itself as the data. My contribution is the manipulation of the data to produce new understanding, the process being referred to as secondary analysis (Heaton, 1998; Irwin, 2013). A full explanation of the process and the extent to which it is a good fit for my purposes was provided in section 3.7 of the methodology.

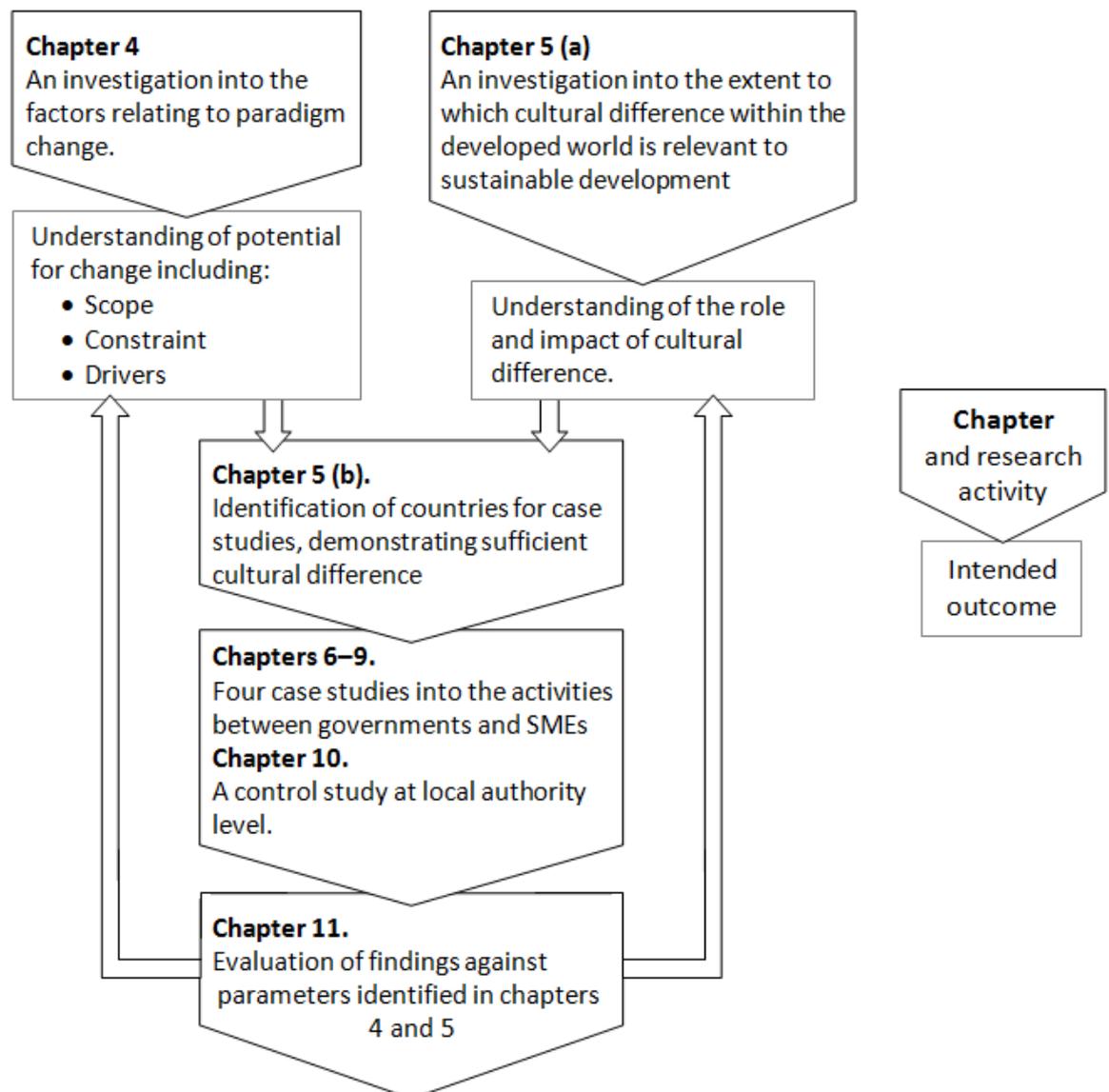


Figure 4.1: The structure of the remaining research

4.1 An overview of systems thinking

The strength of systems thinking is that it enables the analyst to visualise mental constructs, relationships and structures in a way that aligns more closely with the fuzzy reality of life than is facilitated by using just words (Checkland, 1985; Kirk, 1995). It allows examination of complex issues from different perspectives and also from different levels of holism, enabling relationships and trends that would not otherwise be noted to emerge (Checkland, 1985; Jackson, 2009).

Systems are dynamic, and it is important for the analyst to be able to identify the manner in which they change over time. This can be achieved through the examination of feedback loops that may become evident through the course of analysis (Sterman, 2000).

4.1.1 Oscillation

One of the more common manners in which systems behave is oscillation. As with the business cycle, performance is seen to swing between two different modes of behaviour, and this is caused when there are negative feedback loops that appear to over-correct swings in behaviour (Sterman, 2000).

4.1.2 Virtuous and vicious circles

Where there is a positive feedback loop, there is no element within the feedback loop that will control swings in behaviour. Unless there is intervention, this results in the systems remaining on a given trajectory which can either continually improve, creating a virtuous circle, or deteriorate in a vicious circle (Sterman, 2000; Dickson, Farris and Verbeke, 2001).

4.2 Systems thinking tools

There are two stages in using systems thinking tools. The first and most critical is that of developing the maps and models. Once developed, the models can be used to assess the outcome of intervention in the system (Sterman, 2000). The process relies on the relative placement of components on a map, supported in some cases by arrows and the inclusion of boundaries. There are different types of map that lend themselves to specific forms of analysis and are deemed appropriate for application in a wide range of disciplines, including that of policy making (Sterman, 2000). This work relies on just four.

4.2.1 The systems map

The systems map is fundamental to systems thinking. It enables identification of the elements of a system, which are positioned in the map in a considered way. The map typically consists of the names of the elements within oval frames, surrounded by a boundary. The oval frame is symbolically relevant, because it denotes a lack of structure that would have been imposed had a rectangular frame been used.

The elements of the system are positioned in a systems map so that relationships are evident. This is done through three devices:

1. Subsystems can be created with elements nested inside each other.
2. Interconnectivity is represented by overlapping elements.
3. The positioning of the boundary identifies the components of the system.

The decision as to whether an element should be placed within a boundary or in its environment is made on the basis of whether the element affects the system and/or is influenced by it. This results in a structure that can be justified, because positioning of the boundary is based on objective considerations.

The process of creating the systems map is informative because it involves questioning the position of each element within the map. This helps provide further understanding about the relationships within the system (Sterman, 2000, p.36). Elements within the environment that affect the system are kept outside the boundary. They are retained because it is important to recognise their existence.

4.2.2 The influence diagram

The influence diagram is an extension of the systems map. Here arrows are added that signify the fact that one component of the map affects another. The strength of the arrows can symbolise the strength of the relationship.

There are two types of arrow. A single-headed arrow demonstrates that the relationship flows in the direction of the arrow. A double-headed arrow indicates that the same force works both ways between the elements. Where two components exert different pressures on each other, two single-headed arrows are used. The arrows can be labelled with the kind of force that is exerted (Sterman, 2000).

4.2.3 The multiple cause diagram

The multiple cause diagram is a variation of the influence diagram. Here the phenomenon in question is placed in the centre of the diagram, and the analyst systematically asks, "What causes this?" and places the causes around the phenomenon. The question is asked again of each of the causes, and the process is systematically continued until all events that contribute to the outcome are mapped into the diagram.

Once the initial diagram is created, the analyst looks for further linkages to ensure that the end result is an accurate representation of the system including feedback loops. The analyst can identify the significance of the elements within the diagram by systematically assessing whether each one is necessary or sufficient to cause the end outcome.

4.2.4 The sign graph

This is a development of the multiple cause diagram and is best used where a feedback loop is identified. The analyst must identify the nature of each link in the feedback loop by assessing whether there is a negative or positive correlation. These are signified by a plus or minus sign against the arrow. When the diagram is complete, the self-correcting feedback loop would be seen to have an even number of negative signs, and one that would need correcting through intervention would have an odd number. This is one of the more useful diagrams for the policy maker because the results of intervention can be assessed from it (Sterman, 2000).

Using first a systems map in order to identify the initial structure of Kondratieff's theory, I explore the nature of the system by developing influence diagrams that are expanded as each contribution to the theory is explored. Following this, a multiple cause diagram is developed and the nature of the feedback loop explored through the use of a sign graph. Once the nature of the system is fully identified, the final influence diagram is used to identify the scope of action available to governments.

4.3 Understanding paradigm change

In the next section of this chapter (adapted from Sandland, 2009) I examine theory embodying paradigm change in order to understand the entities involved and the relationships between them. A systems approach has been adopted because it involves ascertaining all of the components of a problem and facilitates consideration of the relationships between them to develop an understanding of causal chains. Consequently potential drivers of change are identified as well as the potential impact of change in any one element. It produces models which facilitate the testing of the impact of change, importantly accommodating the qualitative nature of the material.

Essential to systems development is the identification of assumptions that are made when developing the models. The principal assumption made in this analysis is that the theorists have established validity for their contributions to the discussion. Reference to the observations of subsequent discussion about the theory has helped me to ensure that this is the case. It is also recognised

that in referring to business activity, Kondratieff ignored the “not for profit” sector.

In the introduction to this thesis I argued that numerous factors including technology and society are involved in change. In the literature review, I included a discussion about the contribution made by Kondratieff. His observations have been developed into what is now referred to as long wave theory, which has been largely overshadowed by economic theory concentrating on short- and medium-term cycles (O’Hara, 1994; Silverberg and Verspagen, 2003). Thus much of the literature relating to long waves is dated. It is, however, considered of relevance to this thesis because it facilitates understanding the components of change in the order of magnitude that is required to move into a sustainable trajectory.

Kondratieff and the subsequent long wave theorists recognised that paradigm change was part of a system, but did not focus their work on identifying whether paradigm change could be manipulated. The purpose of my work in this section is to try to identify the extent to which any entity or group of entities is both necessary and sufficient to stimulate change in a desired direction, and introduce greater understanding of their impact from a business perspective.

4.3.1 Long waves and paradigm change

The dynamics and entities associated with paradigmatic change that were observed by Kondratieff were discussed in section 2.5.2 of the critical review of literature. In the following sections I briefly outline the theories that have been put forward contributing to the development of a clear view of long wave theory. Each theorist concentrated on a different element of the entire system, adding more insight to the working of the system and developing the theory into an interdisciplinary topic. In order to aid comprehension of the system, I will take a similar route, adding elements of the system one at a time. It should be noted that the system should not be critiqued until the process is completed, because only then will all the entities concerned be considered.

Systems analysis tools, namely system maps, influence diagrams, a multiple cause diagram and a sign graph, are developed in order to establish the relationships and mechanisms involved. These are reviewed in stages in order to ensure that a clear understanding of each subsystem is achieved.

Kondratieff observed that there was a correlation between cycles of innovation and business cycles, against which social trauma and changes to the locus of economic strength could be mapped (Freeman and Perez, 1988) (summarised in table 4.1 and represented in figure 4.2).

Table 4.1: Kondratieff's observations

Kondratieff's observation	Source
Economic cycles driven by business cycles	Freeman and Perez, 1988
A clustering of activities	
Innovation triggering investment	Dosi et al, 1988
New production systems leading to economies in processes fuelling recession	Tarascio, 1998
The downturn invariably includes pressure on agriculture and the deepest part of the recession can trigger wars and revolutions	O'Hara, 1994
The upturn could take place in a different country	Fisher, 1998

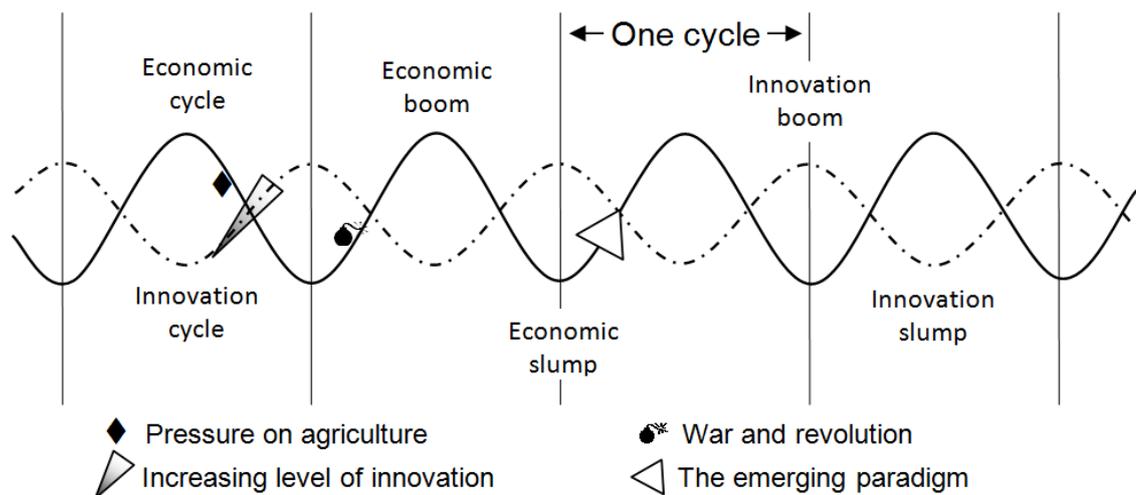


Figure 4.2: Schematic representation of Kondratieff's observations

In successive economic cycles, Kondratieff observed a clustering of innovation which he believed attracted investment fuelling an economic boom. This was followed by moves to improve efficiency in the production system, which triggered the start of recession, ultimately causing social trauma as nations competed for resources needed for survival (Tarascio, 1998). The centre of growth for each upswing could be a different country because the most prosperous were likely to suffer the greatest in a collapse and be unable to re-emerge with their former strength (Fisher, 1998).

It is interesting to note that the theorists who contributed to this discussion in the late 1980s were responding to a period of “economic malaise” that lasted through the 1970s and '80s (Sterman, 1986) triggered by the recession of 1973. The pattern continues to hold true as the latest recession started nearly 35 years later with the financial crisis of 2007–2009 and the further characteristics of an economic slump that is felt worldwide accompanied by both war and innovation (Allianz, 2010).

4.4 The impact of innovation in the economic cycle

Schumpeter and De Bresson isolated profit as the link between long waves and business cycles (O’Hara, 1994; De Bresson, 1987). Schumpeter argued that innovations were causal to economic upturn but treated both innovation and government action as externalities. Innovations included the development of new products that, once accepted by the market, became profitable because they could be marketed at a premium (O’Hara, 1994). The economic benefit created by profit gained during this period is augmented by the increase in employment required for the installation of new plant (Freeman and Perez, 1988, in Dosi, 1988).

Freeman and Perez make the point that such growth is balanced by the tendency to finance innovation through increased debt, fuelling the need for future growth (Perez, 1983, in Freeman, 1986). As other businesses copy the new ideas, overproduction tends to occur, fuelled by a desire for economies of scale which encourage mass production. When coupled with competition, prices are forced down, squeezing profits and leading to recession until the next range of innovations can lift the market again (O’Hara, 1994; Freeman and Perez, 1988, in Dosi, 1988).

Process innovation, which tends to occur later in an industry’s life cycle (Abernathy and Utterback, 1975), involves labour saving methods that can herald the recession (Freeman and Perez, 1988, in Dosi, 1988). Peled (2001) noted inertia in the system, explaining that industries prefer to use tried and tested processes, delaying investment in new plant. It could be argued that such inertia increases the amplitude of the cycle because inefficiencies would need to be sufficient to overcome the inertia before any change is instigated.

Figure 4.3 is a systems map of the long wave system from the perspective of business, as originally postulated by Kondratieff, reflecting the understanding garnered from the subsequent theorists' observations.

For the sake of clarity, elements within the environment have been summarised, in that social unrest includes war and revolution, and natural events include both crop production levels and natural trauma such as earthquakes and hurricanes. The map has been presented in a neutral state, meaning that elements such as "processes" embody the technology both before and after any innovation.

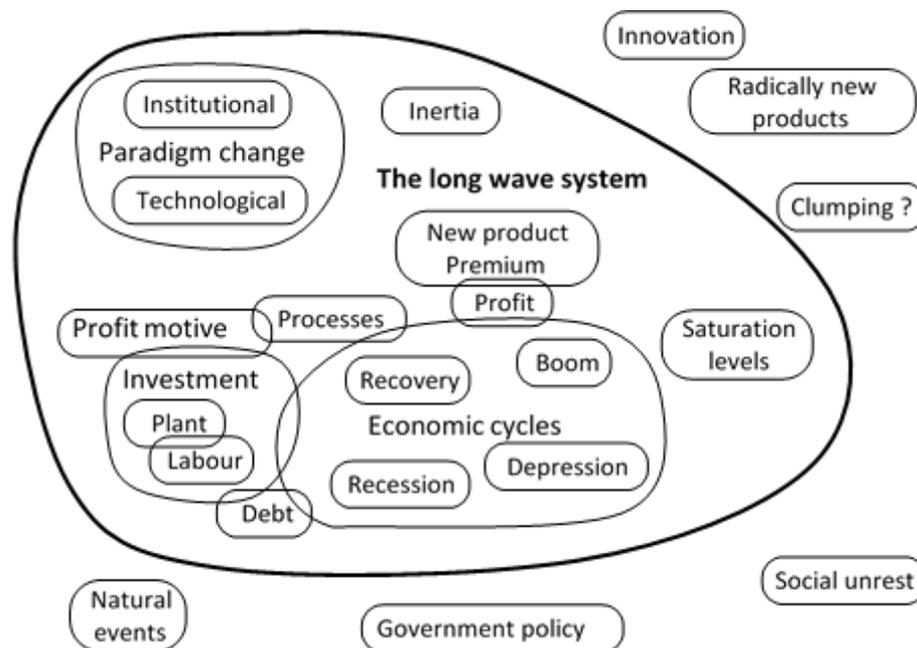


Figure 4.3: A map of the long wave system from a business perspective

What is important at this stage is to recognise the elements that are influential and those that interact with each other. Paradigm change has not been linked to economic cycles, because it has been shown to follow recession but is not necessarily caused by it. It is potentially the result of innovation.

I have separated the profit motive from profit itself. The motive to generate profit influences action but does not necessarily yield the desired results. Profit, on the other hand, represents the net financial gain from an undertaking; it is fundamental to the economic health of a system and the ability to invest in further activities.

O'Hara (1994) suggested that most theorists disagreed with Kondratieff's belief that innovations clump and discredited the hypothesis that they trigger the

upswing in the economy, and therefore there was a need to seek a different explanation. Three theorists offer answers: firstly addressing the focus of innovation, secondly exploring the timing of innovation, and thirdly considering the industry in which the innovation takes place.

4.4.1 The focus of innovation

Kondratieff observed that innovations clumped during the downswing of the economic cycle, but it was argued that the term “innovation” was used to embody new materials, markets, organisational structure and process as well as product-focussed developments (O’Hara, 1994). In this context, innovations are seen to occur throughout the cycle. Greater clarity is established by Abernathy and Utterback (1975) and Mensch, Freeman and Perez (1988), who differentiated between product- and process-focussed innovation, noting that it varied at different stages of the cycle. Figure 4.4 has been presented as an influence diagram that accommodates these differences.

I developed figure 4.4 using the concepts presented in figure 4.3. I have added the different focus of innovation and clarified relationships. To do this, I had to question whether further factors should be added to the map in order to complete each relationship. The impact of innovation is dependent on its focus and consequently I have differentiated the impact of the different areas of innovation:

- I have shown the effects of radical product-focussed innovation by the use of the solid line.
 - The term “radically new products” includes markets and materials that require societal acceptance and contribute to the upswing in the economy.
- I have represented the effects of process-focussed innovation spawned by saturation of the market lowering profitability with a broken line.
 - The “process” cycle is shown to start at “saturation levels” in order to prevent the erroneous assumption of a virtuous circle that does not exist.

Inertia is retained within the environment, because it is not caused by any of the factors within the system; however, it exerts a negative influence in the process innovation cycle.

- I added “competition” because it was the cause of oversaturation of the market forcing prices and the associated profits down.
- I added “employment levels” because it provided a link between “labour” and the swings in the economic cycle.

As noted in 4.4 above, Schumpeter, De Bresson and other earlier theorists argued that innovation was external to the system. Applying systems theory has led me to the conclusion that innovation and competition should both be recognised to be part of the system. Both innovation and competition can be stimulated by the potential for profit and they are both instrumental in the changes in the trajectory of the economic cycle. Seeing as they both are influenced by the system and influence it, systems theory would uphold their status as part of the system. The profit motive, however, is not always the stimulant for an innovation, and I investigate further drivers of innovation in section 4.6.

I have placed boundaries around “paradigm change”, “economic cycles” and “the business system”. Each of these can be considered to be subsystems within the larger system. They all belong within the larger system because they influence and are influenced by each other.

4.4.2 Timing of innovations

The second explanation proffered in order to address the driver of the economic cycle is that of the timing of the innovation. Perez (1983) further explored the relationship between the focus of innovation and the stage in the economic cycle. She identified the timing of process innovations with greater precision, claiming that they begin to occur towards the end of the upswing and are diffused in the form of new equipment by the time the depression occurs.

Perez argued that the new cluster of product-focussed innovations are developed using the established technology regarding production plant, which is not necessarily the most effective manner of production, and thus the peak of the next economic wave occurs when the potential efficiency that can be achieved with the old technology is exhausted. The new paradigm becomes fully embedded as new technologies are developed to deliver the new products efficiently. These can help preserve profitability within the saturated market.

I now refer to Ansoff's industry life cycle (figure 4.5), which shows a loss during its emergence stage followed by a dramatic rise in profitability during its growth phases which drops to a plateau during maturity before fading away during decline. This is because I note the similarity in the profit curve with that described by Perez that helps to substantiate her argument.

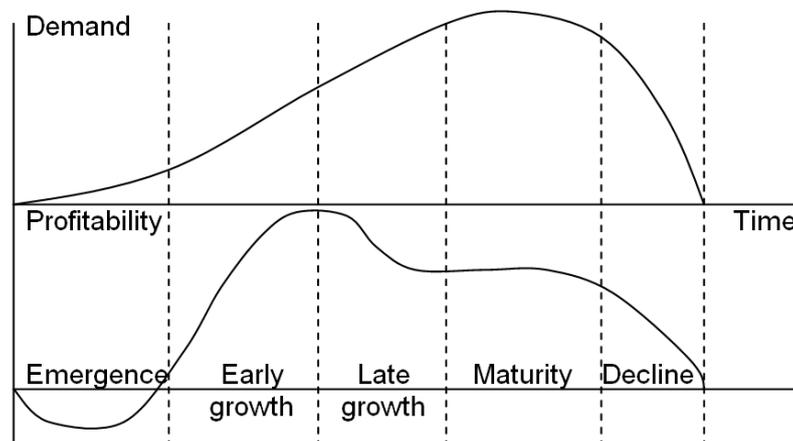


Figure 4.5: The industry life cycle (Ansoff et al, 1976)

Harrigan and Porter (1983) consider the options for industries within the decline phase and explain that the speed of decline is influenced by a range of factors that determine the cost of exiting the industry. Their analysis shows that whilst profitable niches might be identified and exploited, declining industries shrink significantly and demand radical change if the businesses within them are to survive. They also point to the wider impact on the supply chain when upstream industries that are critical to businesses downstream cease to exist.

De Bresson (1987) recognised the cumulative impact of innovations meant that the magnitude of the innovation may be of lesser influence in paradigm change than the extent to which it contributes to the change process. De Bresson also noted that the more radical changes leading to a paradigm change occurred when the potential efficiencies within a system had been attained and the attention was turned to new streams of revenue. This argument led De Bresson to conclude that the motivation of profitability is a core driver of both the upswing and the downswing in the economic cycles.

Application of this theory to the latest paradigm embracing the introduction of the Internet highlights a potential flaw with this argument because it would be reasonable to argue that the paradigm change occurred when social acceptance had reached a critical mass, enabling business to adopt the Internet

as its primary means of communication. This is regardless of the processes involved in delivering the service. Perez developed her theory before such an obvious counter-example had come into being and the style of innovation is addressed in 4.6 below.

4.4.3 The industry in which the innovation takes place

Coombes and Kleinknecht (1983, in Freeman, 1986) argued that the move from product-focussed innovation to process innovation only occurred in newer industries and concluded that the older industries, being in their mature stage, had already adopted all feasible process-based improvements. The implication of this is that the paradigm adopted in each long wave is largely influenced by new industries, the more mature ones having achieved a stable state.

Whilst Freeman observed that a new paradigm consists of technologies that have been proved to be effective in the preceding one (Freeman, 1992), Perez intimates that there is an element of chance that determines which innovations dominate a new paradigm dependent on the timing of the innovation. She notes that the organisations in their infancy during the downswing suffer the least, demonstrating apparent resilience. This attracts investment, enabling them to develop into the growth stage that heralds the new paradigm and associated rise in the economy (Perez, 1983, in Freeman, 1986).

In table 4.2, table 4.3, figure 4.6 and figure 4.7, I map the role of innovation to the economic cycle and show that process-focussed innovations should be considered part of the system because they not only affect the system but are driven by it themselves. However, the stimulus for product innovation is not fully investigated at this stage.

Table 4.2: Characteristics of innovation

Observation	Theorist
Innovation occurred throughout the cycle.	O'Hara (1994)
Innovation occurred in many guises. During the downturn, it was focussed on new products, but later in the cycle, the focus moved to the process.	Troub (1981); Freeman and Perez (1988)
The cumulative effect of innovation could equate to that of radical change. Radical change only occurred after potential efficiencies from incremental change were achieved. The profit motive was the core driver of change.	De Bresson (1987)

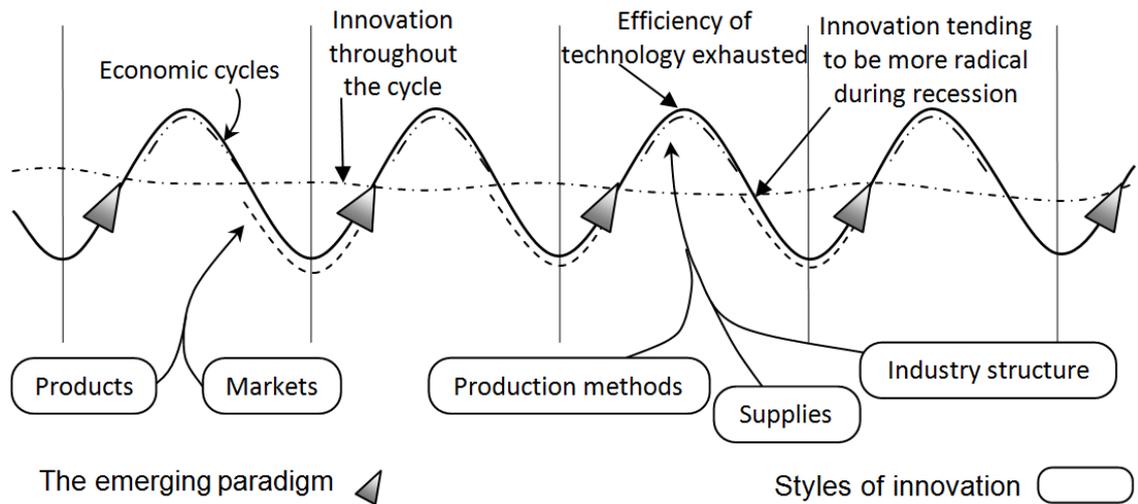


Figure 4.6: Consideration of the style of innovation

Table 4.3: The relationship between innovation and the new paradigm

Observation	Theorist
Mature industries had little impact. Process innovation occurred in the new industries.	Coombes and Kleinknecht (1983)
The new paradigm reflected technologies that had proved successful.	Freeman (1986)
Dominant technology in the new paradigm could not be predicted. New industries survived the downswing the best. Those industries attracted investment, enabling them to fuel growth.	Perez (1983)
The premium new products attracted enabled investment and growth fuelling the upswing in the economic cycle.	Schumpeter (O'Hara, 1994)
Innovations were causal to economic upturn.	

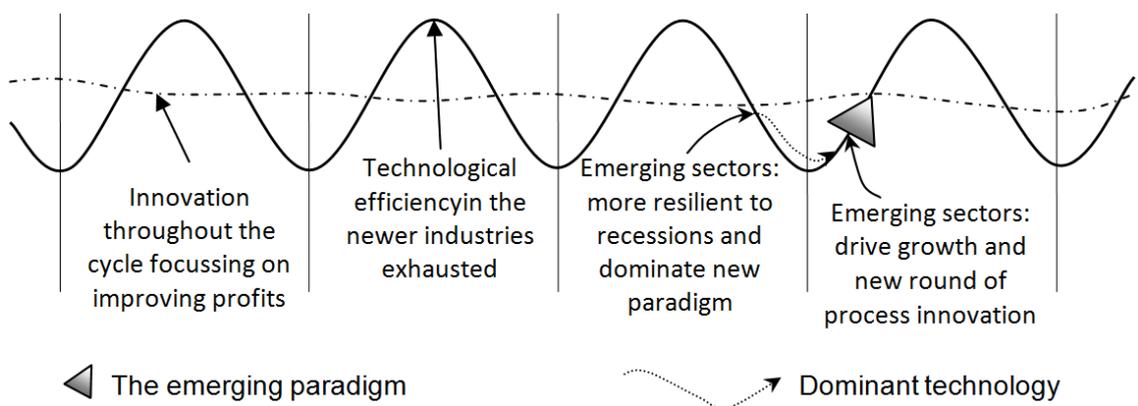


Figure 4.7: Evaluation of the impact of innovation on the new paradigm

4.4.4 Summarising the relationship between innovation and the new paradigm

In examining contributions to the theory relating to the structure of Kondratieff's waves, a theme begins to emerge. Innovation, whether focussed on the product or the process, is motivated by the desire for profit. However, the same process

also drives the economic cycle. For that reason I consider innovation to be a necessary element driving long waves but, at this stage in the development of understanding of the system, I do not consider it sufficient, because it is driven by the profit motive and, as shown in figure 4.4, the links between innovation and the inflow of investment and between innovation and the growth in outputs and employment have not been fully established (Rosenberg and Frischtak, 1983, in Freeman, 1986).

The findings at this stage suggest that the time of greatest opportunity that could be exploited to shape the new paradigm is during the downturn, where, firstly, the innovations that cluster to promote more radical change are likely to occur, and secondly, emerging industries are believed to be more resilient, attracting the investment that fuels subsequent growth. If, as outlined in section 2.5.2 of the literature review, innovation in one paradigm retains “sustainability as usual” as its focus, the new paradigm should incorporate the ethos. It is, however, necessary to explore the theory further to consider the other elements that are required to enable change.

4.5 The technological and social subsystems

Broadening the scope of factors driving long waves, Perez postulated that there were two subsystems at work: the technological and the social, as shown in figure 4.8. She believed that new technology is uneconomic until society itself changes and that society’s natural hesitance in adopting a new technology increases the lag between the innovation being developed and the upturn in the market. For instance: in order to embrace the paradigm emerging in the fourth wave, that of low-cost energy and mass production, society needed education, and advertisements, retail outlets and planned obsolescence were introduced. This caused widespread spending that aided the subsequent expansion (Perez, 1983, in Freeman, 1986).

Perez and Tylecote both recognised that society was an intrinsic part of the system. The downswing, the period initiated by process development and illustrated by the arrows with a broken line, is typified by a drop in the real value of earnings, and redundancies occur as industry seeks localities with a lower wage demand in order to bring about economies and maintain profitability. Thus a mismatch is created between the comparatively few who profit from

developing the new technologies and the income levels of the many working in production, meaning that the larger sector of society has less disposable income with which to purchase goods, exacerbating the downswing (Perez, 1983, in Freeman, 1986; O'Hara, 1994). I have not included elements within the business system that are not directly influenced by the social and technological subsystems in order to maintain clarity within the final influence diagram.

Whilst the economic cycle is clearly demonstrated in this diagram, at this stage it has not been possible to change the focus to that of paradigm change.

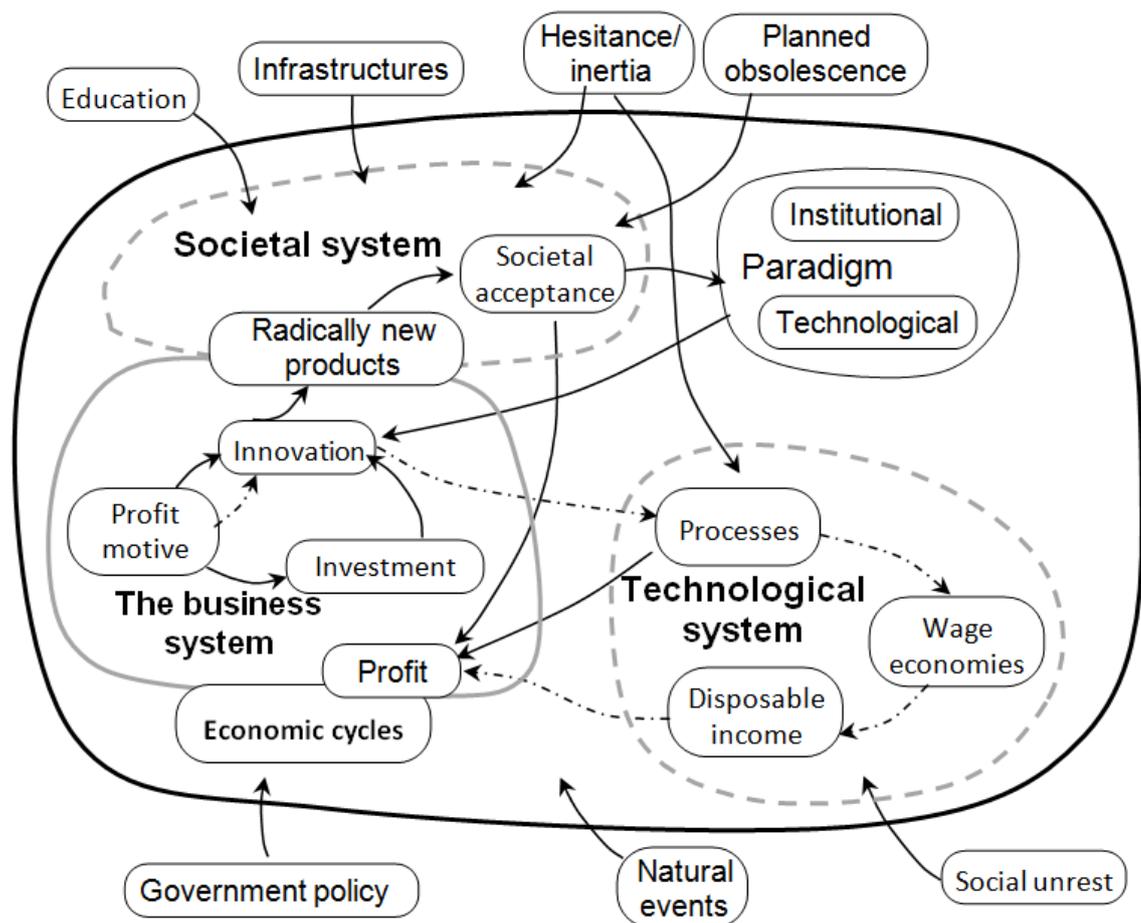


Figure 4.8: An influence diagram showing the role of the technological and social subsystems

4.5.1 The role of governments and institutional change

Having identified the implication of the growing disparity of wealth, Perez also identified the critical role of governments during the downswing and recession whilst they seek to stabilise the economy and promote growth (O'Hara, 1994). Schumpeter also noted the role of governments, but did not analyse their influence because he maintained that they were external to the system of long waves and he was only seeking answers to the phenomena that resided within the system (Anderson, 2006). I would argue that governments should be

considered an essential component of the system. In sections 2.3.4 and 2.6.3 I refer to their role in maintaining a stable economy to favour business, showing that they respond to economic conditions with action that itself influences the system.

Perez recognised that the upswing could only take hold once there was a sufficient degree of congruence between the technological and social systems, ensuring that the ability and the will to pay matched the ability and costs of production, including the profit element. Tylecote maintained that the development of such a position required regulation in order to compensate for any mismatch (Anderson, 2006).

Empirical evidence appears to confirm Tylecote's argument that each upswing had been preceded by a change in legislation rendering a sphere of activity profitable for the entrepreneur. Whilst such changes of property rights had no doubt been prompted by innovation, they enabled the entrepreneur to profit at a level that compensated for the associated risk (Anderson, 2006; Kingston, 2006).

Although legislation was a necessity, it was not considered a sufficient forerunner to change because on each occasion it was associated with a change of institutional structure. For instance, the introduction of property rights in both America and Europe led to the wealth and security that enabled investment in other ventures including factories. Similarly, the Limited Liability Act is identified as being the forerunner of the larger Corporation and Trademark Registration Act which facilitated the birth of the brand.

Figure 4.9 is an influence diagram that I constructed with a different focus. With the inclusion of government policy in the system, it has now become possible to change the emphasis from the economic cycle to the agents of change. I have consequently simplified elements within the business cycle. I have linked the profit motive and investment because, as discussed in the review of literature, the economic imperative of maximisation of utility incorporates the desire for financial gain influencing the majority of investment decisions.

These simplifications enable the potential scope of influence of government policy to become evident. This could be considerable, because not only does it

have the ability to direct innovation, but innovators will also act in anticipation of new policies. Thus it potentially amplifies the impact of natural events.

This diagram demonstrates the pivotal role and the broad reach that the government holds in that it has more potential to encourage change than any other entity in the diagram.

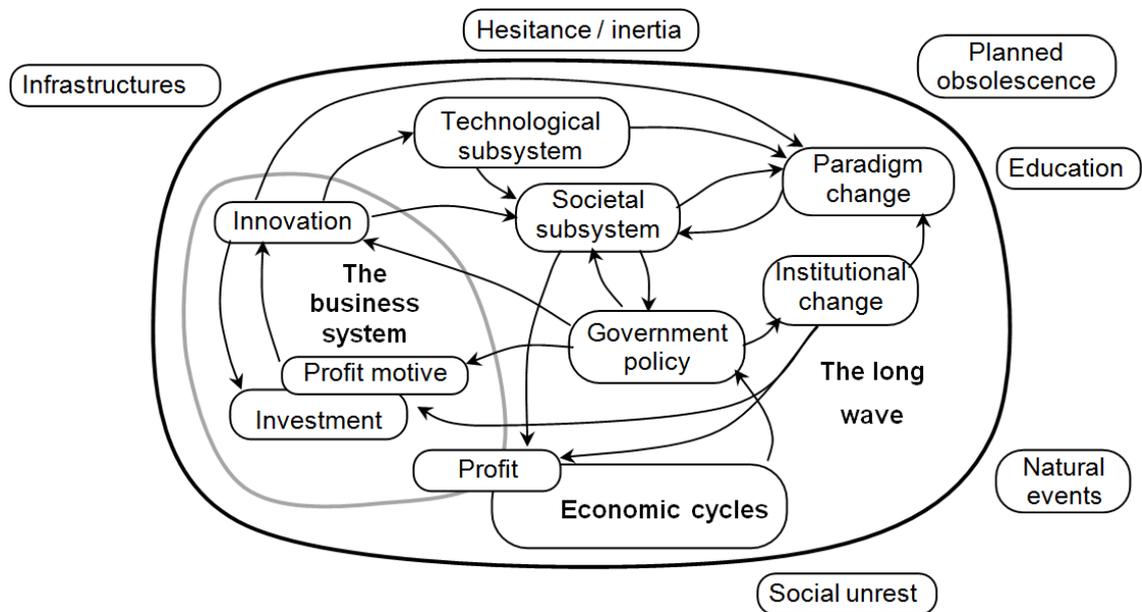


Figure 4.9: An influence diagram including the role of legislation and new institutions

4.5.2 Determinants of the character of an emerging paradigm

A key question of interest underlying this thesis is the determinant of the nature of the paradigm that emerges with the new upswing. The investigation to this point has looked at the mechanics, not the nature of the paradigm change and how to encourage a more sustainable paradigm. Kondratieff believed that it was not possible to determine the nature of an emerging paradigm. However, as already stated, some theorists allude to the role of technology in shaping change.

De Bresson (1987) suggested that the innovations preceding a paradigm change occurred after potential efficiencies of the existing system had been exhausted, thus suggesting that the new paradigm embodied the radical change necessary to achieve efficiencies that were not possible with the preceding one.

Freeman observed that the new paradigm includes the technologies that have proved their efficiency in the preceding one. However, Perez's view is that

industries that are emerging prior to the downturn are the ones that dominate the upturn. I would argue that this is a significant observation because it augments the idea that it is possible to influence the new paradigm. It means that the dominant technology in an emerging paradigm is not a random occurrence and efforts made to encourage sustainable practices in one paradigm will, if given sufficient support, emerge in a more effective form in the subsequent paradigm.

4.6 A review of the system of change

Each theorist discussed has added a layer of complexity to the understanding of the long wave system, providing plausible arguments for the addition of further disciplines to what originated as an economic theory. Economic cycles are still a significant factor within the system, but I have changed its focus to that of paradigm change. This calls for a review of the components of both the system and its environment to establish whether more recent research contributes further to the understanding of the dynamics within the system. I will consider the environmental factors before moving to those within the system.

4.6.1 Social unrest

As explained in section 4.4, social unrest is a combination of war and revolution, two entities identified by Kondratieff which he maintained were external to the system. Now that government policy has been included in the system, I question the composition and location of social unrest within the map. Social unrest is not necessarily as extreme as war or revolution. I consider it to also include riots and demonstrations. These can occur in response to the economic climate and government policies, and in turn could influence government policy. This means that social unrest at this level should be included within the system, although it should be recognised to be in response to elements within the system rather than external factors such as a quest for power that can lead to war or revolution.

4.6.2 The timing and locus of change

During the upswing and mature stages in a cycle, organisations get locked into a “technological trajectory” as the new paradigm begins to become established. The trend is to elect to concentrate on becoming specialists in core competencies as part of a network of organisations working together in the

delivery of goods and services to the market. This locks the organisations into the trajectory and creates particular challenges where technological change is concerned. Disruption at organisational level potentially exacerbates the amplitude of the cycle, causing an entire network to collapse, intensifying the economic decline. For the organisations within a network to survive, society, institutions and the organisations all need to change together (Cecere, 2014), but, as discussed in section 4.5.1, this is not typical.

4.6.3 Inertia and hesitance

Inertia influences three areas within the system. Firstly, it causes businesses to delay adopting appropriate technologies for the production of their innovative products. Secondly, it impedes decision making within governments, and finally it causes society to delay adopting the innovations themselves, a phenomenon first recognised by Rogers in his theory of the diffusion of the innovative product (1962).

In section 2.6.1 of the literature review I consider the characteristics of the individual decision maker in comparison with the decision to be made. This investigation into behavioural science reveals the manner in which, working as an individual, the decision maker is likely to procrastinate when faced with a complex decision.

The situation is not improved significantly when considering decision making within groups. In section 2.6.2 of the review of literature I show that the resultant requirement of consensus delays a decision. I also find that expert opinion does not necessarily override such delay. This is no different in the political arena, where the politician has to refer to outside agencies for their expertise.

In section 2.6.4 of the review of literature I identify the manner in which experts who are not included in the decision-making process will push for further discussion in order to ensure their opinion is aired, even if they agreed with the original decision. Such intervention in decisions made in the political arena by external parties can be to the extreme of deferring the decision completely.

Inertia is therefore seen to be augmented by the complexity of the decision that should be made as well as the capacity of the decision makers themselves and the entities involved. Inertia remains in the environment, but its influence should not be underestimated. It influences the entire system and in section 4.4 I

showed how inertia increases the amplitude of the economic cycle, which would create a greater imperative for governments to intervene.

This inertia is still evident. Takeshi Uchiyamada of Toyota (2009) noted that in spite of rising fuel prices, government intervention was needed to aid the societal acceptance of the electric car. In addition, research is still being undertaken to identify the multiple causes of inertia, with the belief that such knowledge will facilitate more realistic attitudes to the introduction of innovation to the market (Zsifkovits and Günther, 2015).

To this inertia should be added the time it takes to innovate (Andries and Wastyn, 2012). In terms of paradigm change the implications are twofold. Firstly, the innovator does not necessarily recognise the paradigm in which the innovation will operate, and secondly, inertia adds to the period of time between identification of a need and the diffusion of an appropriate solution.

4.6.4 Planned obsolescence

Planned obsolescence is an action taken by organisations to limit the useful life of a product. This practice has been in evidence since the early 1920s when the Phoebus cartel created a worldwide standard so that light bulbs burned out after 1,000 hours (Friedel, 2013; Conversable Economist, 2014). The motive was to dictate the need for replacement to generate the associated profit. In some instances, this practice is justified on environmental grounds because it hastens the need to replace old, inefficient technologies (Fishman, Gandal and Shy, 1993). As such planned obsolescence can be used to drive the acceptance of a new paradigm. It should be considered to be part of the system because it is an action taken by entities within the system and it influences the system.

4.6.5 Education

Having placed the government within the system and identified the environmental justification for planned obsolescence, it can be argued that education is also part of the system. This can be both at a formal level within educational institutions and also at a broader, more societal level. Education not only informs society and the market, but also can stimulate the development of knowledge that underpins the innovation of improved technologies.

4.6.6 Innovation

The only element of the entities identified within the system that needs review is that of innovation. The analysis to this point has considered two types of innovation: innovation that is stimulated by the desire to create new opportunities in the marketplace that stimulate growth, and innovation that aids economies and is instrumental in the subsequent downturn. However, as alluded to in section 4.4.3, the stimulus for innovation has been attributed to economic expedience without consideration of alternatives. This needs confirming.

Innovation is frequently the outcome of a response of business to changes in its environment. This may include exploiting the potential of new technologies or a reaction to changes in the law, competition or societal attitudes and needs (Tidd and Bessant, 2014). A growing trend resulting from this stimulus is that of developing low-cost alternatives to new technologies coming on to the market (Tidd and Bessant, 2014). This trend could potentially hasten the onset of economies in production, which would shorten the length of the business cycle and reduce the amplitude.

Alternatively, the stimulus could be internal to an organisation, resulting from research, experiment, accident or inspiration (Tidd and Bessant, 2014). In the majority of these cases, the process of diffusion is controlled at an organisational level, managed in a way that yields the most profit possible for the business concerned, and does not provide the grounds to change the conclusions drawn by the earlier theorists.

A further source of innovation is the customer. The end user is best placed to identify the characteristics of a product that fits their needs and consequently has tailor-made artefacts either at the point of sale or that are subsequently copied and marketed by businesses.

A change in this style of innovation facilitated by the Internet is the ability to create products such as applications and programs that can be marketed without the need to undertake further production (Lambrecht et al, 2014; Tidd and Bessant, 2014). In this case, start-up costs are little more than those required for development of the program, innovation is more frequent and profit streams are not necessarily generated from the end user (Lambrecht et al,

2014). For instance, the browser Firefox receives the majority of its income from the search engine that is installed in the browser by default (Anthony, 2011; Vaughan-Nichols, 2013) and digital goods generate revenue for their creators from the advertisements that they carry (Lambrecht et al, 2014).

In spite of the extent of this change, its impact on the business cycle is minimal. There are three reasons for this. Firstly, the style of change is more incremental than radical in nature, tending to mimic or develop technologies that are within the knowledge of the end user who refines the technology to suit their purposes. Secondly, if there is the potential for profit or the need for substantial investment, then the efficiencies that rule the business cycle come into play. Finally, the style of innovation that could potentially prove more disruptive to the business cycle, that of digital products, is limited to that sector alone.

Changes to the influence diagram in figure 4.9 accommodating the insights this review of the system has revealed are provided in figure 4.10.

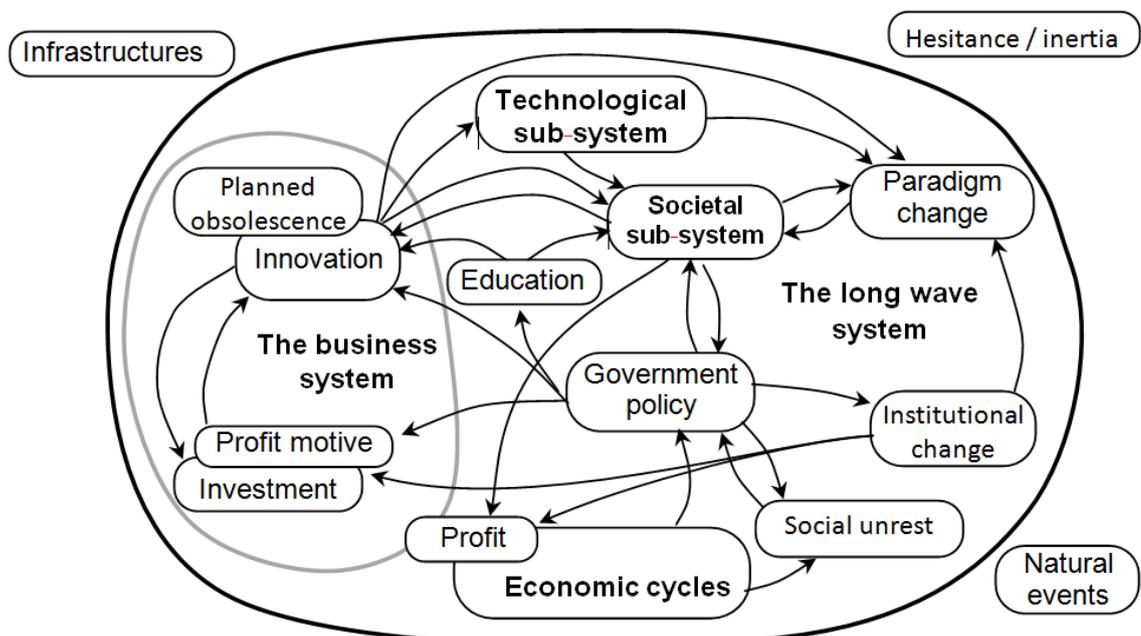


Figure 4.10: An influence diagram accommodating the review of the system

4.7 Causal links

I have now developed an influence diagram that accommodates the opinion of theorists regarding the entities involved in paradigm change, revised to accommodate changing trends. It is now possible to develop this further to identify the role governments could play in paradigm change. Figure 4.11 is a multiple cause diagram of paradigm change, using the knowledge gained thus far.

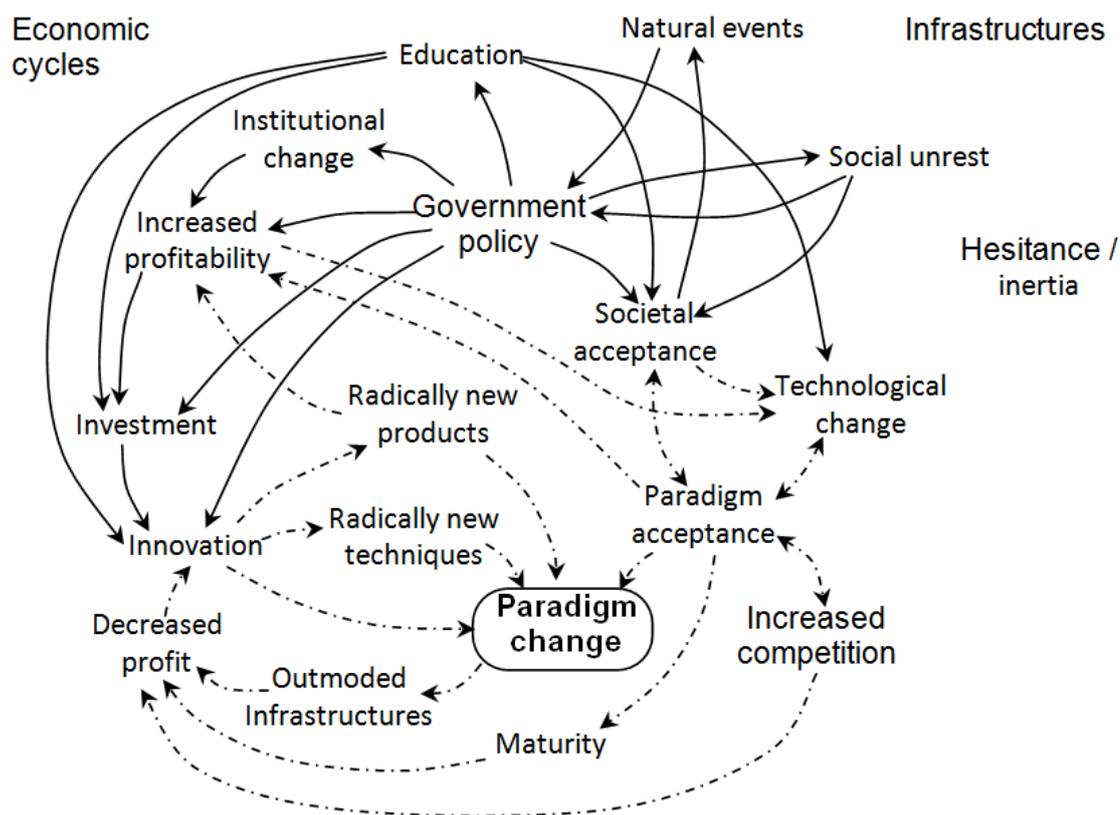


Figure 4.11: A multiple cause diagram of paradigm change

In figure 4.11 the arrows represent potential causal links and, as such, clearly demonstrate the scope for governments to instigate change. It should be recognised that not all of the entities involved in the influence diagrams have been included, but they still exert an influence. I have placed three such elements in the environment. These are “economic cycles”, “infrastructures” and “resistance/inertia”, which all have the potential to exert a negative influence on the entire cycle of change:

- The downswing in the economic cycle causes greater societal need and limits the finance available for investment in change. During this period the government receives less finance through taxation but the burden of providing support is greater, leaving less for investment.
- Hesitance and inertia retard action and therefore their influence on the ability to change has been recognised (section 4.6.3).
- Infrastructures lock entities into technological trajectories, potentially increasing the magnitude of disruption caused by change (section 4.6.2).

Development of the diagram entailed my repeating systematic questions such as “why” and “what will the effect be?” until I had established an adequate

explanation of the causal links within the system. I have also questioned the existence of other factors that could be considered. There is a need to balance completeness with simplicity with these diagrams in order to prevent overcomplication to the point that the diagram becomes meaningless, but it is important to ensure nothing of relevance is omitted.

Ensuring all the links were complete revealed further elements of the system that I needed to include in order to make sure the detail within the causal events was charted:

- Outmoded infrastructures and industry maturity were added, because they played a critical role in stimulating the second round of innovation that heralds the downswing in the economic cycle.
- Paradigm acceptance was considered to be a critical addition because it demonstrates the difference between accepting the need to change and actively adopting new practices. It incorporates the service sector and embeds the new paradigm at a deeper level. It is also a necessary factor leading to industry maturity. This differs from paradigm change because it is a necessary prerequisite to the change itself.

To a certain degree, the relationships associated with paradigm acceptance include self-perpetuation in that accepting the new paradigm stimulates further acceptance at societal level and promotes further technological change and competition. For this reason I have linked the factors in this area of the relationship diagram with double-headed arrows.

Feedback loops are evident and are indicated on the diagram with the broken line. These involve innovation and paradigm change, one involving outmoded infrastructures and the other involving technological change. A critical element within both loops appears to be profitability levels. A sign graph of the elements involved has been developed in figure 4.12, which clearly reveals the impact of the motivation to generate profit.

The sign graph was described in section 4.2.4. The critical points to note are that it is created in a neutral state and the plus and minus signs indicate the relationship between each pair of elements. The number of minus signs in any loop indicates whether it is a vicious or virtuous circle.

This sign graph has revealed two complementary feedback loops, linked by potential profit. The loop on the left is a vicious/virtuous circle, suggesting that potential profits would constantly drive further innovation that in turn would increase potential profit. However, this does not operate on its own and is moderated by the system on the right that shows how increased maturity and competition both drive down potential for profit.

The dotted line around elements within the system on the right indicates the role of the passage of time. This characteristic that has emerged from my creating and questioning the logic of the diagram suggests a degree of inevitability outside the control of the entities within the system. The system on the left appears to be in part a response to the negative effect within the right-hand system.

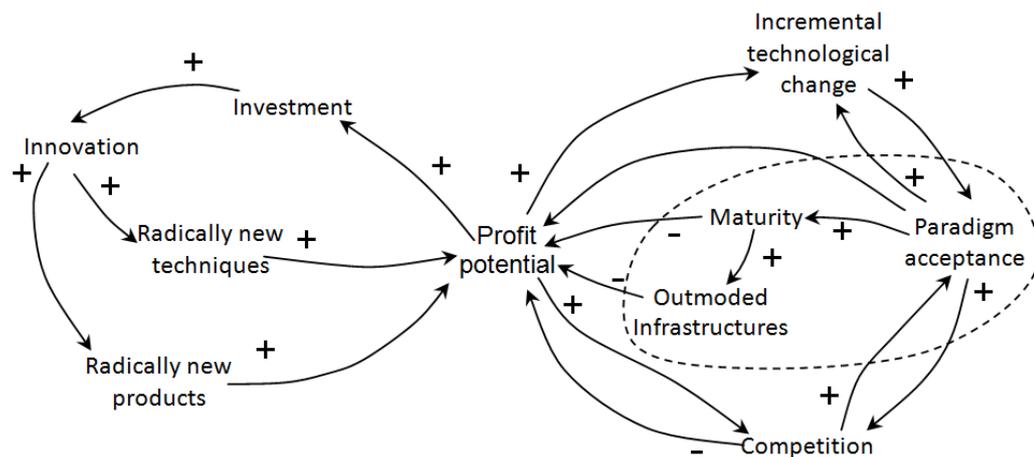


Figure 4.12: A sign graph demonstrating the impact of feedback loops

the profit motive, indicating that profitability is a necessary component, but the complexity of the preceding diagrams indicates that it is not sufficient to cause change. Other factors need to be included in the mix.

Thinking through the elements required within the sign graph developed an understanding that the role of competition and incremental change could be of more effect than originally observed. These two factors, competition and incremental change, encourage the diffusion of the technology. This is a prerequisite for paradigm acceptance, the subsequent maturity and exhaustion of dominant technologies and the associated economic welfare. The reduced profitability would be a stimulus for investment in product innovation which,

according to Tylecote, if supported by appropriate legislation, should incorporate more of the qualities that support sustainable development.

When this sign graph is taken in conjunction with the associated multiple cause diagram (figure 4.11), it is also clear that governments are well placed to manipulate paradigm change. They can direct the focus of innovation both through education and through investment. They can also encourage adoption of desired technologies through manipulating the associated profitability and encouraging societal acceptance.

The sign graph illustrates two concepts. Firstly, the whole system is highly sensitive to the potential for profit, and secondly the impact of the right-hand feedback loop should not be underestimated. In merely stating that a practice or product will be legislated against in the future, the government reduces the forecasted profit potential of that practice or product and thus encourages innovation in an effort to find alternative solutions. However, for governments to be able to exert such power effectively, the business populations would have to believe they would be willing to carry through their declared action that could potentially undermine the profitability of the business sector.

4.7.2 The position of the stakeholder

In this analysis of paradigm change I have revealed that one of the major determinants in shaping the techno-economic paradigm is the profit motive. This would suggest that environmental sustainability is not a primary consideration and is not likely to be pursued if it results in a loss of competitive advantage (Steger et al, 2006). However, in reviewing the literature I found that shareholders are not the only stakeholders of business (section 2.6.3), and the remainder can also influence decisions. Of those that I referred to in the literature, Steger et al (2006) provided the most detailed breakdown of stakeholders into logical groups that facilitated greater understanding of the interaction between the stakeholder and businesses, identifying the characteristics of each. These were:

- The “**challengers**”, including NGOs and consumer groups that seek transparency and social and environmental responsibility. This group are potentially the most demanding, but they have the weakest power of leverage over businesses, although they can influence governments.

Their approach can be confrontational or more supportive through the development of standards (Steger et al, 2006).

- The “**bystanders**”, being entities that hold power, such as governments and unions. Those in the EU recognise that they have already developed relatively high standards and, where environmental issues are concerned, they are currently not considered to be interventionist (Buchholz and Rosenthal, 2004; Steger et al, 2006; Verbeke and Tung, 2013). Activities of the government are also constrained by numerous issues that I revealed in the review of literature, including those revealed through a study of behavioural theory (section 2.6.4) and public choice (section 2.7).
- “**Incrementalists**” form a group that embodies the key players within business, including organisations and consumers. This group seeks to maintain a level playing field for competition, and the name given to this group reflects the considerable natural evolution that has occurred over time. Steger et al (2006) maintain that in Europe, this group believes that there is little scope for radical change. Whilst some businesses make significant strides in developing new sustainable practices (Haberberg et al, 2010), such action is not industry-wide, leaving performance at the more holistic level of this thesis poorly resourced (Haberberg et al, 2010).
- **The media.** As I indicated in the review of literature, this group can entrench opinion and the fear of publicity can encourage responsible behaviour.

Any classification system can be contested, but it is considered that the generalities embodied by the above are adequate for the purposes of this thesis and I have not found an alternative that is a better fit.

4.7.3 The scope and impact of change

In long wave theory, paradigm change is secondary to economic cycles. However, the focus of this research is to assess the factors that will influence a change in paradigm, and thus the economic cycle is a secondary issue. Figure 4.13 is an influence diagram in which paradigm change is the primary issue. In order to limit the components within the map, the subsystems have been represented at a generic level and should be assessed in conjunction with the

previous figures for the full level of detail to be understood. The following conventions have been adopted:

- The actions that are considered to be those which are the most effective in driving through change are represented by the arrows in bold.
- The impact of change is represented by arrows with dotted lines.
- The influence between the societal subsystem and political action is represented as a broken line. This representation is differentiated because it is a relationship that has particular qualities identified in the review of literature (section 2.7).
- I have added further links. These are as a result of my asking the question, “What is the mechanism that makes this relationship work?”
- The groups identified by Steger et al (2006) are labelled in bold italics.
- Environmental factors that cannot be controlled by entities within the system are in regular italics.

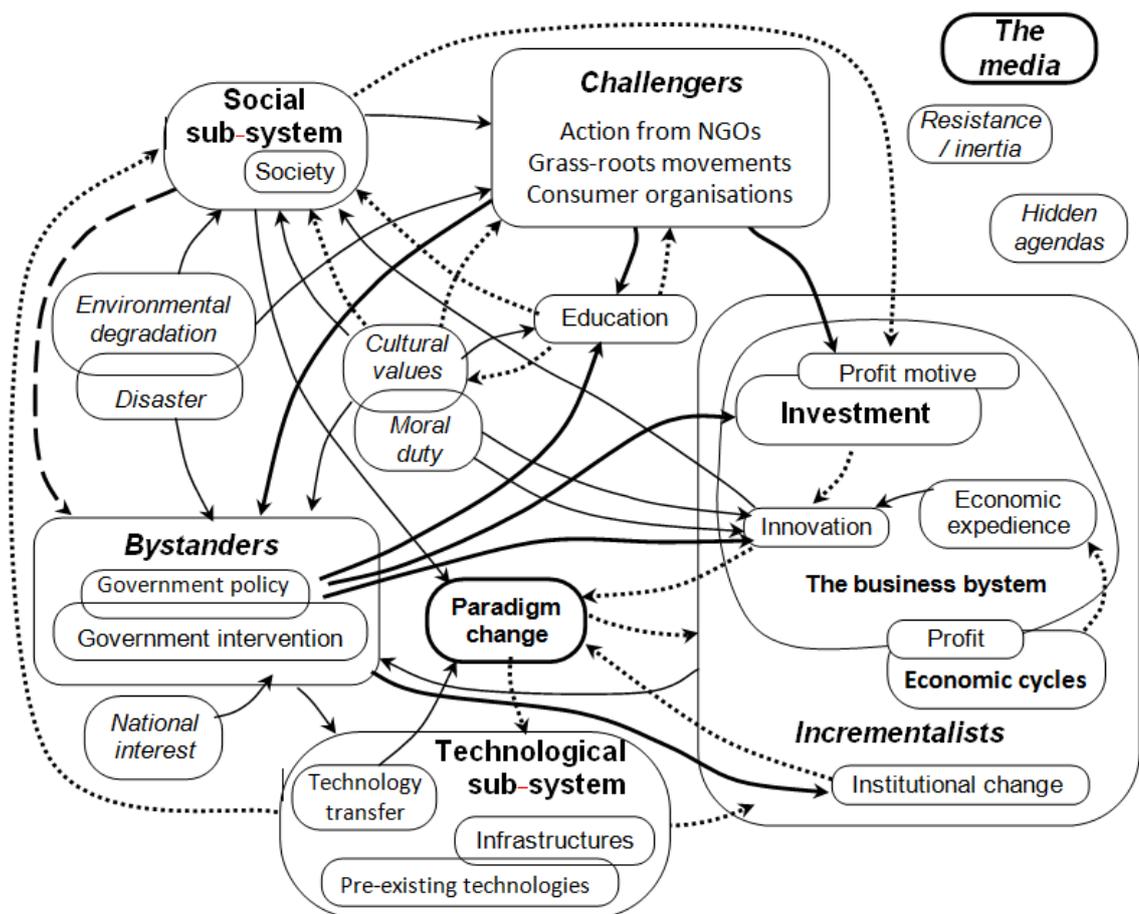


Figure 4.13: An influence diagram showing factors relating to paradigm change within the control of society

Where developing practice to promote environmental sustainability is concerned, the entities within the business and economic cycle are not viewed as principal drivers of change. Steger classifies this group as incrementalists, and long wave theory would suggest that the core focus of their activities is driven by economic expedience or stimulus from government. Thus, appropriate change emanating from the business sector would follow other changes that render such action profitable. However, the role of incrementalists is important because it aids the diffusion of new practices and further drives the system. This is in keeping with the findings in figure 4.11 which demonstrated that increased profitability was a prior requisite for investment in innovation

In keeping with figure 4.11, this diagram includes evidence to suggest that governments have the potential to be a primary driver of change. However, with respect to driving society towards sustainability, Steger et al (2006) have classified this group as bystanders, indicating that they require stimulus from elsewhere to spur action. This correlates with my findings in the review of literature which revealed significant limitations in the freedom of the government to act.

It is recognised that globalisation is embedded in the current paradigm, and the first countries to legislate in a manner that could damage their competitive position are likely to undermine their economic stability (Le Veness and Fleckenstein, 2003). It follows that inter-governmental agreements, such as the Kyoto agreement, are likely to yield more effective action as they would enable and prompt government action whilst still preserving competitiveness.

Caprar and Neville proposed that some nations are “tighter” than others. This is a characteristic that was referred to by Hofstede, and relates to the extent to which it is considered acceptable to deviate from the norm (Caprar and Neville, 2012). This would suggest that there is a constraint on the societal group as well as the challengers that inhibits their effectiveness within some cultures and proffers power where being a change agent is concerned in others. Indeed, Hofstede found that nations with tight governance, dictating actions to the people, were supported by an apparent national preference for such direction and an associated level of compliance.

In figure 4.12 it is demonstrated that the profit motive is a central issue in encouraging the necessary investment for innovation. The two factors seen to reduce the potential profitability are increased competition, which drives prices down, and the passage of time, whereby the maturity of markets similarly depresses profits. It follows that governments are well placed in encouraging change if they are able to influence the market to ensure activities and innovations that support sustainable development can yield significant profits.

4.8 Summarising drivers of change

In this analysis I have reviewed theories from a systems perspective with a view to developing a map of the factors that lead to paradigm change. The nature of change is determined not only by technology and society, but by the environment, together with an interconnected web of entities ranging from national interest to personal gain, and uses instruments as varied as political intervention and the media.

Examination of long wave theory reveals a number of interlinked issues. The role of entrepreneurs is a consistent feature of both economic upswings and downswings, but the trigger that enables the downswing to move to the upturn appears to involve legislative change that leads to new business structures. These are in turn driven by core business concepts, including the life cycle of an industry and of products, and lead to changes not only in the economic cycles but also in technological paradigms. Coupled with this is the role of society, which needs to respond to the activities of businesses to render them profitable. Wealth disparity that occurs as businesses seek to cut costs undermines the profitability of business, contributing to the downturn.

In investigating stakeholder theory in parallel with Ansoff's industry life cycle, I identified some important characteristics:

- Businesses are sensitive to factors that can influence their profitability. This appears to be a central driver of paradigm change
- The profit motive drives innovation of both the product and process, the focus of which is fundamental to the change in economic climate.
- Governments and stakeholders that bring business action into the public eye have the potential to be highly influential in shaping business practice.

- Governments could in theory educate society and support the diffusion of the new paradigm.
- Economic cycles appear to be driven by industries that begin to emerge during the downturn which fuel the growth of the economic boom and, as they reach maturity, make economies that trigger the downturn. This pattern correlates with Ansoff's industry life cycle.

It should be remembered that government action is limited because economic prosperity is generally a higher priority than sustainability. Thus, according to Steger, a key activity of campaigning for sustainability rests with grassroots activists and NGOs.

Figure 11 is an influence diagram that includes all of these components which highlights the influence that governments wield over the system, but identifies their current "bystander" status. I then developed a multiple cause diagram which identified the scope and potential impact of the action governments could potentially take, and its associated sign graph highlighted the need to manipulate markets to ensure that activities that represented the best available technology where sustainable development is concerned retained potential profitability at the expense of practices that should be abandoned.

The feedback loops in figure 11 suggest that once change is instigated, provided society accepts the need for it and adopting the changes does not undermine profitability, the changes will carry on through to subsequent paradigms, augmenting the degree of change achieved. This again is an area where governments can sponsor action, the feedback loop demonstrating the augmented value such action could yield.

Having established the factors that contribute to paradigm change, in the next chapter I move to the second activity, that of evaluating the role of culture in contributing to the ability of a nation to change.

Chapter 5. An Exploration into Cultural Difference and Environmental Sustainability

The purpose of this part of the research is to explore the nature of culture that supports the adoption of sustainable behaviours and to examine the extent of difference between nations. Very little work has been undertaken in this respect, but a paper that has influenced this part of my work is that of Caprar and Neville (2012). Their paper was more concerned with the role of culture in broad terms than with assessing individual dimensions. Their paper included a meta-analysis of research undertaken into the relationship between culture and sustainability at the time of writing, which has provided data to inform this section of this research.

Caprar and Neville summarised the core findings from the few studies undertaken prior to the time of their publication. However, their discussion consisted of two paragraphs in which they identified the studies into national cultures that were used by the researchers and did nothing more than list the dimensions that were found to be influential, noting the fact that not all of the dimensions listed were identified in every study. They noted ambiguity with two of the dimensions and concluded that “certain cultural values seem to be associated with sustainability adoption” (Caprar and Neville, 2012).

Caprar and Neville observed that some of the papers concerned had utilised large databases involving many countries and they believed that the findings could be considered to be robust. Table 5.1 summarises the findings of these studies. Hofstede’s dimensions were used in all of the pieces of research apart from those identified with a (G), which related their findings to dimensions established in the GLOBE study.

I developed table 5.1 from the summary drawn by Caprar and Neville. The inconsistencies identified by them are apparent, in that both poles of individualism and masculinity are seen to correlate with the same behaviour and not all of the dimensions are found to correlate in every study. In table 5.1, I have tabulated the cultural dimensions concerned with specific behaviours demonstrating environmental sensitivity, policy formation, adherence, enforcement and tangible support for sustainability initiatives, something that Caprar and Neville did not do, and a factor which could account for these

apparent anomalies becomes more apparent; cultural characteristics were shown to support specific activities and behaviours.

Table 5.1: Cultural characteristics and behaviour relating to behaviours supporting sustainable development

Dimension		Impact	No. studies
Power distance	Low	Recognition of ethical standards. Ethical policy development. Social/environmental performance. Capacity for environmental sustainability.	6
Power distance (G)	Low	CSR values.	1
Humane orientation (G)	High	Financial support for sustainability initiatives.	1
Individualism	Low	Identification of unethical behaviour.	4
Individualism	High	Adherence to policies. Judgement of ethical scenarios. Ethical attitudes. Capacity for environmental sustainability.	4
Institutional collectiveness (G)	High	Financial support for sustainability initiatives. CSR values.	1
Masculinity	High	Enforcement of regulation.	6
Masculinity	Low	Sensitivity to ethical and environmentally sensitive behaviours. Social/environmental performance. Capacity for environmental sustainability.	6
Performance orientation (G)	Low	Financial support for sustainability initiatives.	1
Assertiveness (G)	Low	Financial support for sustainability initiatives.	1
Uncertainty avoidance	Low	Policy development.	3
Uncertainty avoidance	High	Enforcement of regulation.	3
Long-term orientation	High	Adherence to ethical marketing behaviours.	2
Long-term orientation	Low	Punishment of unethical behaviours.	2
Future orientation (G)	High	Financial support for sustainability initiatives.	1

Chapters 6 to 10 contain case studies of four countries that I have developed and the resultant findings are assessed against the cultural characteristics that are attributed to each nation in chapter 11. The activities and behaviours that are of greatest interest to this research are environmental sensitivity, policy formation and support for sustainability initiatives. This is because adherence and enforcement are difficult to observe with any degree of accuracy. It is therefore the cultural characteristics that support these areas of interest that should be isolated.

The researchers identified by Caprar and Neville had used the framework of either Hofstede or the GLOBE. However, the strengths of a third framework, that of Hampden-Turner and Trompenaars, also require consideration. Their

research does not produce composite scores for their dimensions; rather, they draw a cultural sketch of the country based on the understanding garnered from their responses.

Hampden-Turner and Trompenaars published their work five years before that of the GLOBE study, and it is considered by many to be robust (Mendoza, 1999; McIntosh, 1999), supported with a substantial database (McIntosh, 1999). Their work has attracted the least criticism in its underlying methodology and avoided the statistical process of multivariate analysis, which is dependent upon assumptions (Roberts, 2008). Their work also includes examples clearly showing an understanding of the characteristics in question, demonstrating a critical phenomenological approach in contrast to the more statistical approach of the other two studies (Mendoza, 1999; McIntosh, 1999). Their consideration of organisational culture is potentially the weakest part of their work, being criticised for being somewhat forced (Mendoza, 1999).

It should also be noted that Hofstede's work, being first published in 1980, is more dated. Hofstede is also criticised for using a broad-brush approach, originally identifying just four and later five dimensions (Williamson, 2002) which included a degree of overlap (House et al, 2004, p.346). Further criticism was made of Hofstede's "feminine" characteristic which was assumed to be the antithesis of "masculine".

The GLOBE study, published in 2004, provides a much more recent analysis of culture. There are questions regarding the methodology used in the study as well as the justification for the range of dimensions identified (Bertsch, 2012; Vernaik and Brewer, 2010). A further difficulty is posed by the provision of two scales, one for practice and one for values. A comparison of these is in appendix 5 and they are at times seen to be negatively correlated.

5.1 The development of a framework for cultural characteristics

Two approaches are taken to facilitate the use of the work of Hampden-Turner and Trompenaars as a point of comparison. Firstly, their database will be used to develop a composite score with a similar focus to each of the dimensions identified to correlate with sustainable behaviours in the research summarised by Caprar and Neville. This activity is the content of the first half of this chapter.

Secondly, at the point of comparison in chapter 11, the insights gained in their cultural sketches will also be considered.

This could be seen to be a retrograde step in that the work of Hampden-Turner and Trompenaars was applauded for its phenomenological rather than statistical approach. However, the purpose of this activity is to create a point of comparison against which to compare the findings of my research with those of the research identified by Caprar and Neville. The data provided by Hampden-Turner and Trompenaars facilitate the creation of comparative measures that align with the particular characteristics of the other two frameworks which are identified in section 5.1.1 below.

5.1.1 Examination of the compatibility of the frameworks

In table 2.4 (section 2.4.10), I mapped the cultural dimensions between the different frameworks, and table 5.2 below explains the comparison in greater detail. I then provide an explanation of how I used the data provided by Hampden-Turner and Trompenaars in order to delineate between their dimensions and provide a more precise match with those of the other two frameworks. The purpose of this exercise is to ensure that the framework I have developed can be used as a basis of comparison.

Table 5.2: Correlation between the dimension of study and Hampden-Turner and Trompenaars' dimensions

Original dimension	The equivalent Hampden-Turner/ Trompenaars dimension	Justification
Power distance (GLOBE)	Corporate culture	See "A" below.
Future orientation (GLOBE)	Attitude to time	House et al (2004, pp.288–294) explain that their "future orientation" is not the same as Hampden-Turner and Trompenaars' time horizon, because the GLOBE dimension includes the ability to plan accordingly. However, attitude to time involves synchronicity, which enhances adaptability.
Performance (GLOBE)	Achievement versus ascription	Largely focussed on continual improvement, House et al (2004, pp.246–247) maintain that only one question correlates with Hampden-Turner and Trompenaars' framework. However, in asking whether status must be earned, they go some way to being a satisfactory equivalent.

Original dimension	The equivalent Hampden-Turner/Trompenaars dimension	Justification
Humane orientation (GLOBE)	Altruistic	See “B” below.
Assertiveness (GLOBE)	Drive	See “C” below.
Institutional collectivism (GLOBE)	Individualism versus communitarianism	House et al (2004) differentiate between in-group and institutional individualism. Hampden-Turner and Trompenaars (1997) refer little to family values, concentrating largely on the interaction between the individual and the workplace. For this reason, the two dimensions are deemed to be sufficiently similar.
Individualism (Hofstede)	Individualism versus communitarianism	Hofstede’s handling of individualism has come under a lot of criticism. However, the vignette he provides (1984, p.171) includes the family needs as part of the individual’s realm and opposes them with dependence on institutions, suggesting there is sufficient overlap between these two dimensions.
Power distance (Hofstede)	Corporate culture	See “A” below.
Uncertainty avoidance (Hofstede)	Universalism versus particularism	Both these dimensions relate to a strong dependency on regulation (Hofstede, 1980, pp.114–118; House, 2004; Parboteeah, Bronson and Cullen, 2012).
Masculine (Hofstede)	Neutral versus affective Achievement versus ascription	In Hofstede’s dimension, the masculine end tends to be reward-seeking and assertive whereas the low level of masculinity seeks comfort and security and is nurturing in character. This was seen to correlate with Hampden-Turner and Trompenaars’ dimension of neutral versus affective, which measures emotional responses (1998, pp.8–11). Hofstede’s inclusion of the level of interdependency coupled with valuing the entities that are depended upon results in correlation with achievement versus ascription (House et al, 2004, p.347).

A. Power distance

Power distance as identified by Hofstede correlated positively with practices relating to power distance identified in the GLOBE study (House et al, 2004, p.543). However, it involves a paradox that further supports the detailed delineation established by Hampden-Turner and Trompenaars. Hofstede

related power distance to inequality (Hofstede, 1984, pp.64–109) and identified a continuum between hierarchy and paternalism because one of the three questions asked in this part of his research was whether management was “autocratic or paternalist” (Hofstede, 1991, p.27). This approach suggests an assumption that a low power distance included consideration of a paternal characteristic rather than simply an absence of hierarchy in the workplace.

In contrast, House et al (2004, pp.533–534) consider power distance to signify discrete hierarchical groups with limited social mobility. The Confucian nations combine high power distance with an in-group culture that builds respect for status and age into the structure, meaning that even within the same group the older person is deferred to by the younger. Those higher in the hierarchy take a paternal role. In contrast to this, in cultures that combine both power distance and individualism, those higher in the hierarchy have the potential to abuse their position and with it compromise ethical standards.

It follows that Hampden-Turner and Trompenaars found that in some instances, the greatest levels of paternalism were found in the most hierarchical organisations. This was their argument for their approach to corporate culture. In particular, the structure that they identify as “family”, which is hierarchical, also includes the characteristic of paternalism, opposed to the more bureaucratic “Eiffel Tower” (Trompenaars and Hamden-Turner, 1997, pp.157–169).

This paternalist characteristic is missing from both of the two egalitarian structures, the “guided missile” and the “incubator”, but of these two, whilst there is a flat hierarchy, the members of the incubator are supportive of each other and those working in an incubator are motivated by their achievements, whereas workers within the guided missile are motivated by finance (Trompenaars and Hamden-Turner, 1997, pp.172–176).

The order I have identified to correlate with conforming to the characteristics of power distance from low to high is:

Family, Incubator, Guided missile, Eiffel Tower.

The focus of further questions that identify the low power dimension characteristic were also included in this identification of power distance, namely:

- The adoption of a particular rather than a universal view.
- The company should make allowances for those with specific difficulties.
- Salary should consider family size.
- A job is a job for life.
- New employees should fit in rather than the company adapt to exploit their strengths.
- The company should not provide housing.
- Achievement earns more respect than age.

There are two points to note with this grouping. Firstly, the questions had to be aligned so that the poles correlated. Secondly, it is recognised that some of these opinions are the same as those used to measure feminine characteristics, but paternalism is not a direct correlation with masculinity, being more supportive rather than aggressive. The resultant overlap is in keeping with the observation of House et al (2004, p.346) that Hofstede's dimensions were not entirely discrete.

B. Altruistic

There is no dimension in the work of Hampden-Turner and Trompenaars that is a direct correlation with the humane orientation, creating the need for me to identify appropriate measures which I have labelled "altruistic". The humane orientation identified within the GLOBE study relates to feminine characteristics of nurturing and altruism (House et al, 2004, pp.30 and 406). Elements of these characteristics are evident in the focus of some of the questions relating to ascription versus achievement and communitarianism versus individualism, for example:

- Making allowance for those with special needs.
- Helping a family member rebuild a damaged store.
- Salary considering family size.
- Identification of the feminine characteristics of nurturing and permissiveness.

C. Drive

As with humane orientation, there was no direct comparison with the characteristic of assertiveness. Assertiveness is a dimension that was identified

in the GLOBE study (House et al, 2004, pp.395–407) and was included within the umbrella of masculinity by Hofstede (1991, p.164). However, assertiveness and masculinity are not measuring the same quality.

Assertiveness, as described by House et al (2004, pp.395–407), relates to the drive to satisfy an individual's desires either at a corporate or at an individual level. This is a subset of masculine characteristics which they consider to have a strong correlation with both performance orientation and individualism. Hampden-Turner and Trompenaars have asked specific questions that support this characteristic, which I have isolated in order to establish a measure that I have named "Drive" to differentiate it from the classifications within other studies.

Agreement levels for the final two statements were reversed in order to align with the remainder of the responses. This is because both of these statements emphasise the achievement of the individual, whereas the preceding statements emphasise the group. The relevant statements are:

- The group should take credit rather than the individual.
- Responsibility for actions lies with the group rather than the individual.
- A job is a job for life.
- New employees should fit in.
- Achievement is more important than "being yourself".
- Achievement earns more respect than age.

5.1.2 Application of the framework to observed behaviours

In table 5.3, I summarise the characteristics identified by Hampden-Turner and Trompenaars, identifying the relevant end of the continuum (in bold) and its associated impact on environmental initiatives.

Parboteeah et al (2012), who undertook research to assess cultural influence in the provision of financial support for environmental protection and were included in the meta-analysis of Caprar and Neville, identified a difficulty in locating accurate information that would provide a robust measure. Their work was based on the responses to two questions raised in the GLOBE survey (2004) which asked respondents to indicate if they would donate part of their income if

they knew the money would be used to reduce environmental pollution and, similarly, if they would be prepared to pay extra tax for the same cause.

Table 5.3: A summary of the relevant characteristics using Hampden-Turner and Trompenaars' dimensions

Dimension		Associated behaviour
Individualism versus communitarianism	L	Sensitivity to ethical behaviours. Capacity for sustainable development.
Individualism versus communitarianism	H	Financial support for sustainability initiatives. Judgement of ethical scenarios.
Neutral versus affective	L	Sensitivity to ethical behaviours.
Universalism versus particularism	H	Policy development.
Achievement versus ascription	L	Financial support for sustainability initiatives. Capacity for sustainable development. Sensitivity to ethical behaviours.
Attitude to time	H	Financial support for sustainability initiatives. Adherence to policies.
Dimensions that are not specifically delineated in Hampden-Turner and Trompenaars, but can be identified through specific responses attained:		
Altruistic , evident in elements of: corporate culture (family), specific versus diffused, individualism versus communitarianism	H	Financial support for sustainability initiatives.
Paternal and egalitarian within a family corporate culture	H	Sensitivity to ethical behaviours.
Drive , evident in elements of: individualism versus communitarianism, ascription versus achievement.	L	Sensitivity to ethical behaviours. Financial support for sustainability initiatives.
An additional dimension within Trompenaars and Hampden-Turner's analysis that is considered to be a logical requirement:		
Attitude relating to the environment	H	Policy development.

H = high end of the continuum and L = low end.

Bold identifies the end in question.

My research investigates the manner and extent to which governments use finance as a tool to support a broader range of initiatives under the umbrella of sustainable development as well as encourage business engagement. The assumption is being made that such action would be underpinned by similar performance indicators.

Having developed a framework based on Hampden-Turner and Trompenaars' cultural dimensions, it is now necessary to return to the behaviours and associated cultural dimensions identified in table 5.1 and substitute the new framework of dimensions established in section 5.1. This is summarised in table

5.4, which is confined to the papers associated with the behaviours that are to be investigated in this thesis.

Table 5.4: A summary of the influence of culture on behaviours

		Values and sensitivity				Standards		Diffusion		Action	
		Judgement of ethical scenarios	Ethical attitudes	CSR values	Perception of unethical scenarios	Capacity for sustainable development	Social/environmental performance	Marketing ethical norms	Diffusion of codes of good governance	Ethical policies	Financial support for sustainability initiatives
H: Hofstede's dimensions G: The GLOBE study		H	H	G	H	H	H	H	H	H	G
Framework used		H	H	G	H	H	H	H	H	H	G
Individualism versus communitarianism	L			✓	✓			✓	✓		✓
	H	✓	✓			✓					
Neutral versus affective	L				✓	✓	✓			✓	
Family corporate culture	H	✓	✓	✓		✓	✓			✓	
Achievement versus ascription	L				✓	✓	✓				✓
Universalism versus particularism	H									✓	
Altruistic	H										✓
Attitude to time	LT							✓			✓
Drive	L										✓

Hofstede's dimensions were developed to assess cultural difference between nations on the basis of a sample within IBM, and the respondents referred to in Hampden-Turner and Trompenaars' analysis were all business managers. It is not immediately apparent whether the dimensions are appropriate for application to the action of governments. However, the prior research used to inform the relevance of cultural dimensions used the same dimensions and found correlation with government action. On the basis of the arguments above, I am further seeking to validate this argument.

5.1.3 An examination of the dimension in individualism and communitarianism

In table 5.4, I have used a common platform throughout and it clearly indicates the anomaly referred to in the opening of chapter 5, whereby both poles of individualism versus communitarianism are shown to promote "values and sensitivity" and "action". The occurrence of differing ends of a continuum correlating with action could be justified because of the difference in the nature

of the activities concerned, which are handled separately for the remainder of this work. The disparity evident in the studies relating cultural difference to values and sensitivity requires further investigation.

There are potentially four reasons for this anomaly:

- The development of the framework, discussed in section 5.1.
- The characteristics of the cultural dimension in question.
- The effect of mixing two or more cultural dimensions.
- The rigour of the work providing the data.

The characteristics of the cultural dimension in question

Hofstede's dimension of individualism versus communitarianism is the one that has come in for criticism because it appears to be too broad. The difficulty, outlined in the critical literature review (section 2.4.7), was avoided in the GLOBE study by creating two dimensions with which to measure individualism, firstly at societal/family level and secondly at institutional level.

House et al found that both of these dimensions correlated with uncertainty avoidance, but whereas institutional collectivism (practices) showed a positive correlation the in-group dimension (practices) showed a negative one. Similarly, work undertaken by Waldman et al (2006) found no correlation between awareness of ethical issues and individualism on the "in-group" dimension, but did identify it at institutional level.

This lends credence to the opinion that the manner in which both the high and the low ends of Hofstede's dimension appeared to show a correlation with a specific behaviour is a reflection of the breadth of factors incorporated into this measure, which was avoided in the GLOBE survey by the creation of two dimensions.

The rigour of the work providing the data

In assessing the sensitivity of a national ability to judge ethical decisions, Beekun et al (2008) identified a correlation between the ability to make ethical judgements and levels of power distance and individualism. The study only involved two countries, which is a very small sample from which to isolate the effects of individual variables.

Of the four papers contributing to the literature on culture and sensitivity to ethical issues, the paper assessing ethical attitudes (Christie et al, 2003) was the only one to select a sample that purposely isolated different cultural characteristics. However, there were four problems with its approach:

1. The selection did not take the mix of cultures into account.
2. The USA was selected as being the nation of difference for four of the five dimensions tested. This again constituted a small sample.
3. Christie identifies numerous other factors, including history, education and GDP, that influence the choices made, yet has chosen three nations with no similarity to control these variables.

These first three points can lead to lateral collinearity, whereby the variables influence each other, producing misleading results in spite of the procedures in place that should eliminate them (Kock and Lynn, 2012).

4. Identification of diversity does not accommodate the spread of data. For instance, in Hofstede's 1980 study the index for individualism ranges from 12 to 90 with a mean of 51 (Hofstede, 1984, p.158). Christie, however, uses two countries with scores of 76.9 and 79.9 in comparison with one of 105 (the highest). Accepting the fact that Christie may have referred to a different publication, all these scores are above the mean, reducing the scope for a clear delineation between the results. For masculinity, the problem is even more marked with the three countries all being mid-range. The full range of responses in Hofstede's work (1984, p.189) is 5 to 95, yet Christie selected countries with scores of 42.5, 45.4 and 55.5: scores that surround the mean of 51. Indeed, Christie et al considered this to be contributory to their somewhat ambiguous results.

The work relating to the perception of unethical scenarios (Arnold, 2007) involved the subjects judging the extent to which behaviours could be considered to be ethical. A univariate regression analysis identified that low individualism and the feminine characteristics of caring and nurturing proved to have correlated with significance in 8 out of the 13 scenarios. House et al (2004) found that cultural dimensions correlated with each other. This means that they do not act independently of each other. Whilst both of the dimensions

were found to have correlated with the judgement of unethical scenarios, one of these could have done so through lateral collinearity.

The work of Waldman et al (2006) used the GLOBE dimensions and assessed both in-group collectivism and institutional collectivism. The association with sensitivity to ethical scenarios was shown to be not significant for in-group collectivism, but the authors claim a significant correlation with institutional collectivism. However, as with the work of Christie, there were many variables involved in the analysis and insufficient information has been provided (such as there being no provision of an adjusted R2 for the different models) to substantiate the notion that the statistical analysis has not been used to fit the prediction.

5.1.4 A summary of the challenges posed when assessing culture using statistical means

This review of the processes involved raises the following points about the nature of assessing cultural difference using statistical measures. Whilst these factors may not help understand the anomaly identified, they are considered at each stage of this exploration.

- The cultural dimensions do not act in isolation of each other. Hofstede (1984, pp.211–231) and House (2004) both consider the impact of the combination of cultural characteristics.
 - Both the GLOBE project and Hofstede's work involved plotting pairs of cultures on matrices which in many cases show statistical correlation between the dimensions involved, critically including that of individualism and power distance.
 - The GLOBE study investigated the nature of each dimension in much greater depth and conducted extensive statistical analysis to determine any correlation between the characteristics, including extensive reference to literature to substantiate their findings.
 - Hampden-Turner and Trompenaars (1994) go beyond a statistical discussion, recognising that some pairings could moderate behaviour whilst others could exacerbate it. Consequently they avoid the use of statistical measures, preferring to view the entire mix of the culture rather than isolating individual characteristics. Their work is grounded in and supported by close observation of the culture as a whole.

- The dimensions are configured as linear scales between two perceived opposing extremes. Their effect, however, could be moderated by a third variable. Hampden-Turner and Trompenaars, for example, argued that an inward- or outward-facing characteristic could modify the outworking of the dimension in question.
 - The pattern observed in table 5.4 suggests that power distance may be a characteristic that dominates the adoption of the behaviour in question.

5.1.5 The impact of these findings

These conclusions substantiate the gap in the research that should be investigated through empirical study and, critically, demonstrate that statistical analysis is potentially an inappropriate mode of analysis both for research undertaken using a small sample and for data which involve a substantial degree of complexity in both variables.

These considerations substantiate the observations about the approach that should be taken when handling interdisciplinary issues that embody complexity of this level, validating the steps already taken and directing subsequent lines of enquiry. In this thesis I am seeking to explore the impact of cultural difference at a detailed level, looking at the impact of culture in terms of the mix involved and the influence of the poles in comparison to the mid-scores.

5.2 The identification of countries to include in the analysis

Investigation into the work of researchers summarised by Caprar and Neville in 5.1.1 above revealed the need to ensure that the sample isolates a variety of cultural characteristics but also, importantly, to consider external factors such as GDP and history. This has entailed the following:

1. Identification of a shortlist of countries that have a common basis where development and GDP are concerned, from which to select the countries to be included in the case studies.
2. Reviewing the data.
 - Identification of the data being used for this part of the investigation.
 - Identification of the cultural characteristics of these countries using data provided by Hampden-Turner and Trompenaars.

- Grouping the countries into four quartiles. This is considered sufficient because literature tends to refer to countries displaying a high or low propensity for a cultural characteristic but does not normally differentiate between minor differences.
3. Compensating for missing data.
 4. Considering the impact of the weighting of the quartiles.
 5. Reviewing the spread of cultures within the shortlisted countries, in relation to the behaviours being assessed.

These activities are reported in the remainder of this section.

5.2.1 Identification of a shortlist

In order to identify a cluster of countries with a similar level of development, definitions that categorise nations in terms of their state of development were examined. These were found to be:

- The “first world” and associated “second” and “third” worlds (Brewer, 1993; Nations Online, 2013)
- “Industrialised nations” (Council on Foreign Relations, 2013)
- The “developed world” and associated emerging/developing or undeveloped nations (United Nations, 2013)
- The “western world” (Heinemeyer, 2011)

For each of these, there are a variety of definitions and there is contention with respect to which countries belong in which category (The Economist, 2006). This is further complicated by the changing status of countries as they develop.

This thesis is seeking to establish the breadth of cultural difference within developed countries, using cultural dimensions that were established at the turn of the century. Development brings about its own change. Thus it is not considered expedient to incorporate countries that have recently joined the ranks of the “developed world”, because it is considered that their development could itself cause cultural change negating the validity of the findings. Thus the countries of interest are the top 20 leading economies in terms of world trade and expansion in 2002, summarised in table 5.5:

The United States of America was not included in the rankings, the focus of the document being that of its competitors. However Sowinski reports that it was a

major actor, threatening the position of Canada. The USA is therefore included in the list of countries assessed.

Table 5.5: The top 20 nations in terms of trade, listed in descending order (Sowinski, 2002)

Netherlands	France	Switzerland	Sweden	Denmark
Germany	Italy	Ireland	Spain	Norway
Canada	Japan	Austria	New Zealand	South Korea
United Kingdom	Australia	Belgium	Finland	Singapore

5.2.2 Reviewing the data

Hampden-Turner and Trompenaars published two books that include elements of their data. The first, *The Seven Cultures of Capitalism*, limits their findings to a selection of capitalist countries. The second, *Riding the Waves of Culture: Understanding Cultural Diversity in Business*, includes a much broader range of countries. The questions also differ, demanding that I handle the data in each book separately in the initial stages of analysis. In both cases, I have separated the data into four quartiles, which delineate the countries that tend towards the poles of a characteristic, and those that tend towards the midpoint.

Appendix 6 consists of an analysis of the data from Hampden-Turner and Trompenaars' first book. However, their analysis includes many countries outside the remit of this thesis. Whilst these have not been included in the appendix, their responses have been accommodated in the identification of the range of the data to ensure that the quartiles encompass the entire spread of data and the midpoint is correctly identified. The dimension of universalism versus particularism in appendix 6 clearly demonstrates the outcome of this course of action. The lower quartiles are not populated because the lowest scores were registered by countries outside the scope of this research. Focussing solely on the data for countries within the developed world would have caused inaccuracy, because it would potentially ignore the presence of more extreme attitudes and cultures.

Appendix 7 is an analysis of their second book, and I merge and summarise the two in appendix 8. This addresses the difficulty of only having partial data in *The Seven Cultures of Capitalism*. Where both books reveal a similar range it has been assumed that it encompasses the majority of the data. However, where the data in *The Seven Cultures of Capitalism* demonstrate a narrower range, the breadth identified in the *Riding the Waves* is used to guide assumptions

relating to the manner in which the data from the two books should align, adjusting the quartiles that were identified in appendix 6. The particular changes made are documented under “Data adjustment”, below.

Unless otherwise indicated, the tables in appendices 6 and 7 show the rank order of the selected countries within the developed world divided into quartiles.

Data adjustment

It was noted that in scores relating to honesty, the eastern bloc countries formed a high proportion of the lowest-scoring countries, dramatically illustrated by Serbia registering 19% lower than the next country in the list for the second set of questions. The eastern bloc shares a common history involving oppression that appears to have distorted the data. The oppressive rule of communist states demanded a subjugated compliance, but drove activities underground (Svasek, 2002; Beissinger, 2009). Thus their history adds a new dimension to that of simply respecting or not respecting the law because having a lax attitude is not the same as actively seeking to resist the law and avoid detection. Because of this, Soviet bloc countries have been removed from data relating to universalism versus particularism.

Two further adjustments were made to ensure that both sets of data were aligned. Firstly, I reversed data where the measure focussed on opposite ends of the continuum to ensure that the end comparison was like for like.

Secondly, the range for achievement versus ascription was adjusted. This was because, at 26%, the range in *The Seven Cultures* was markedly narrower than that of the responses for two questions reported in *Riding the Waves*, which were 44% and 73%. I needed to estimate the impact that responses from a greater range of countries would have had on the spread.

The spread of data from *Riding the Waves* showed capitalist countries populating the cells toward the lower end of the continuum. I therefore assumed that in non-capitalist countries, there is potentially a tendency to respect age in preference to achievement. The range was increased to 40% by assuming that the lowest-performing nation would only have 23% of their population agreeing that achievement was to be respected more than age and the spread of data into quartiles was adjusted accordingly.

The resultant spread of data correlated more closely with the response to having to earn respect. Increasing the range further would entail moving only one country, Japan, from the third into the second quartile, and the data were then stable up to a range of 52, where the lowest datum was 11%. I was therefore satisfied that the testing of the normalised versions demonstrated that the quartiles were preserved over the majority of the data.

A further difficulty arose when assessing attitudes relating to time. These were demonstrated in both books through schematic representations of the past, present and future, the comparative size of circles denoting the relative importance, and proximity to each other denoting the extent to which one influences another. The results within the two books differ, but where there is overlap, they demonstrate some notable differences. In the case of Sweden, for instance, the future is indicated to be more important than the past in *The Seven Cultures* and of lesser importance in *Riding the Waves*. I decided to use the average of both sets of data.

5.2.3 Compensation for missing data

Missing data are a common problem when undertaking research in the social sciences. They can cause bias and should be compensated for. In many cases, missing data result from non-response, a choice taken by the respondent that can embody bias (Little and Ruben, 2002, p.75; Tarling, 2009, p.17); for instance, more respondents with a legitimate complaint are willing to complete satisfaction surveys in order to air their grievance. This, however, is not likely to be the case with this research because in one of the sources of material, *The Seven Cultures of Capitalism*, the missing data were the choice of the authors rather than the respondents.

Much of the literature relating to imputation refers to the larger datasets that demand algorithms and computation in order to handle the quantity of material. Indeed, many writers refer to the need for a large dataset in order to use these methods (Little and Ruben, 2002; Andridge and Little, 2010; Peyre, Leplège and Coste, 2011; Kaplan and Chen, 2012). The dataset in question here, however, is relatively small, enabling the use of manual methods which avoid the traps of relying on parametric methods that apply to the entire body of data.

Bias avoidance

Imputation is the process of substituting missing values with values derived from other elements of the data. In its simplest form, it uses the mean of the values that are available. This, however, can cause a bias in the response (Tarling, 2009, p.17; Lin, 2010). This bias is reduced by combining several imputations including sensitivity testing, using different assumptions on which to base the calculation of the data. The end results are combined and, in doing so, accommodate the uncertainty in the data (Mason, Richardson and Best, no date; Little and Ruben, 2002; Tarling, 2009, p.19; Lin, 2010). This is not quite the same as multiple imputation, which uses algorithms and regression to create multiple sets of data in order to accommodate uncertainty and which has been criticised for being reliant on parametric modelling (Little and Ruben, 2002, p.90).

Bias can also occur through inappropriate weighting. This can occur through the selection of data to include in the analysis. Before imputation commenced, the range of questions asked in each category was reviewed and those that were very similar in nature were removed because these would have weighted the issue involved inappropriately.

Classification of the missing data

The first consideration when imputing data is to identify the pattern of data missing. There are three commonly accepted classifications (Mason, Richardson and Best, no date; Little and Ruben, 2002; Lin, 2010; Yulei, 2010; Peyre, Leplège and Coste, 2011):

- missing completely at random (MCAR)
- missing at random (MAR)
- missing not at random (MNAR)

There are two patterns within the missing data. The first is caused by the more limited focus of Hampden-Turner and Trompenaars in *The Seven Cultures of Capitalism* giving rise to missing data classified as MNAR. There is also a more general pattern of isolated instances of missing data where the missing data would be classified as MAR.

On most occasions, the pattern of missing data is “item non-response” rather than “domain non-response” (Mason, Richardson and Best, no date). However, in this case, there are instances where the missing data relate to an entire group of questions and are therefore “domain non-response”. This can give rise to difficulties in developing substitute data. Given remedies are to review each incomplete record in order to establish appropriate substitute data or to ignore the incomplete data entirely (Little and Ruben, 2002, p.19).

5.2.4 Steps taken to compensate for missing data

Little and Ruben (2002, p.8) observed that there was little point imputing data if the variable added little to the resultant analysis. However, Peyre, Leplège and Coste (2011) warn against creating a selection bias by ignoring the respondents for which data are incomplete. In this work, the decision of whether or not to include a nation will only be taken after every effort has been made to impute the missing data. As advised by Andridge and Little (2010), care has been taken to ensure that the imputed data are not dominated by overreliance on one complete set of data which itself would create bias.

Missing data within each category were provided using the following assumptions for guidance.

Assumption 1

That the findings of other research can be used to substitute the missing data (Mason, Richardson and Best, no date). For this I used the work of Hofstede and the GLOBE, but where there was no direct equivalent, I looked to the work of others. This assumption embodies two further potential interpretations of the findings:

Hofstede and the GLOBE have produced rankings that are not entirely the same as that of Hampden-Turner and Trompenaars. When imputing the value of a country, its rank order could be preserved, ignoring the actual percentage score that it achieved, or the percentage score could be the determining factor and might produce a different order within the list of countries.

- In appendix 9, I assumed that responses would correlate with the countries directly above and below the country in question, retaining the rank order of the surrounding countries in the list.

- In appendix 10, the underlying assumption is that the country's performance for the missing questions should be guided by the percentage performance identified by the alternative source, regardless of its relation to other countries. With this in mind I compared the spread of data to that of Hampden-Turner and Trompenaars to determine the quartile in which the imputed data should fall.

The material informing the imputation guided by this assumption is as follows:

Universalism versus particularism: This dimension relates to regulation. Hofstede's uncertainty avoidance includes the characteristic of depending on laws (1980, pp.114–118; House et al, 2004, p.607), and as such is deemed compatible. A high level of uncertainty avoidance correlates with a universal culture. The findings of Hofstede (1980, p.122) have provided the missing data for this dimension.

Communitarianism versus individualism: Hofstede's dimension of individualism (Hofstede, 1980, pp.148–159) provides an inverse correlation with that of communitarianism versus individualism, the table on page 158 providing the data. House et al (2004, p.474) confirmed that the findings of some of the finer delineations of the GLOBE survey correlated with those of Hofstede.

Neutral versus affective: Relating to masculinity versus femininity, this dimension inversely correlated with the GLOBE's "gender egalitarianism" (House et al, 2004, pp.343–365) and directly correlated with Hofstede's dimension of masculinity (Hofstede, 1980, pp.176–189), with the table on page 189 providing the necessary data.

Attitude to time: Hofstede's long-term orientation and the GLOBE's future orientism are potentially equivalent measures. Venaik Zhu and Brewer (2013), however, identify a critical difference, namely that Hofstede's dimension was related to perseverance and financial planning whereas the GLOBE survey explored the relative importance of planning for the future compared with planning for immediate issues. I decided the GLOBE survey was more closely aligned to the work of Hampden-Turner and Trompenaars and used its findings relating to practices rather than values (House et al, 2004, p.304) to complete the data.

Achievement versus ascription: This dimension correlates with the GLOBE's "performance orientation", there being no equivalent in Hofstede's work. The table reflecting values (House et al, 2004, p.251) has been used to impute the data because it correlates more closely with the specific question that included missing data.

Specific versus diffused: Only a few of the questions under this section are of relevance, namely those that apply to the altruistic/humane dimension. Relating to the humane dimension, the table on page 573 of House et al (2004) has been used to provide the missing data, there being no equivalent measure in Hofstede's analysis.

Corporate culture: family: This measure is part of a matrix whereby two dimensions of egalitarianism and hierarchical are placed in conjunction with a person-oriented or task-oriented approach.

The matrix provided in Trompenaars and Hampden-Turner (1996, p.179) does not include all the nations. Attempting to recreate the matrix using the data provided for the two dimensions did not correlate with that provided by Trompenaars and Hampden-Turner, who cautioned against too rigid an interpretation of the data because of significant variety within individual cultures (Trompenaars and Hampden-Turner, 1996, p.179). However, within their text, reference to other nations such as Japan (Hampden-Turner and Trompenaars, 1994, pp.32–37, p.168; Trompenaars and Hampden-Turner, 1996, p.159), Austria (Trompenaars and Hampden-Turner, 1996, p.159), the Netherlands (Trompenaars and Hampden-Turner, 1996, p.163) and Asian countries in general (Trompenaars and Hampden-Turner, 1996, p.161) enabled completion of the data.

Attitude towards the environment: This category was handled separately. Neither House nor Hofstede refers to elements of this dimension. The question with the most missing data related to the extent to which stakeholders were accommodated. The Economist (2010) reported that European countries all took a similar stance. Aggestam (2004) confirmed this with more detail in that the United Kingdom was seen to align more with the USA than with the rest of Europe, focussing more on the stockholder than the stakeholder. This

document listed the countries under consideration and hence provided much of the missing data for this question.

Aggestam’s analysis (2004) identified an Anglo-Saxon cluster consisting of the USA, the UK, Canada and Australia. It is argued that cultural characteristics could be grouped under large regions (House et al, 2004; Ongaro, 2008). It is assumed that Ireland and New Zealand belonged to this group. Mediterranean countries were not included in Aggestam’s analysis but Schlierer et al (2012) found that the Spanish SMEs were sensitive to stakeholder needs and, whilst their use of terminology might not be the same, appeared to correlate with the performance of the French. This aligns with a geographic cluster identified by House et al (2004).

Paternalism, altruism versus humane and drive: The data for these dimensions were gathered from questions in other categories and adjusted accordingly. It was not possible to impute all of the data relating to paternalism in the corporate culture for Belgium. However, only one data point out of eight was missing and the dimension did include data that were missing from the initial material. For this reason, I considered Belgium sufficiently complete to remain in the dataset.

Table 5.6 summarises data that could not be imputed:

Table 5.6: Data that could not be imputed

Dimension	Country	Reason
Universalism versus particularism	South Korea	No additional data in the alternative study
Communitarianism	South Korea	No additional data in the alternative study
Neutral versus affective	South Korea	No additional data in the alternative study
Attitude to the environment	South Korea	No additional data in the alternative study
Altruism/humane	South Korea	No additional data in the alternative study
Achievement versus ascription	Norway, Belgium	No additional data in the alternative study
Paternalism in corporate culture	Norway, South Korea	No additional data in the alternative study
Drive	South Korea	No additional data in the alternative study

Assumption 2

The GLOBE analysis identified that behaviours of nations clustered around characteristics of geographic region and climate. These generalisations will be used to guide further imputations identified in appendices 11 (geographic region) and 12 (climate). Table 5.7 contains a summary of the sources of information required for these two imputations:

Table 5.7: Source of information for the second assumption

The GLOBE appendices and page numbers (House et al, 2004)			
Dimension	Dimension	Geography: Appendix 3C	Climate: Appendix 3D
Universalism versus particularism	Uncertainty avoidance	636–637	638–639
Communitarianism versus individualism	Individualism ¹	479–480	479–480
Neutral versus affective	Egalitarianism (reversed)	372–373	375–376
Attitude to time	Future orientation	322	321
Achievement versus ascription	Performance orientation	260–261	263–264
Specific versus diffused	Humane ²	581	580

The following were not included in the GLOBE study:

Belgium: Belgium was not included in the GLOBE study, but it is surrounded by the Netherlands and Germany and the assumption that their geographic and climatic influence will be similar has been made. Belgium has been included in the same group

South Korea: With no direct equivalents, South Korea was not included in any of the dimensions with any level of confidence.

Norway: Although Norway was not included in the survey, House et al (2004, p.184) describe it as part of the Nordic group, which confirms that it can be imputed using the criteria for this group in the geographic clusters.

The Nordic group was split between “continental” climates and “marine west coast” climates. House et al (2004, p.207) explain that it is possible for a country to straddle two climate regions, and describe the marine west coast as those countries typically between latitudes 35° and 50° with a west coast that facilitates moderation of their temperatures by the sea, whereas continental climates straddle a wider latitude of 30° to 60°. Sweden is in this latter group, and although Norway has a west coast, I have assumed because of its more northerly location that Norway shares a similar climate.

¹ This analysis does not include any clusters relating to climate. Rather than have one less set of data, imputation in appendix 12 related to “in-group collectivism values” (House et al, 2004, pp.479–480).

² The individual countries were not listed in these tables, but House et al explain the groupings at the outset, confirming that there is no need to consider the possibility that the grouping differs where there are no lists.

Assumption 3

It is assumed that data can be imputed by using complete data from a respondent with a similar pattern of responses to other questions (Little and Ruben, 2002), provided good matches are identified in the process (Andridge and Little, 2010). In order to ensure a good match I identified matching pairs in each dimension rather than for the entire dataset (appendix 13).

Where more than one country shared responses with the country to be imputed, the average of the two countries was used as a guide. At this stage, countries for which there were insufficient data in the responses provided by Hampden-Turner and Trompenaars to facilitate imputation with any reliability were removed. These countries are summarised in table 5.8:

Table 5.8: Data that could not be imputed for the third assumption

Dimension	Country	Reason
Universalism versus particularism	Austria, Norway	No original responses
	South Korea	Could not establish similarity
Communitarianism versus individualism	Austria, New Zealand	No original responses
Paternalism ¹	Austria, New Zealand, South Korea	Incomplete dataset
Neutral versus affective	South Korea	Incomplete dataset
Drive	Austria, Belgium, New Zealand	Incomplete dataset
Altruism/humane	South Korea	Incomplete dataset
Achievement versus ascription	Belgium	Incomplete dataset

Assumption 4

It is assumed that the missing data can be replaced by the mean average of the other scores available for the nation in question (Peyre, Leplège and Coste, 2011). This assumption does not rely on further external data but will only provide the missing data for countries for which there are some data from which to determine the mean. I did not consider this to be acceptable for countries where more than half of the data were missing. The average figure calculated from the original material (appendix 8) was used. The countries identified in the above table that had no original responses were not included in this iteration.

Sensitivity to the use of median or mean in summarising the output from the various imputations was tested. Little difference was observed, with only a few

¹ Belgium had one of the eight elements of data for paternalism missing, but I considered this to be acceptable because of the small proportion of missing data.

instances where it might be considered to be worth further investigation. The mean was used for the remainder of the analysis because it incorporates all of the assumptions involved in the imputation. Using the median could result in being overly influenced by the value of the central data point.

5.2.5 Weighting the quartiles

As explained in section 5.2, the data have been clustered into quartiles. The distribution of the data was conducted in a manner that retained their linear nature. However, in considering the subsequent treatment of quartiles it is necessary to consider the characteristics of the data because they could potentially fall into one of three categories:

- a. The impact of the cultural characteristic on action that supports the environment is linear, suggesting the weighting should be linear.
 - This would suggest weights of 0.125, 0.375, 0.625 and 0.875. This is in effect giving a weight of 0 to 1 but taking a central point for each quartile.
- b. The impact of the cultural characteristic on environmentally friendly action is to some degree exponential, suggesting that the lowest-ranking levels of a culture would not influence the behaviour and should be set at zero, and the scale used reflects the increasing influence of the higher-ranking groups.
 - This would suggest weights of 0, 0.05, 0.375, and 0.875. These weights have been selected because they retain the same upper limit but would plot a curve.
- c. The characteristics between some of the poles of the dimensions actively oppose each other, suggesting the lowest quartile could actively work against a specific outcome rather than contribute little to its occurrence
 - This would suggest weights of -0.875, -0.29, 0.29 and 0.875. Once again, the same upper limit has been retained, but the opposite pole has been given an equal and opposite weighting, with an assumption that the midpoint between the two poles represents a neutral position.

The effect of the different weightings

The negative weighting

In that the linear nature of the weighting was retained, the rank order of the countries was not the issue in question. However, the wider range and negative weighting to the opposite pole emphasised the countries in the upper and lower quartiles. Using the potential to offer financial aid as an example, the two weightings produced results as shown in figure 5.1.

The point along the continuum at which action is neutral, where this assumption would suggest the characteristic leads to behaviour that neither wilfully ignores the demands of sustainability nor seeks to take positive action, has been set arbitrarily at the midpoint. However, the impact of this choice suggests that only two countries are likely to offer financial aid, which is not a likely outcome. This would suggest that the negative pull of the pole is not likely to be “equal and opposite”.

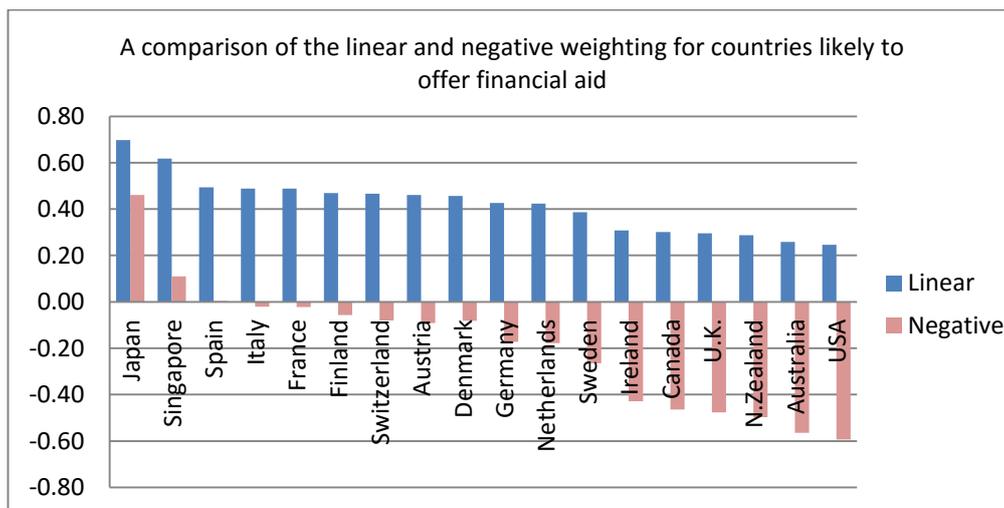


Figure 5.1: A comparison between linear and negative weighting

The exponential weighting

The use of this weighting is supported by the assumption that the pole found not to correlate with certain behaviour causes a level of inertia that impedes a proactive approach to support sustainable initiatives. In moving from a linear relationship to an exponential one it is also feasible that the rank order of countries in the analysis will change. It was anticipated that the exponential nature of the weighting would emphasise the performance at the two poles.

The greatest degree of change is seen in the cultures believed to support the offering of financial aid (figure 5.2), where it can be seen that there is some difference to the rank order in the mid-ranges but little at the two ends of the continuum. The lower level of apparent performance is to be expected because of the reduced level of contribution from all but the upper quartile.

The full implications of using an exponential weighting have been assessed through the construction of graphs that compare this weighting with a linear one together with the performance for the equivalent dimension for the same countries provided by the GLOBE survey and Hofstede. In every case, the linear weighting was either very similar to the other two frameworks or closer to them than the exponential weighting. The manner in which I assess the better fit is discussed in section 5.2.7 and a full set of results is provided in appendix 14. It is concluded that use of linear weighting is sufficiently robust.

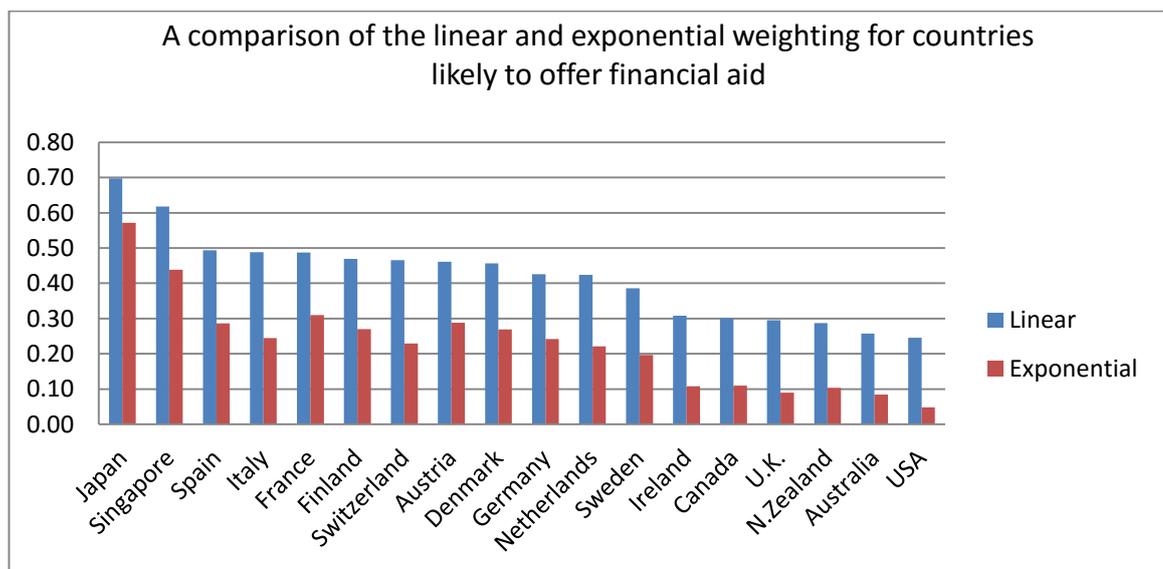


Figure 5.2: A comparison between linear and exponential weighting

5.2.5 National response to sustainable development based on cultural analysis.

In table 5.9 I collate the results according to the associated behaviour. This summary identifies trends that could determine the manner in which nations respond to the challenge of sustainable development.

Table 5.9: National culture aligned with style of governance

Behaviour	Hampden-Turner and Trompenaars		The countries closest to the desired character	The countries furthest from the desired character
Sensitivity to ethical behaviours (including sustainable development) and standards	Paternal and egalitarian	H	Japan, Spain, Singapore	Canada, Netherlands, Australia, USA
	Neutral versus affective	L	France, Spain, Finland, Denmark	Japan, New Zealand, Austria, Australia
	Achievement versus ascription	L	South Korea, Austria, Spain, Japan	New Zealand, Ireland, Canada, USA, Australia
	Aggregate		Spain, France, Finland	UK, USA, New Zealand, Canada, Australia
Diffusion of sustainable practice	Individualism versus communitarianism	L	Japan, Singapore	UK, Netherlands, Australia, USA, New Zealand
	Attitude to time	H	Denmark, South Korea, Norway, Switzerland, Japan	UK, Italy, Ireland, Spain
	Aggregate		Japan, Singapore, Spain	Netherlands, USA, Ireland, Australia
Ethical standards and capability	Neutral versus affective	L	France, Spain, Finland, Denmark	Japan, New Zealand, Austria, Australia
	Paternal and egalitarian	H	Japan, Spain, Singapore	Canada, Netherlands, Australia, USA
	Achievement versus ascription	L	South Korea, Austria, Spain, Japan	New Zealand, Ireland, Canada, USA, Australia
	Universalism versus particularism	H	Switzerland, Canada, Sweden, Australia	Japan, France, Italy, Belgium, Singapore
	Aggregate		Spain, Singapore, Japan, Italy, France	UK Canada, USA, New Zealand, Australia
Policy development	Attitude to the environment	H	Norway, France, Austria, Switzerland, Denmark	Sweden, Spain, Belgium, UK, Italy
	Universalism versus particularism	H	Switzerland, Canada, Sweden, Australia	Japan, France, Italy, Belgium, Singapore
	Neutral versus affective	L	France, Spain, Finland, Denmark	Japan, New Zealand, Austria, Australia
	Paternal and egalitarian	H	Japan, Spain, Singapore	Canada, Netherlands, Australia, USA
	Aggregate		Sweden, Finland, Spain	Austria, Australia, New Zealand
Financial support for sustainability initiatives (GLOBE)	Attitude to time	H	Denmark, Switzerland, Japan	Australia, USA, UK, Italy, Ireland, Spain
	Altruistic (humane)	H	Japan, Singapore, Finland, Spain	USA, UK, Australia
	Achievement versus ascription	L	South Korea, Austria, Spain, Japan	New Zealand, Ireland, Canada, USA, Australia
	Individualism versus communitarianism	L	Japan, Singapore	Netherlands, Australia, USA, New Zealand
	Drive	L	Japan, Singapore	USA, New Zealand, Belgium
	Aggregate		Japan, Singapore, Finland	UK, USA, Australia

The national cultures associated with each behaviour are charted in more detail in appendix 15.

5.2.6 Characteristics of the GLOBE survey

Bearing in mind the criticisms of secondary analysis of primary data, specifically those relating to the potential for a flawed analysis resulting from a lack of understanding of the processes involved in developing the original data, I have conducted a detailed comparison of the GLOBE, Hofstede, and Hampden-Turner and Trompenaars frameworks.

In section 2.4.7 of the literature review I referred to the dual aspect of the GLOBE survey in that it created scores for both values and practice. It was also claimed that these were at times substantially different, and did not correlate directly with those of Hofstede.

A comparison of the scores for the countries involved in this study substantiates these findings and identifies further difficulties in comparing the scales. The GLOBE survey provided a score out of 7, and the highest score was 6.37 and the lowest was 2.7, meaning that most fell into a very narrow band with little difference evident between many nations. In contrast, Hofstede's scale was from 1 to 100, and where compensation for response bias was accommodated, the resultant score was at times higher than this. The lowest score was 6, indicating the spread of results. Similarly Hampden-Turner and Trompenaars used the full range of scores up to 100, and my subsequent handling used a central number for each score, meaning the highest score that could be achieved was 0.875 and the lowest 0.125. The impact of this is explored in greater depth below.

The dual aspect of the GLOBE survey

The GLOBE survey produced a ranking for practice and values. Figure 5.3 demonstrates the most extreme case, where the score for values was nearly inverse to that of practice.

The degree of difference was inconsistent across the dimensions and is illustrated by the chart for assertiveness, which was the least extreme, although a tendency towards a negative correlation can still be observed (figure 5.4). The full set of charts is in appendix 16.

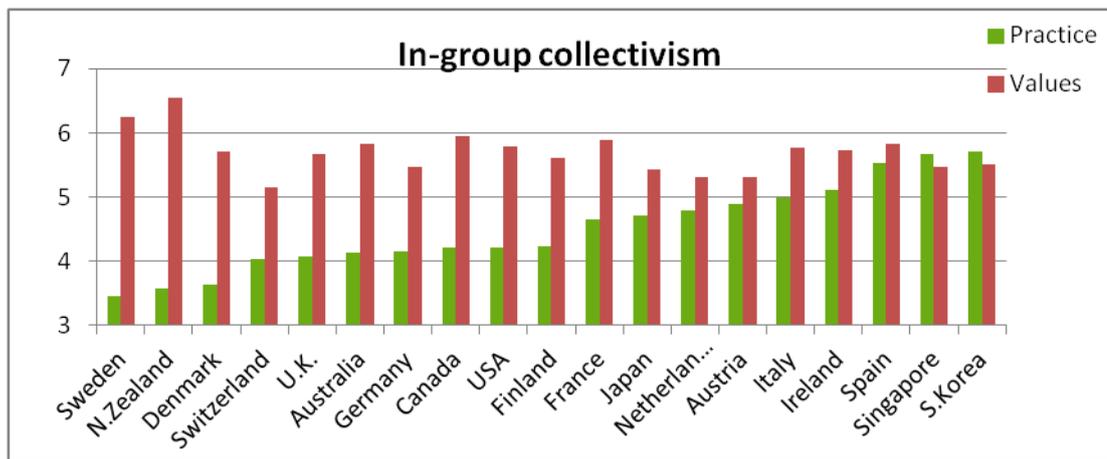


Figure 5.3: A comparison of the scores for practice and values relating to in-group collectivism

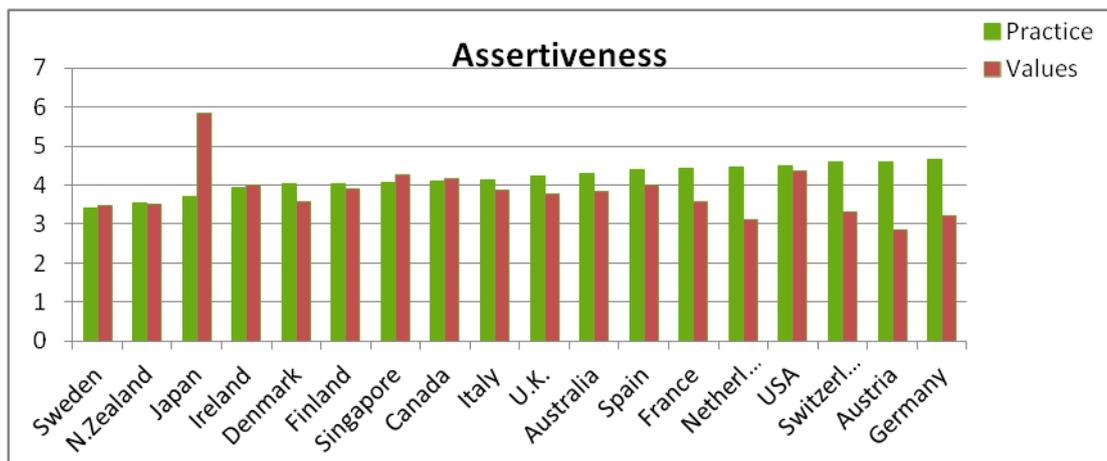


Figure 5.4: A comparison of the scores for practice and values relating to assertiveness

The set of “practice” scores was deemed more appropriate for comparison than that of values for two reasons. Firstly, the original researchers used the practice rankings rather than the values (Parboteah et al, 2012; Waldman et al, 2006). Secondly, in this thesis I concentrate on actions taken by the nations in question.

The spread of scores in the GLOBE survey

The spread of data for some of the dimensions is very limited, as demonstrated in figure 5.5 where the values scores for power distance range from 2.43 to 3.56 and those for practices range from 4.14 to 5.68, on a scale of 1 to 7. The differences between this, Hofstede’s dimensions, and the scales I produced using Hampden-Turner and Trompenaars’ data are clearly evident, such that in comparative graphs I have shown the results for Hofstede and my results on the left-hand axis and those for the GLOBE survey on the right-hand axis.

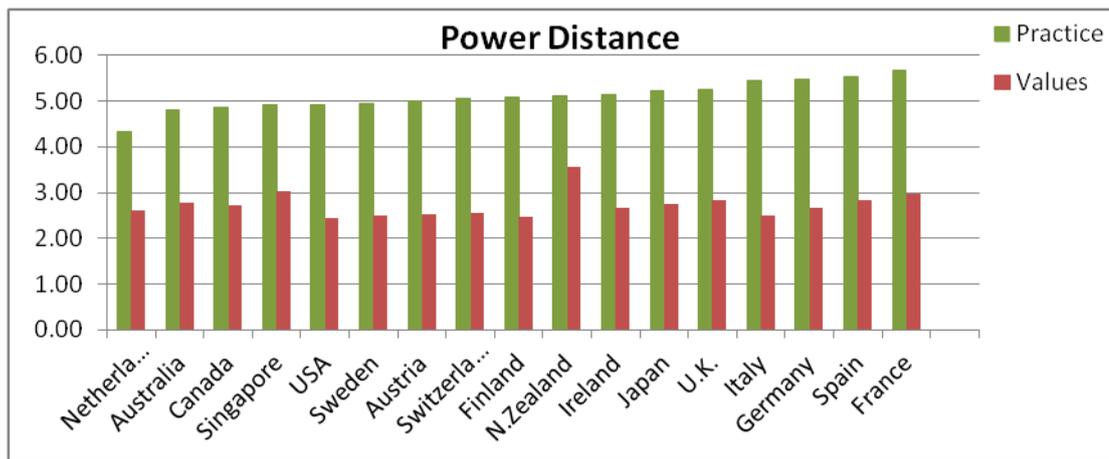


Figure 5.5: The spread of scores for the two measures for power distance

5.2.7 A comparison of the three frameworks

Section 2.4.8 of the review of literature contained reference to the critique undertaken by others of the compatibility between different frameworks. These concentrated on the GLOBE project and Hofstede’s dimensions, and mostly concentrated on methodology and the finer delineation between the descriptions of the dimensions. At this stage, this study is comparing the ranks given to the nations in question and comparing these with the similar measures developed from Hampden-Turner and Trompenaars’ data.

I identified correlation visually. This approach is argued to provide greater accuracy than the use of statistical measures which are influenced by the presence of outliers and prevent insight into the precise character of the correlation (Zhang et al, 2015). The impact of outliers is greater in a small sample, as with this research. A framework for charting similarity is outlined below.

Figure 5.6 illustrates the extent of similarity established between the frameworks for paternalism and power distance against both the linear and exponential weighting for my results created from Hampden-Turner and Trompenaars’ database.

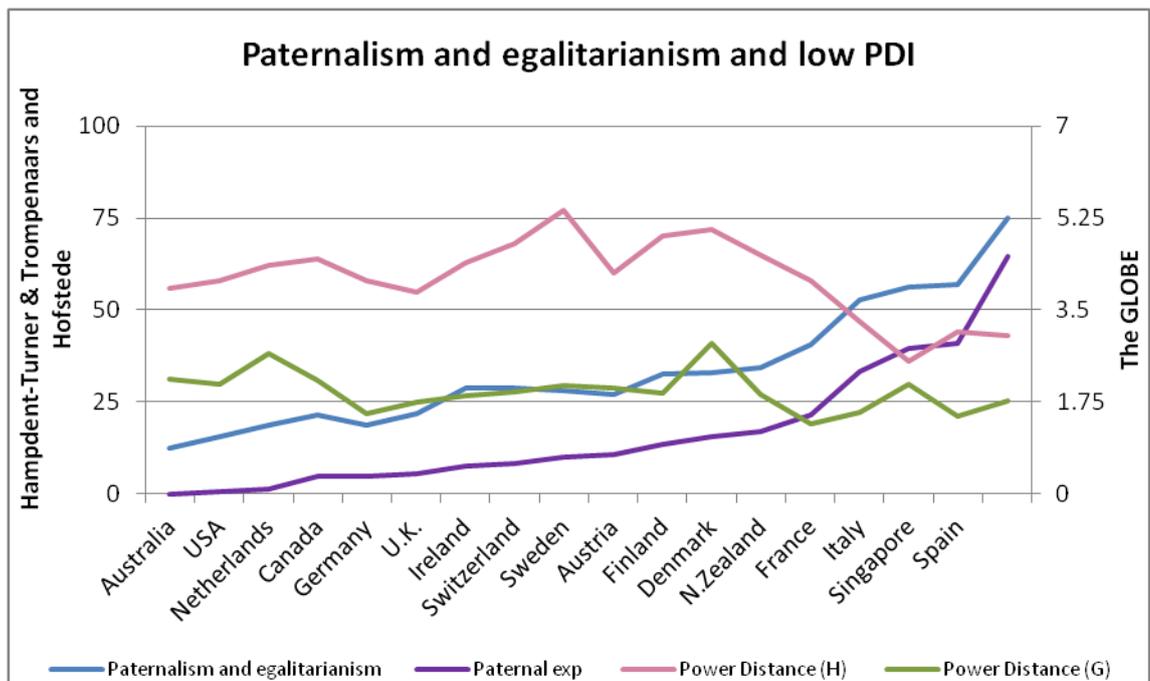


Figure 5.6: A comparison of frameworks representing paternalism and low power distance index (PDI)

In this case, no similarity is established between the GLOBE project and the responses from Hampden-Turner and Trompenaars, and only half of the responses are similar between Hofstede's power distance and the selected Hampden-Turner and Trompenaars responses. This is described in table 5.10 at the end of this section. However, the chart demonstrates how closely my set of figures correlates with those of the GLOBE survey for the Germanic countries and the British in a way that the correlation coefficient could not. I have also included the version of my scale using the exponential weighting, which shows a very similar curve to the linear one, but the detail in the mid-ranges is not quite as close as that using the linear version.

In comparison, figure 5.7 shows a closer correlation between the GLOBE project and Hofstede's uncertainty avoidance dimensions, and a degree of association is evident between these and Hampden-Turner and Trompenaars' universalism versus particularism. In this case, about half of the GLOBE responses echo Hofstede's. The curve I developed from Hampden-Turner and Trompenaars' data using a linear scale moves in roughly the same direction and at best can be described as a one-quarter match. It also falls within a similar range to two thirds of the countries in Hofstede's scale.

The version of my scale that has been created using an exponential weighting rises faster than the linear version and is consequently a worse fit.

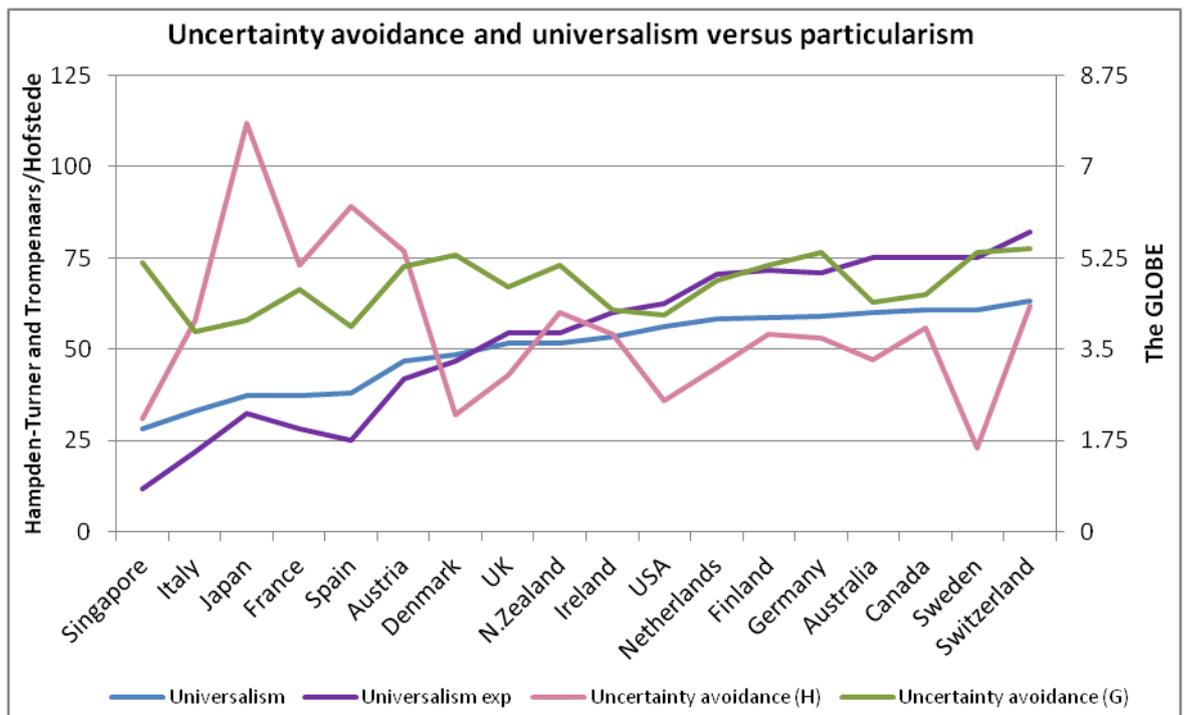


Figure 5.7: A comparison of frameworks representing uncertainty avoidance

In table 5.10, I summarise the level of similarity found between the three frameworks which are fully analysed as above in appendix 14. There was a clear similarity with all but two of the dimensions between the framework I created from Hampden-Turner and Trompenaars' dimensions and the GLOBE project.

Having collated the data in table 5.10 it is clear that in spite of a low level of similarity between the three frameworks, the framework I have developed can be considered to be tenable. There are a number of reasons why I draw this conclusion.

- With just 21 nations involved, it is a comparatively small sample, making the identification of correlation less reliable.
- The variation between two sets of indices developed by the GLOBE suggests that it would be unreasonable to expect a close match.
- Hampden-Turner and Trompenaars observed that distinctly different responses were obtained from the same set of respondents by simply rephrasing the question.
- Researchers have placed confidence in the indices of both Hofstede and the GLOBE even when their responses show little similarity.

- Although not significantly similar, there are more incidences of similarity between the index I have developed and Hofstede's index or the GLOBE survey than there are between the latter two frameworks.

This last point is important. The purpose of the activity was to establish a framework that I could use to test the findings of researchers using the other two frameworks. The fact that my index showed a greater similarity to both of these than they did to each other suggests that it is good for the purpose.

Table 5.10: A summary of the similarity between the three frameworks

Dimension	Hofstede versus the GLOBE	Hofstede versus Hampden-Turner and Trompenaars	The GLOBE versus Hampden-Turner and Trompenaars
Uncertainty avoidance and universalism versus particularism	Poor match, different range	Minimal, similar range for 2/3 of countries	Minimal
Neutral versus affective and masculine	Poor match	1/4, similar range	1/2 is a close match including range
Individualism	Association	Association 1/4, similar range	Minimal association
Paternalism	<1/4	Mixed: 1/3 negative, 1/4 close positive but dissimilar range	1/2 close match, 2/3 similar range
Drive and assertiveness	N/A	N/A	Some association, similar range
Attitude to time and future orientation	1/2 but different range	<1/2 but different range	1/3, similar range
Achievement versus ascription	N/A	N/A	No association
Altruistic and humane	N/A	N/A	No association

The lack of a close match between the different frameworks also substantiates the grounds for caution when using statistical analysis based on any framework for cultural dimensions.

5.2.8 Summarising cultural variety

The above analysis was undertaken in order to provide a framework against which to assess the compatibility of the cultural dimensions established by Hampden-Turner and Trompenaars with those of Hofstede and the GLOBE survey in respect to national initiatives that support sustainable development.

Research into cultural behaviour is a well-established discipline. However, investigation into the impact of culture on sustainable development is an area of

research that is in its infancy, and involves two subjects that are both complex in nature.

The most problematic issue with the subject area is the nature of culture in that it interacts with other dimensions, such as education or politics, and therefore, as with the case with one of the papers, if no effort is made to ensure similarities exist in all aspects apart from the dimension of interest, especially when the analysis is conducted statistically, there is no ability to claim that there is a clear correlation between behaviours and culture.

Using Caprar and Neville's meta-analysis and Hampden-Turner and Trompenaar's analysis of cultural characteristics as sources of data, it has been possible to explore the manner in which countries could be expected to act in respect to sustainable development. This activity has assumptions embedded within it, but is sufficient to underpin the next activity: that of identifying countries with sufficient difference that can be the focus of case study development.

Finally the dimensions established using data from Hampden-Turner and Trompenaars were compared with their equivalent dimensions in the GLOBE project and Hofstede's values. This demonstrated that there was sufficient albeit weak similarity among most of them to substantiate the intended comparison.

5.3 Embedding cultural characteristics into the research method

The rest of this chapter explains the development of case studies investigating the manner in which governments, principally at local authority level, support small to medium sized enterprises (SMEs) in adopting clean technologies. The next two sections concentrate on explaining the underlying reasons for selecting the focus of the study and the sample concerned. The final part of this chapter is devoted to explaining the approach taken for the control study.

5.4 Relations between governments and SMEs as measure for environmental performance

The investigation into the factors relating to paradigm change in chapter 4 revealed that the agent with the most potential influence was the government, yet Steger labelled governments as bystanders because of their broad remit demanding a stable economic platform in order to promote social welfare (section 4.5.2). This suggests that action within governments is an appropriate

indicator of the importance that they attach to balancing the triple bottom line and, in particular, the environmental element.

A further reason for believing that focussing on government action is appropriate stems from the nature of national culture. In selecting a focus for empirical work relating to national culture it is important to ensure that individual actions are not used as examples because they may not be representative (Hofstede, 1984; Hofstede, Hofstede and Minkov, 2010, p.147). The public nature of governments means that they are more representative of a culture than individual organisations.

It could be argued that the cultural dimensions that are identified by theorists apply only to the corporate world, and not to governments. However, the work of Caprar and Neville (2012) summarised research that purported to have found correlation between government action and cultural dimensions, and the nature of culture discussed in section 2.4 of the review of literature is such that it arguably underpins actions and decisions made in every walk of life. This question of the relevance of corporate culture when assessing the action of governments is considered in the discussion of findings, in section 11.7.2.

In section 2.7.2 of the review of literature, I established that the propensity to be proactive in government depended in part on the political persuasion of the ruling body. Politicking, however, meant that this could not necessarily be determined through examination of campaign documentation; rather, it required a review of actual actions. It would be inappropriate, therefore, to attribute all behaviours to culture alone. It was considered necessary to establish the extent to which political persuasion could also play a part. For this reason, the final chapter presenting the findings of the empirical work is a subsidiary study into the actions and performance of a sample of London boroughs, ensuring different political persuasions are represented, but against a backdrop of a similar culture.

Focussing the research on support for the SME was also a carefully considered choice. Large businesses have greater resources to facilitate investment in the identification and adoption of best practice. Small to medium sized enterprises, on the other hand, do not have the same facility. Therefore it is the SME that needs government support. However, it is recognised that such support could at

times be subsumed into more generalised action. This means that the study will not concentrate solely on support that is specifically for SMEs, but will include all action that would be of benefit to them.

5.5 A justification for the choice of countries

Purposive sampling has been used in order to select four countries that demonstrate different attitudes in order to develop a case study for each. Two measures have been used to guide the selection. These were the responses to questions raised by Hampden-Turner and Trompenaars in their two publications, namely whether countries believed it was worth seeking to control nature (Trompenaars and Hampden-Turner, 1997, p.143), and the extent to which they are seen to protect the environment from a long-term perspective (Hampden-Turner and Trompenaars, 1994, p.262). The scores given to these two questions are summarised in a matrix with the selected countries highlighted (figure 5.8).

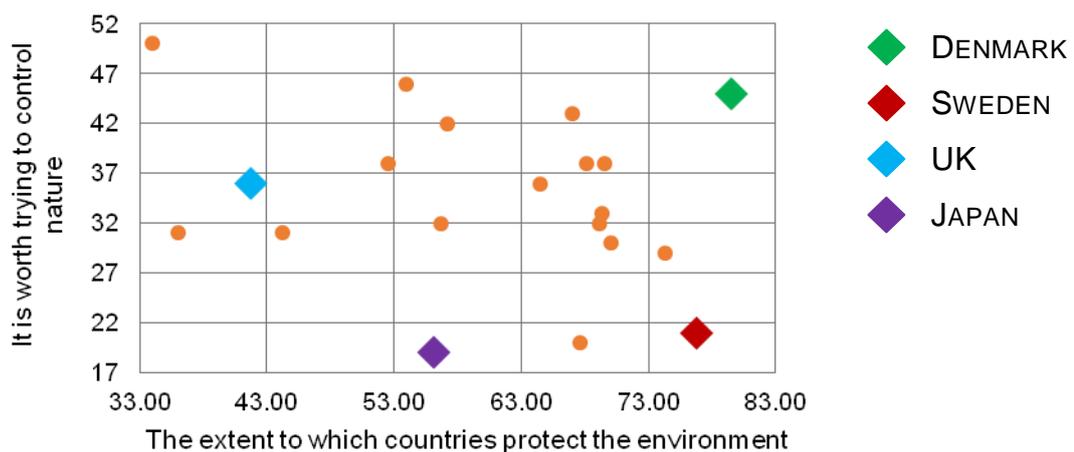


Figure 5.8: Responsiveness to the environment used as a basis of the purposive sample

The choice of countries has ensured that the spread encompasses extremes in every sector. The United Kingdom does not offer the most extreme position in the upper left area, but it was selected because it also had a capital that was governed by local authorities of different political persuasions, facilitating a study into the impact of politics as outlined in section 5.

Further factors influencing the choice of the countries are as follows:

- I was looking for a country in each quadrant of the matrix.
- The decision to use the United Kingdom as the focus for one case study was confirmed because at the time of identifying national cultures, the

available data suggested that of the 21 countries included in the comparison in appendix 15 it was among the lowest-scoring nations in all but diffusion of good practice.

- When equated with countries that believed it was worth seeking to control the environment, Denmark was 5% lower than the highest-ranking country (Trompenaars and Hampden-Turner, 1997, p.143). In addition to this, Copenhagen was a winner of the 2013 city climate leadership award and is seeking to be the first carbon-free city in the world with a target date of 2025 (C40 Cities, 2013).
- With respect to its belief that it is worth controlling nature, the response relating to Sweden was only 2% higher than the lowest-placed country; however, Stockholm is reported to be in the forefront of cities that are promoting sustainable economic growth (LSE Cities, 2013).
- Where attitudes to the environment are concerned, Japan appears to be the opposite of the United Kingdom, having the lowest regard for the worth in seeking to control nature, and being mid-range in its efforts to protect the environment, whereas the United Kingdom is mid-range in its belief in the value of controlling nature and one of the lowest where effort is concerned. When reviewing the other dimensions believed to be relevant to sustainable development, Japan consistently demonstrated different characteristics from the western nations.

5.5.1 A check to ensure that the spread of cultures provides sufficient breadth

The selection of countries was undertaken on the strength of two characteristics and subsequent action. However, this was no guarantee that the sample would produce a wide range of characteristics for each of the dimensions in question.

A summary of the salient cultural dimensions is illustrated in figure 5.9, where the difference between the eastern and western cultures is apparent. Denmark and Sweden both show a higher level of the relevant characteristics than the UK in every dimension apart from universalism.

The three western nations are similar with respect to paternalism, drive and individualism, whilst Japan provides a stark contrast. Denmark and Sweden

differ the most markedly from each other in respect to their attitude to time and universalism.

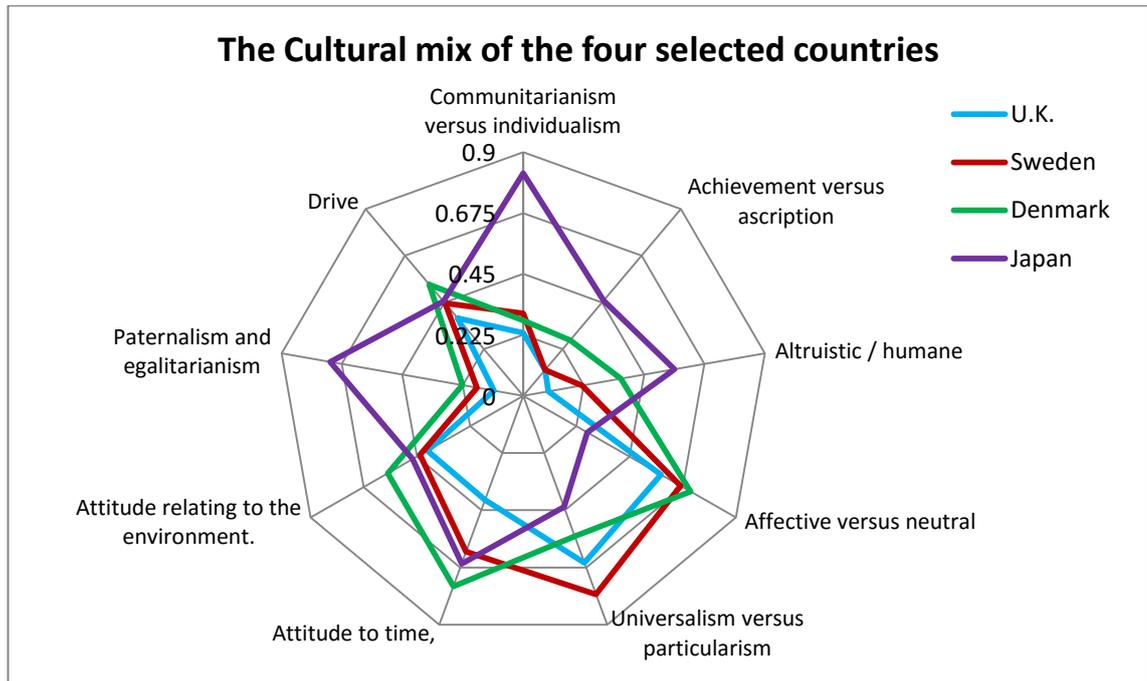


Figure 5.9: The variation in cultural dimensions that are associated with sustainable development

In addition to these critical points of comparison, further characteristics that have been demonstrated to influence action where sustainable development is concerned are also considered. All the countries are developed and educated. The Nordic countries share a similar history and geographic influences (House et al, 2004, p.184). The three western countries share the same classification of political system, which according to Mauritzen and Svava is that of a “committee-leader” structure (Hofstede, 2010, pp.306–307).

Further characteristics support the ability to make comparisons in spite of a small sample size. Varying in size and population density, all the countries have a large exposure to coastal waters, being either islands or peninsulas. Both Japan and Sweden have a large proportion of their landmass that is inhospitable for habitation. Over 99% of businesses in each nation are SMEs.

Figure 5.9 has represented all of the poles of the cultural dimensions that support sustainability initiatives towards the perimeter of the spider graph. Bearing in mind that the values used are representative of the position at the turn of the century, this analysis demonstrates that the selection embodies sufficient cultural difference.

5.6 Government communication in the 20th century

My data are to be gathered by examining, as far as possible, information published on government websites. There is a need to first consider its suitability. The birth of the Internet heralded the birth of the information age, which caused a paradigmatic change in communication methods within business and some governments (Fraser, 2007). The Canadian government set the trend of using the Internet to communicate to the populace, including disseminating the demands of sustainable development initiatives and coining the term “e-government” (Fraser, 2007). E-government is becoming more widespread as its capacity to assist knowledge exchange is recognised, but as yet it is not widely researched (Ryan et al, 2012). The two activities most commonly utilised are those of disseminating information and of offering services (Ryan et al, 2012).

This propensity to use the web in this way facilitates data-gathering for this research because such communication is public and thus accessible. However, there are further considerations that should be taken into account in order to assess the effectiveness of this approach.

The manner in which the webpage is constructed is of importance. The visibility of relevant material and the ease with which it can be identified is fundamental to knowledge exchange (Barnes and Vidgen, 2003; Phang, Kankanhalli and Sabherwal, 2009; Ryan et al, 2012), and this is only effective if the recipient of the message demonstrates a desire to find it (Phang, Kankanhalli and Sabherwal, 2009) and has the ability in terms of time and resources to engage in boundary spanning (Teigland and Wasko, 2003). These findings are pertinent to e-government, where ease of use ranked the highest in user requirements (Barnes and Vidgen, 2003).

Similarly, the reliability of information was seen to be important (Barnes and Vigden, 2003; Ryan et al, 2012), achieved in part by the reputation of the entity providing the material (Barnes and Vigden, 2003). A further characteristic that has been identified for a successful engagement in knowledge exchange is that of “sociability”, whereby networking including the sharing of experience is facilitated (Barnes and Vigden, 2003; Phang, Kankanhalli, and Sabherwal, 2009). This is trusted the most by the knowledge-seeker when there is evidence

of an expert that validates the comments made (Phang, Kankanhalli and Sabherwal, 2009). Other dimensions seen to denote quality in e-government websites are more subjective and not pertinent to this research.

5.6.1 The use of e-communication in this research

In reviewing the actions of local authorities in London, their webpages are the primary vehicle for communication that will be assessed. This is because, as explained in 5.6 above, e-government is becoming more widespread, and London's local authorities all have their own webpages advertising their services to the local residents.

It cannot be assumed that e-communication is a direct replacement for other forms of communication, and it is necessary to consider relevant theory. Berlo (1960) identified several elements to communication that should be considered:

- Both parties to communication, namely the originator and the receptor of information, are influenced by their own attitudes, their knowledge, the social system and culture.
- The manner in which the message is constructed is important. Whilst the basic content could be the same, the manner in which it is received is influenced by the way it is presented and the terminology involved.
- The channel used to transmit the message is influential. Communication involves transient stimulation of the senses, and it has been established that subsequent memory depends on the manner in which the message was communicated, reading being the most inefficient method (Flannigan, 1997; Wesson, 2012).

When relating communication to the medium of the web, further consideration has to be made. In that webpages are not targeted at a specific user, it is necessary to format them so that they support all users. This means that assessment of e-communication also demands the consideration of navigability, careful organisation of content and the facility to complete the desired activity (Gregory, Youcheng and DiPeitro, 2010).

5.7 A framework for evaluating sustainable development

"Sustainable development" is an umbrella phrase that is used to describe any situation that needs management of resources underpinning the economy,

society and the environment. I concentrate on environmental sustainability, and it is necessary to identify the range of factors that this involves in order to assess the scope of activity taken by governments.

In broad terms, business-related environmental issues involve resource depletion, pollution and the emission of greenhouse gases (Welford, 1997; de Sena, 2009).

There are three frameworks that have been considered and compared in table 5.11. ISO 14000 is an internationally recognised voluntary standard for environmental management within businesses which lists the issues that a business should consider (Starkey, no date, in Welford, 2001). Similarly, the OECD has established a list of criteria against which performance should be measured (OECD, 2014). The final framework is that used by the FTSE4Good series. This series is a financial index listing the best-performing industries according to their ethical rankings. The criteria are divided into three categories, being governance, social and environmental care, but only the environmental criteria are included in this study (FTSE, 2014).

Table 5.11: A comparison of environmental frameworks

Category in ISO 14000	OECD¹	FTSE4Good
Air emission	Emissions of air pollutants Greenhouse gas emissions	Climate change
Wastewater effluent		Water use
Waste management	Generation of primary waste by sector Municipal waste – generation and treatment	Pollution
Land contamination		
Raw material and natural resource usage	Material resources	Resources
Impact on local communities	The impact on local communities is addressed largely in air emissions	Bio diversity

ISO 14000 is a self-managed scheme with each participating organisation setting its own targets and objectives. For this reason its framework is only loosely structured, indicating the categories where action could be deemed advisable. The OECD provides a much more detailed range of business-facing

¹ The following have been omitted from the list because they are not relevant to urban SMEs: forest; biodiversity (threatened species); land resources; water (freshwater abstractions; freshwater resources (long term annual average, billion m³); lake and river quality; wastewater treatment (%population connected)); instruments used for environmental policy; environmental expenditures and revenues.

indicators including productivity achieved from the resources used, summarised in table 5.12, and financial measures, summarised in table 5.13.

Table 5.12: OECD green growth indicators: environmental and resource productivity

CO ₂ Productivity	Production-based CO ₂ emissions, index 1990 = 100	
	Production-based CO ₂ productivity, US\$ per kg of CO ₂	
	Production-based CO ₂ intensity, tonnes per capita	
	Demand-based CO ₂ productivity, real net national income per unit of CO ₂	
Energy productivity and energy renewables	Energy productivity and intensity	Energy productivity, US\$ per ktoe
		Energy intensity, toe per capita
	Renewable energy	Renewable energy supply, % TPES
		Renewable electricity, % total electricity generation
Material (non-energy) productivity	Material (non-energy) consumption	Non-energy material productivity, US\$ per kg

(OECD, 2014b)¹

Table 5.13: OECD green growth indicators: monitoring economic opportunities and policy responses

Green technology and innovation	RD in environment and energy	Public spending in environmentally related R&D, % total public spending
	Green patents	Green patents, index 1990 = 100
		Patents – Electric and hybrid vehicles, % total PCT patents
		Patents – Energy efficiency in buildings and lightning, % total PCT patents
		Patents – Renewable energy, % total PCT patents
		Patents – Air pollution, % total PCT patents
		Patents – Water pollution, % total PCT patents
		Patents – Waste management, % total PCT patents
Environment prices, taxes and transfers	Environmentally related taxes	Total environmentally related taxes, % GDP
		Labour taxes, % GDP

(OECD, 2014b)

Of the three frameworks, that provided by the OECD is clearly more detailed and consequently the case studies have been evaluated in a similar manner, to which has been added the provision of financial support as explained below.

5.8 The structure of the case studies.

In section 2.4.1 of the literature review I argued that culture is a multifaceted concept embodying beliefs and values rooted in the subconscious, through to their outworking in the form of behaviours and artefacts. It was also noted in

¹ The following categories have been omitted, bearing no relevance to the urban SME: the socio-economic context and characteristics of growth; monitoring the natural asset base (freshwater, land and wildlife base); monitoring the environmental quality of life; international financial flows (official development assistance).

section 2.5.6 of the review of literature that the rational decision resulted from considering all the implications that are pertinent to the decision being made. Section 5.1.3 referred to such factors that were identified by Christie et al (2003) that could not be considered cultural but influenced action. These were history, education and GDP. In addition, in section 2.8.5 of the literature review, I showed that a different level of environmental performance was achieved depending on geographic factors such as the population density.

With the above in mind, each case study commences with an overview of the land and people concerned, identifying characteristics of the country that could influence behaviour, including the land and population sizes, available resources and economic performance.

I then provide an outline of the government structure including the scope of control of the different levels of government, which is followed by the data and associated discussion addressing the five areas of research summarised in table 5.9 and explained in 5.8.1 below. This is largely qualitative, but is augmented by performance provided by third parties, including the longitudinal performance provided by the OECD.

5.8.1 Data collection

The above section (5.8) and section 5.5.1 of this chapter included reference to a number of variables that influence action. These supplementary variables will be examined in the investigation of London, whose 32 boroughs furnished richer data than were available elsewhere.

Policy creation

Policies are statements of intent that guide focus on the development of decisions and legislation (Gov.UK, no date c). Policies at all levels of government (national to local, with respect to the capital city) will be examined.

The paper that identified a correlation between policy development and culture had concentrated on the scope of policies that had been developed within business (Scholtens and Dam, 2007). This research is assessing whether this pattern translates to government action and will similarly assess the scope of policy as well as the extent to which environmental policy development is embedded in the government in the form of agencies and supporting organisations. For this reason the blurring that can occur between policy and

strategy will be ignored because the strategy itself is evidence of the scope of concern demonstrated by the government.

Sensitivity to ethical behaviours

The papers that found correlations between sensitivity to ethical behaviours and cultural dimensions summarised by Caprar and Neville (2012) reviewed ethical attitudes and CSR values along with the ability to judge ethical and unethical scenarios. This will be assessed through examination of statements defining sustainable development, planning documents and usage of terminology.

Ethical standards and capabilities

The cultural characteristics found to support this criterion were only marginally different from those supporting sensitivity to ethical behaviours. It will be assessed through the identification of performance objectives and assessment of the extent to which they are achieved using data from OECD and Harvard as well as reports generated by the countries themselves. I also consider external factors that are raised by the government as impediments that limit the range of action that could otherwise be taken. These limit capability and potentially cause action that would otherwise be at odds with declared sensitivity to ethical behaviours.

The provision of financial support

The paper that identified a correlation between culture and the provision of financial support investigated the extent to which individuals would be prepared to support green initiatives that reduced pollution in the form of either gifts or taxation. This investigation uses fiscal measures and investment in green patents as a measure of comparison. I collate the funding opportunities for SMEs from all levels of government and support agencies. The purpose of this is to establish the range of support options available. Their value cannot be equated, because of their disparity. For instance, a credit guarantee scheme can be equated in terms of the value of the guarantees, but not the cost to governments.

Diffusion

Analysis of diffusion has been undertaken by establishing what the government has done in order to facilitate the adoption of environmentally acceptable behaviours by SMEs. This involves looking at the manner in which the

infrastructure has been developed as well as the more direct support given to the SME. In cases where the government maintains that diffusion activities should be focussed in a specific manner, these have been reviewed to assess whether action supports the intention.

Where diffusion was concerned, the action that was of specific interest related to the issues identified in 5.7 above, namely:

- **Power production and usage:** Investigating CO₂ productivity at demand and production including the use of renewable energy sources.
- **Resource, waste and emissions management:** Minimising demand on resources, including that of land required for landfill purposes, and managing associated air quality.
- **Transport:** Minimising CO₂ emissions and reducing the need for transport.
- **Building control:** Whilst the initial focus is frequently on residential properties, building control raises two points of interest for this study. Firstly, it guides those businesses involved in the building trade, and secondly, the technologies promoted can then be transferred to business properties.
- **Financial controls:** This includes incentives and deterrents that can influence behaviours.
- **Innovation of clean technologies:** Evidence of incentives encouraging the development of clean technologies together with the extent to which clean technologies have diffused to the point of becoming commercially viable.

Where they were available, indices providing performance at a national level have been used because these are evidence of diffusion. In addition to the performance ratings for the OECD indicators discussed in 5.7 above, the Global Cleantech Innovation Index (providing data on research and development funding together with successful diffusion rankings) and Quandl figures for GDP have been used. The complete list is provided in appendix 17.

5.8.2 The basis of comparison between the four countries.

Comparison of the four case studies must take into account the complexity of both sustainable development and culture, and in particular the uncertainties relating to the interaction between different cultures explained in section 5.2.8.

I have created a comparable framework, using data from Hampden-Turner and Trompenaars' research, that has enabled me to create a common platform accommodating the differences between the two frameworks used in the literature summarised in Caprar and Neville's meta-analysis (Caprar and Neville, 2012).

5.9 The control case study

As explained in section 5.2.7, culture may not be the only factor influencing change. In order to test this, chapter 10 consists of a rigorous study of a sample of London boroughs. This allows the effects of political persuasion, population density and wealth to be compared across regions that share the same national culture.

5.9.1 Data relating to the London boroughs.

The data required for chapter 10 take a different form and have been collected through four activities:

1. A walk-through audit of a sample of local government webpages from the perspective of a member of the public, identifying the ease with which a person seeking support for business activity can identify what is available.
2. Systematic use of search terms "environment" and "sustain*" (or "sustainable" and "sustainability" if the truncated version yields no results), indicating the extent of information that is available along with the ease of finding it.
 - a. The 120 most recent documents revealed in each search were reviewed and sorted by relevance. This number was selected because pilot studies revealed that in most cases the occurrence of relevant documents tailed off after this point. Some boroughs capped the number of responses shown to a number within this region.
 - b. The content was classified to determine the focus of concern.

3. Examination of the use of terminology, indicating the extent to which an effort is being made to differentiate core sustainability issues from those of a more superficial nature.
4. Examination of the activities undertaken or promoted that are designed to encourage sustainability.

For London, the data gathered for each borough are explained in table 5.14. Most of the data were gathered through the walk-through analysis described above and augmented by the subsequent searches for specific terms.

Table 5.14: Explanation of the source of material informing the study of the London boroughs

Controlling party	London Councils, 2014
Low-carbon zone	Mayor of London, 2009; The Guardian, 2009
Budget per capita	London Councils, 2014
Sustainability standard	Identified through the documentation on the council webpage and, if not evident, through a search using Google.
Population density	London Councils, 2014
Business type	Identified through the documentation on the council webpage and, if not evident, through a search using Google. This was to ascertain any grounds for different levels of provision of support or performance.
Comment	This section was used when there was an item of potential interest that did not fit the other categories.
Federation of Small Businesses report	The Federation of Small Businesses surveyed small businesses in each of the London boroughs in order to assess the relationship between the London borough and SMEs. This was expressed in terms of the extent to which the SME had contacted the London borough, the manner in which such contact was handled, and whether the borough had contacted the SME for its opinion.
Strategy	The principal focus of the strategy as defined by the London borough within its webpages.
Business-facing support	Support designed specifically to assist businesses and advertised through the borough's webpages.
Support of business environmental performance and educating the market	Development of the market and/or infrastructure that facilitated the sustainable development of SMEs and was advertised through the council webpages.
Future plans	Information provided within action plans on the webpages that related to support for SMEs.
Website	Reporting the findings of the walk-through analysis. This describes what information is available together with the titles of links that are likely to be used by a person browsing the web seeking assistance. Details recorded include: <ul style="list-style-type: none"> • The existence of links relating to business and/or the environment which

	<p>are on the home page, including their visibility when they are not obvious.</p> <ul style="list-style-type: none"> • The names of subsequent links that lead to useful material. • The types of material that are available. • The extent to which there is “cross-linkage” between the pages, making it easy to find documents regardless of whether the browser started with “business” links or those for the environment. • The terminology used (see “language” below).
Language	The terms in question are “green”, “environment” and “sustainable”. The manner in which these terms are used is recorded.
External support	The extent to which the borough provides links to other agencies that can offer support. The agencies are listed and where they are not well known (i.e. national) a brief description is provided. The description is only provided for the first time these are referred to.
Targets	Where the council has published its performance, it is recorded in this section. Further performance is recorded from the Environment Agency Carbon rankings and government data relating to waste collection. The two data points used are the percentage that is recycled and the residual quantities collected.
Documents	<p>The results of performing searches using the site’s own search engine. There are three reasons for doing this:</p> <ul style="list-style-type: none"> • It ensures that nothing has been overlooked in the walk-through analysis, because a different style of browsing might have resulted in further resources being found. • It facilitates a greater understanding of the use of the terms “environment”, “sustainability” and “sustainable”. • It facilitates discovering more about the activities carried out within the borough. <p>The number of documents recorded by the search engine is documented and the relevant documents coded under the following terms:</p> <p>Policy/strategy; business support; building control; air quality/emissions; pollution; energy/carbon; rivers/flood risk; innovation; resilience; waste; business recycling; household recycling; suppliers/procurement; awards; business awards; transport; electric vehicles; car club; general/sustainability; external support; pledges.</p> <p>Some boroughs had documents that did not fit the above classifications, such as the “one planet” that was unique to Sutton, and were coded individually.</p> <p>The search carried out on the term “sustainable” on the London Borough of Bromley website has been replicated in table 5.17 below.</p>

5.9.2 Analysing support provided by the London boroughs

A framework was developed in order to compare the support and information provided by the different London boroughs. This framework facilitated evaluating the usefulness of each activity. An initial study was undertaken to ascertain the range of materials and support that could be on local authority web pages. This is summarised and assessed in table 5.15 below:

Table 5.15: A summary of classifications of the materials provided by London boroughs

A	<i>Case studies</i>
B	<i>Basic advice</i> consists of the fundamental support a business would need in order to observe regulation, addressed to businesses. This is considered to be the base standard.
C	<i>Calculator</i> is provision of an online tool enabling the user to calculate their own carbon or water footprint. This is not considered as good as <i>face-to-face advice</i> because it will not necessarily accommodate specific circumstances. However, it does have the advantage of enabling the user to remain independent and do the activity for themselves. Flanagan’s analysis of memory indicates that 90% is remembered by those who read, hear, see and do activities for themselves.
D	<i>Household-facing advice</i> . Consists of material that is clearly addressed to the householder, but from which a business person could garner one or two useful ideas. In the light of Berlo’s theory, it is assumed that a message that is not addressed to the recipient is not going to carry as much weight as one that is addressed appropriately. This therefore is of lower value than the base standard of <i>basic advice</i> .
E	<i>Extensive advice</i> is advice in detailed material that includes a range of different modes, such as inclusion of fliers or posters utilising different styles of presentation and language. This is of more value than “ <i>good advice</i> ”.
F	<i>Face-to-face advice</i> . Some websites lead the user to offers of face-to-face support, assisting in the development of management systems or reports that are tailored for specific situations. This is considered to be of more value than <i>extensive advice</i> because it is tailored for the specific business and involves discussion, increasing the capacity to remember the content.
G	<i>Good advice</i> consists of advice that is beyond the minimum, addressed to businesses and made relevant to the business setting. This is of more value than <i>basic advice</i> .

5.9.3 Assessing the value of the support

In order to rank the performance of the local authorities, it is necessary to establish a weighting system to enable the value of the different types of support to be compared. Berlo (1960) argued that the style is influential in the effectiveness of transmitting a message. This suggests that some material provided, even if the content is relevant, may not be received effectively if it is not addressed to the recipient of the message using appropriate language. Household-facing material was consequently not ranked as highly as material that was specifically provided for businesses.

Further guidance was found in a Eurobarometer report that included a survey seeking to establish the extent to which SMEs found different types of support useful. With over 11,000 respondents, the findings of this survey, summarised in table 5.16, were considered to provide a robust basis for comparison. The % column indicates the percentage of respondents agreeing the support was of

help, and W is the resultant weighting. The content of the brackets indicates the terminology used in this research.

The weights in the right-hand half of the table under the heading "remaining classifications" were assigned in a more arbitrary fashion, but their impact was tested to assess their influence in the outcome. The assumptions underpinning the initial allocation of these weights were determined as follows:

- That extensive advice was as useful as case studies and tools, because all of these are "self-help".
- That the poorer-quality advice reduced its usefulness accordingly.
- That the household-facing advice was of lesser value because it was addressed to a different audience.
- That the number of links to external forms of support is relevant in that they can reinforce the message being given and show the extent to which support is available. Their quality is a different matter and assessed differently. The highest number of links on any site was 16. It was assumed that the weight had to be low in order to keep its influence in proportion with that of the other factors.

These assumptions were tested to assess sensitivity, but the process is described at the point of discussing the findings where it can be illustrated with greater clarity.

Table 5.16: Value attributed to different resources

Type of support (Eurobarometer 2013)	%	W	Remaining classifications	W
Grants and subsidies (finance)	34	8.5	Extensive advice	4
Consultancy (face-to-face advice)	25	6.25	Good advice	3
Demonstration of technologies re resource use and waste	19	4.75	Basic advice	2
Funding advice	22	5.5	Household-facing advice	1
Case study	16	4	Links to other support	0.25
Self-assessment tool (calculator)	16	4	Network	4.75

The data gathered for the London boroughs include reference to their performance. In order to compare performance, the data have been divided into quartiles. This is because the same method of analysis is used by the boroughs themselves (London Borough of Wandsworth, 2014m) and it is compatible with the analysis of culture.

5.9.4 Coding documents

The final activity in the development of the case study, searching for terms on council websites using the internal search engine, resulted in lists of document titles and a brief extract from each document including usage of the term searched for. These documents needed to be classified before they could be usefully compared. At times this could be achieved from the title of the document and the extract produced in the search result, but there were instances when the document was opened in order to ascertain its content.

Table 5.17 provides a sample of 15 documents taken from the result of one of these searches. The coding of the full search is recorded in appendix 18. The details of the document are in the left-hand column and the selected code is in the right-hand column (bracketed comment relates to reasons for not coding the document when there was potentially cause to believe coding was required).

Table 5.17: A sample search illustrating the action taken to ascertain content and the coding process

Document details	Code
<p>Key Document title: in bold in each of the subsequent cells Extract provided by the website's search engine in the page of results: in grey regular text Processing of document and interpretation of content when required: bold, beneath the extract</p>	
<p>Bromley sustainable schools forum (BSSF) ... Bromley sustainable schools forum (BSSF). What is a sustainable school?... More in sustainable schools forum</p>	
<p>London borough of Bromley Written statement – 2 Interactive UDP Site – Written Statement – 2. SUSTAINABLE COMMUNITIES. London Document opened: Related to application of the London Plan. Included reference to the need to ensure environmental sustainability within the planning.</p>	Strategy/ planning
<p>BTCAAP019 Building a Better Bromley – Sustainable ... London Borough of Bromley download – Bromley Town Centre Area Action Plan – Building a Better Bromley –Sustainable Community Strategy ... Page opened: Link to documents found elsewhere in the search.</p>	
<p>Btc Appendices 1 To 4 ... A summary of the most relevant ones is set out below. National Policy PPS1: Creating Sustainable Communities (2005) ... Document opened: Included reference to waste and transport management within planning considerations.</p>	Strategy/ planning
<p>London Borough of Bromley Written Statement – 14. and the Mayor's Waste and Energy strategies. SUSTAINABLE AND ENERGY EFFICIENT DEVELOPMENT. POLICY ER4. ...</p>	Strategy/ planning

<p>Bromley Environment Awards 2007 Booklet application ... Page 2. Bromley’s Environment Awards recognise and reward local sustainable initiatives that really make a ... sustainable approach to education. ...</p>	Awards
<p>Appendix A2 – Cray Policy Unit ... Ongoing High • To encourage sustainable developments • To reduce the risk of flooding to property, infrastructure and services ... Document opened: Related to the River Cray and associated flood risk.</p>	Flood risk
<p>London Borough of Bromley Written Statement – 5. It sees better Transport integration as key to providing more sustainable Transport choices and reducing the need to travel. ...</p>	Transport
<p>London Borough of Bromley Written Statement – 6. objectives. Sustainable environmental quality means retaining and enhancing the good aspects of the built environment. ... Document opened: Related to development plan for built environment.</p>	Buildings
<p>Crystal Palace Park Management Board Action Plan 2011–2017 ... should be put in place that brings together the broad range of experience and expertise necessary to guarantee a lasting, sustainable future for the ... Document opened: Related to management of green space.</p>	
<p>Workplace travel planning – Workplace travel planning and impacts. We can support you with practical ways to promote sustainable travel. Benefits. Workplace travel planning ...</p>	Transport
<p>London Borough of Bromley Written Statement – 10. 10.1 The London Plan and the Mayor of London’s Economic Development Strategy “Sustaining Success” aim to create a sustainable world city with ... Document opened: Related to economic sustainability; there were nine references to the environment, focussing on unsightly buildings, local amenity, traffic on residential roads and creating a business and “pleasant” environment.</p>	
<p>Council forced to find further £60 million savings – London years. “We are determined to continue to take a long-term view and achieve a sustainable budget for 2014–15 and beyond. ...</p>	
<p>Btcaap009 Equalities Impact Assessment ... 5.9. The Council’s long-term sustainable community plan (March 2009) sets out a vision for the Borough by 2020 as a place where: ... Document opened: Related to social inclusion.</p>	

The search for the term “sustainable” within the London Borough of Bromley’s website returned 315 documents. Bearing in mind that the documents of interest were those that indicated activity of the local authority that influenced business or created a sustainable infrastructure or market, the first 120 were coded.

5.10 Sample selection for London

Government webpages were used as a source to identify the structures that controlled government at a local level along with the remit of local government. At this broader level, it is possible to assess the development of policies and begin to assess the giving of financial aid and the recognition of ethical standards. However, it is also necessary to determine how policies have been

diffused and resulted in activity. For this, along with identifying greater detail relating to the giving of financial aid and ethical standards, it is necessary to investigate action at local borough level.

For qualitative research involving case study, probability sampling is not appropriate. This is because there is no intention of producing statistics or seeking central tendencies. Rather there is the intention to compare activities dependent on specific criteria. This therefore calls for purposive or strategic sampling (Hancock, Ockleford and Windridge, 2007; Palys, 2009; Lund Research Ltd, 2012).

There are many ways that the sample can be selected when undertaking purposive sampling (Palys, 2008, 2009; Lund Research Ltd, 2012). In that this research is seeking to gather the breadth of experience, the approach that has been adopted is criterion sampling. This approach facilitates assessing different perspectives and can help identify commonality through the disparate perspectives (Palys, 2009; Lund Research Ltd, 2012). It facilitates selecting representative samples that answer specific questions and enables the researcher to select cases that could potentially be the most fruitful (Teddlie and Yu, 2007).

The principal drawback with this style of sampling relates to the extent to which the resultant sample could be biased by the researcher and it is advised that the criteria supporting the selection be justified (Palys, 2009; Lund Research Ltd, 2012).

5.10.1 Criteria accommodated in the sample

Political affiliation

The review of literature revealed that conservative parties take a more laissez-faire approach to government (section 2.7.2). It is therefore necessary to consider political influence in the selection in order to facilitate assessing the extent to which culture rather than political expedience governs action.

Low-carbon zones

The London Authority identified ten regions that were to be designated low-carbon zones as pilot studies (The Guardian, 2009). The purpose of this was to assess the feasibility of different approaches to sustainable living. However, this

will have resulted in behaviours that potentially differ from the activity that would have been evident had that obligation not been placed on the council. It is therefore necessary to ensure that these zones are accommodated in the sample in a manner that does not create any bias because they will have responded to a different remit from the other regions.

Geography

The following variables were investigated in order to assist in the selection of a stratified sample. Data from government statistics (London Councils, 2014) were collated and used to assist in the selection.

1. Proximity to the city centre.
2. Population density.
3. The political party in control.
4. Whether or not the locality has been declared a low-carbon zone.

Proximity to the city centre and population density

Section 2.8.5 in the review of literature included reference to the differing environmental footprints emanating from the density of population that influenced both the need for transport and domestic heating. Secondly, the demand for transport also correlated with the distance to the city centre.

The variable of inner London versus outer London regions had a direct correlation with population density because the lowest density for an inner borough was 31.46 people per acre (Lewisham) whereas the highest density for a borough in outer London was 28.93 people per acre (Brent). This meant that these criteria were complementary and could be handled as one.

Political party

At the 2013 election, ten local authorities retained their Conservative control, nine retained Labour and two authorities retained Liberal Democrat control. Eleven changed parties. The purpose of considering political affiliation in the sample selection was to facilitate comparison in order to assess the extent to which it influenced behaviour. For this reason, the eleven London boroughs where control involved more than one party were not included in the selection.

The sample (table 5.18) had to accommodate the fact that none of the outer London boroughs that were Conservative-held were designated low-carbon zones. For this reason the initial selection excluded the low-carbon zones, and

a range of these were subsequently selected in a manner that created pairs for comparison purposes.

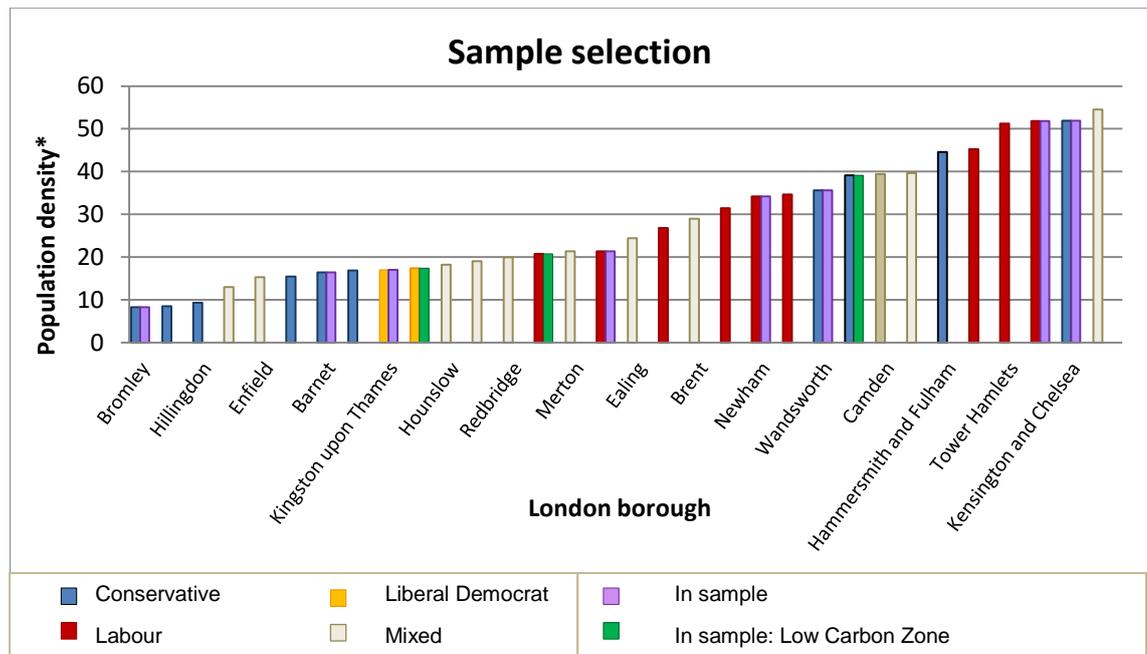
Table 5.18: The selection of the sample

Inner/outer	Political affiliation	London borough	Population density	In sample
Outer	Conservative	Bromley	8.274757	y
		Havering	8.494779	
		Hillingdon	9.347472	
		Bexley	15.42694	
		Barnet	16.45011	y
		Croydon	16.85285	
	Labour	Barking and Dagenham	20.72151	y
		Greenwich	21.36104	y
		Waltham Forest	26.77836	
	Liberal Democrat	Kingston upon Thames	16.99105	y
Sutton		17.41011	y	
Inner	Conservative	Wandsworth	35.62017	y
		Westminster	39.14728	y
		Hammersmith and Fulham	44.60397	
		Kensington and Chelsea	51.93835	y
	Labour	Lewisham	31.46061	
		Newham	34.18027	y
		Haringey	34.64471	
		Lambeth	45.2475	
		Tower Hamlets	51.21756	
Hackney	51.84312	y		

Density is measured in people per acre; low-carbon zones are in **bold italics** and the shading indicates pairs within the samples that will facilitate comparison between low carbon zones and another borough with the remaining characteristics closely matched

The spread embodied by the selection is summarised in figure 5.10, which shows not only that there is a spread of population density, but that pairs facilitate comparison between government control and whether or not the area is a low-carbon zone.

Plotting this spread on a map of Greater London demonstrates that as far as possible, the entire area is represented (see appendix 19). All of the boroughs to the west of London have had mixed government. Of the remainder, the distribution of boroughs is such that the likelihood of activity undertaken in collaboration with neighbouring localities is maximised.



* Population density is the average number of residents per acre.

Figure 5.10: The spread of characteristics in the sample

5.11 Summarising consideration of culture and samples

This chapter has provided a detailed description of the manner in which a framework has been developed from Hampden-Turner and Trompenaars' data. The process has highlighted the sensitivity of responses to research into the subject, which creates substantially different results based on the manner in which the question is framed. Using a common platform has enabled me to ensure that the differences between the GLOBE and Hofstede frameworks are accommodated in the new one, and the extent to which I have achieved that has been revealed through rigorous testing of the results.

Examination of the previous research seeking to identify statistical correlations between cultural dimensions and sustainable behaviours revealed the difficulties that are inherent in relying on statistical analysis. Firstly, complementary causes that govern a behaviour might be overlooked. Secondly, there is a need to consider the interplay between cultural characteristics that underpin behaviours that could be deemed to be out of character when compared to the dimensions individually. Thirdly, it became clear that the case studies in question would need to be selected with care.

The four chapters that follow provide case studies for the selected countries. These all commence with an overview of the key cultural characteristics that should, theoretically speaking, influence the manner in which sustainable

development is addressed. The next section of each case study consists of findings from empirical work, detailing the activities carried out principally in the capital of the country. Finally each chapter ends with a summary of key performance indicators that have been collated by OECD.

In the case of the UK, Japan and Sweden, data have been found through examination of their government webpages. When researching material relating to Denmark, there was little to be found on its government sites. Data were found through other sites such as OECD reports, using the framework established for the other three countries as a guide.

Chapter 10 provides an in-depth study of activities that are carried out in a sample of London boroughs in order to test the influence of external factors including political persuasion, geography and the impact of additional funding.

Chapter 6. Japan

Japan is an island nation with a total landmass of 42,400 sq km. Even if all the land were habitable, Japan would be highly populated, with a ratio of 2.93 sq km for every 1,000 people (Nationmaster, 2014a) or 338.13 people per sq km (OECD, 2014b). However, only 18% of the land is suitable for development because of its volcanic and mountainous nature, and the cities are among the most densely populated in the world, accommodating the majority of the nation's 127 million inhabitants (Nationmaster, 2014a; Facts about Japan, 2014). 25% of Japan's population live in Tokyo, the world's most populous city, which is spread over three metropolitan districts (World population review, 2014b).

99% of businesses in Japan are SMEs, and these employ over 75% of the workforce (Japan Finance Corporation, 2014c). Economically, the GDP is \$5.96 trillion, which equates to \$46,720 per capita (Nationmaster, 2014d). Not only is the country challenged when it comes to habitable landmass, but the land is also very limited in natural resources (Nationmaster, 2014d).

6.1 Characteristics of the Japanese and their impact on sustainable development

The Japanese have certain characteristics that would enable them to address the complexity of environmental concerns with greater ease than other cultures:

- Their focus on harmony and associated blending of multiple perspectives, in combination with their synchronous ordering of activities, enables them to handle the complexity of balancing the needs of the environment, the needs of the people and the welfare of the business world with greater ease than cultures that have greater objectivity and sequential thinking.
- In accepting and bringing order from diversity and shunning objectivity and overarching rules that can provide structures, the Japanese are constantly striving for improvements specific to individual situations. They are expert both at inductive thinking and at using every resource available to them. The detail that the Japanese value and exploit is lost in the generalisations necessary in order to form the objective theories that are valued in the West.

- Tacit understanding is accepted without question. This is in contrast to the western world where there is a tendency to justify acquired knowledge with clear logical lines of deductive reasoning. Where this cannot be achieved, the knowledge is considered unfounded and therefore “suspect” (Hampden-Turner and Trompenaars, 1994, pp.116–117).
- The ability to blend the demands of different market segments into one product can be expanded to also include the quality of reducing the demand on the environment, and the synchronous approach to innovation facilitates the development of more sophisticated solutions and the ability to make rapid corrections should they be required.
- The manner in which the workforce are trained in multiple areas makes them more highly skilled and thus enables contributions to improved processes to emanate from a much broader range of workers.
- Their long-term view taken in conjunction with their holistic outlook enables the Japanese, including their banks, to make investments that are not for immediate financial gain, the environment that is best suited to foster the needs of the environment.
- The Japanese tendency to focus on the externalities has made them more resilient to changing environments (Hampden-Turner and Trompenaars, 1994, p.49, pp.113–116).

However, the Japanese display a few cultural characteristics that are more likely to work against their focus on sustainable development:

- Their strong masculine character is associated with a lack of concern for the environment (Hofstede, 1984, p.209).
- Their inability to accept forecasts with any certainty means that they will only respond to environmental trauma when the effects are beginning to be felt rather than take pre-emptive steps to prevent its occurrence (House et al, 2004, p.288).
- Japan’s strong in-group focus shapes their development at the expense of innovation (House et al, 2004, p.310). This is detrimental to their ability to change.

A full cultural profile including characteristics that are not considered by theorists to be relevant to sustainable development can be found in appendix 20.

6.1.1 Japanese government

The Japanese government is a constitutional monarchy (Consulate-General of Japan in San Francisco, no date), meaning that the ability to legislate resides with the government and the emperor is a figurehead with limited powers (Administrative Management Bureau, Ministry of Internal Affairs and Communications, 2007). Five of the twelve ministries constituting the central government (the Diet) have relevance to the environmental element of sustainable development, including the Ministry of Economy, Trade and Industry.

The Japanese government, and particularly the Ministry of Economy, Trade and Industry, has taken a protectionist position where industry is concerned. As a nation, Japan faces a constraint on industry in that Japan is devoid of natural resources. This means that all materials need to be imported and the government has historically supported industries that add the most value to resources, currently favouring the high-tech sector (US Library of Congress, 2011a). However, this is not to the exclusion of environmental care. Once the Japanese became aware of the harm to human health that can be caused by industrial pollution, the government integrated anti-pollution measures into its industrial policies (Vinger, 2012).

A characteristic of the Japanese style of working is the process of propagating numerous committees and sub-committees. In 2013, there were 4 committees, 12 sub-committees and 19 working groups all reporting to the Advisory Committee for Natural Resources and Energy (ANRE). Recent reorganisation has reduced the number of individual bodies from 60, although it is envisaged that more sub-committees will be developed as the need becomes apparent (Ministry of Economy, Trade and Industry, 2013e).

6.2 Policy development

In developing an overview of the government, the range of bodies that can influence the manner in which policies affect environmental management becomes apparent. This section identifies supporting bodies before identifying

the scope of their policy development both at a generic level and also specifically for Tokyo.

6.2.1 Policy-making bodies

Policy is developed at both national and local level. The national government creates policy in collaboration with business behind closed doors and as such is not entirely trusted by the populace.

Local government includes the electorate in the development of policy and, in doing so, retains their trust (Vinger, 2012).

There are also a number of NGOs that contribute to policy development:

The Japan Business Federation

The Japan Business Federation represents the majority of major businesses in Japan along with roughly 100 associations. It has been able to steer environmental policy to ensure that business interests are not overlooked. It has produced the following:

- *Keidanren Global Environment Charter* (1991), a document that provided advice based on the premise that the environment underpinned business (Vinger, 2012; United Nations Environment Programme, 2013).
- *Keidanren Action Plan on the Environment* (1997), involving businesses that accounted for 80% of Japan's industrial emissions producing action plans in order to pre-empt subsequent regulation (Vinger, 2012).

These action plans and the associated transparent reporting of progress are recognised as a critical component of Japan's waste management approach, helping reduce waste going to landfill by 83% by 2010 when compared to that sent in 1990 (United Nations Environment Programme, 2013).

Policy research organisations

Policy research organisations started to appear as early as 1960. These were instigated by businesses and augmented by quasi-governmental institutions including two, namely the Institute for Global Environmental Strategies and the Institute for Sustainable Energy Policies, specialising solely in environmental affairs. These are supported by the Research Institute of Economy, Trade and Industry, which collates data (Vinger, 2012).

6.2.2 Environmental policy

The current environment policy at a national level was developed in 2007 and consists of ten prioritised actions. The first six cover specific topics and the final four are interdisciplinary:

- To address global warming.
- To close the loop where resources are concerned.
- To manage urban air quality.
- To manage water resources.
- To reduce the potential for toxic substances to cause harm.
- To protect biodiversity.
- To embed environmental values considered in the market.
- To involve individuals and communities in conservation of the environment.
- To develop an infrastructure, including research and development facilities, knowledge exchange and policy development, that facilitates long-term sustainability.
- To contribute to global initiatives promoting sustainable development.

(Ministry of the Environment, Government of Japan, 2007)

This range of policies goes further than the topics listed in the OECD's Green Growth framework listed in tables 5.12 and 5.13 (section 5.7), the reference to reduction of harm caused by toxic materials being an additional element. The detail within the policies (see appendix 21) is developed to address a wide range of actions, including the development of further targets and knowledge exchange.

The policy with respect to energy generation has been updated since the Fukushima earthquake in 2011. At that time, the Japanese were aiming to generate 53% of their power from nuclear energy by 2030, but their confidence in the technology was undermined by the earthquake, which emphasised its vulnerability.

The government is now divided regarding the role of nuclear power in the future and its current policy contains no specific targets, beyond a statement that previously set targets for clean power production would be exceeded. After the Fukushima earthquake, nuclear energy was set to be phased out by 2030 and

clean energy production to meet 35% of demand by 2030. However, all of the remaining 48 nuclear power plants have subsequently been closed for maintenance or repair and the government is only seeking to reopen two of them should it be decided to be safe (Watanabe and Adelman, 2014; Watanabe and Suga, 2014).

6.2.3 Tokyo's "master plan"

A master plan that is envisaged to provide a sustainable future was developed in 2008 and is still in force. There are three principal aims, the breadth of each causing it to address a wide range of issues:

"Conserve the base of life"

In broad terms this aim is seeking to reduce greenhouse gas emissions by 25% by 2020, and to reduce the amount of waste taken to landfill by 55% by 2016. In both cases, the base year is 2000. To achieve this it was envisaged that addressing both domestic and industrial fuel economy and power production as well as promoting recycling technologies would be necessary.

"Ensure a safe and healthy environment"

This entailed addressing emissions to the air with a target of meeting minimum standards for particulates and NO_x by 2010 and to have eradicated the threat of photochemical smog by 2016. To achieve this, stringent measures where vehicle emissions were concerned were brought in, requiring retrofitting technology to clean emissions or replacement of old vehicles. Other pollutants such as dioxins and volatile organic compounds were targeted and concern shown for the handling of chemicals and the need to clean the waters of Tokyo Bay.

"Create a high quality and more comfortable urban environment"

By 2016, it was proposed that the heat island effect should be reduced, partly through the creation of 1,000 hectares of green space through measures such as grassing over school playgrounds and the planting of 1 million trees.

(Tokyo Metropolitan Government, 2012c)

6.2.4 Tokyo's Vision 2020

There are currently 12 projects underway supporting Tokyo's 2020 vision and assisting in the delivery of the Tokyo master plan. Two relate to improving the

safety of the built environment, five relate to social care and activity, one seeks to attract more international business and the remaining four focus on more sustainability-related issues, namely:

- 3 million kW made-in-Tokyo power generation.
- Creating a smart city.
- Building a network of water and greenery.
- Bolstering the land, sea and air transport network.

(Tokyo Metropolitan Government, 2012d)

6.2.5 Tokyo's building policy

The quality of buildings within Tokyo is controlled by the Bureau of Urban Development, a department within Tokyo Metropolitan Government. Its remit has been in place since 1999 and it is subject to delivering the vision for the built environment of the city. It has six tasks, of which only one refers to anything to do with the sustainable environment, the others being focussed on resilience and safety in relation to disaster (the most notable of which is earthquakes), attracting business and supporting urban communities (Bureau of Urban Development, 1999).

The environmentally focussed elements within the building policy relate to the comfort of the built environment and principally involve the development of green space (Bureau of Urban Development, 1999). There is also the stipulation that buildings should be earthquake-proof (World Bank, 2012). The policy does, however, also include reference to managing the by-products of the building process (Bureau of Urban Development, 1999).

6.2.6 Summarising Japanese policy development

The Japanese government develops environmental policy at both national and local level, in collaboration with business, NGOs and the electorate. There are ten actions which align with the spread of the framework established by the OECD for green growth indicators, augmented by particular action to reduce societal exposure to toxins. The additional detail demonstrates an attention to detail that considers an extensive range of subsidiary actions for each point raised.

At a local level, the Tokyo plan is founded on the provision of comfort and safety for the occupants. The vision for the future concentrates on power generation and transport. The vision for building focusses on the more immediate need of being earthquake-proof. There is therefore evidence of detailed and careful policy development; however, the environmental benefit is clearly not the driving motivation.

6.3 Sensitivity to ethical issues

The Japanese recognise the demands laid out in Agenda 21, the policy document endorsed by the United Nations that sets out the areas of action that should be taken in order to reduce the environmental footprint of human activity (Ministry of the Environment, Government of Japan, 2007).

In addition to this, the Japanese have three characteristics that heighten their sensitivity to ethical issues:

- Upon industrialisation the Japanese failed to control toxic emissions (see appendix 22), resulting in serious health effects and fatalities, most notoriously in Minamata. This alerted the government to the need to prevent pollution.
- With little serviceable landmass, the Japanese were challenged early in how to dispose of waste (Vinger, 2012).
- Japan has few natural resources. The need to purchase and import the materials required for industry created an awareness of their value (US Library of Congress, 2011a).
 - This need to import resources means that in order to satisfy the population's needs, the Japanese are also dependent on earning on the international market to make them economically viable (US Library of Congress, 2011a).

6.3.1 Japanese action and associated ethos

The following review of ethos concentrates on identifying the areas of environmental activity that are of concern to the Japanese and the reasons provided for undertaking action.

Climate change

The Japanese are vulnerable to the impact of global warming. Individually, the effects of rising sea levels and of more violent weather patterns pose significant risk, and in Japan's case the two work together, increasing the impact of coastal surges during typhoons. The density of population in Japanese cities compounds the problem, placing several million people at risk of coastal flooding, with Osaka being one of the world's ten most vulnerable cities in this respect (Union of Concerned Scientists, 2011).

At a local level, the Japanese have worked on their coastal defences to mitigate the impact of coastal surges (Union of Concerned Scientists, 2011), but they face a greater threat to property in the form of earthquake damage and this has been the principal focus driving their building design. However, in response to the potential loss of habitable land, it is reported that, not for the first time, Japanese government and universities are collaborating in the planning of an underwater city (World Market Intelligence News, 2014; McCurry, 2014).

The Japanese recognise the need for international cooperation to address the global environmental problems. Having hosted the Kyoto summit in 1997, Japan ratified the agreement in 2002 to reduce its 1990 level of CO₂ emissions by 6% by 2012 and is actively seeking to become a low-carbon society, motivated primarily by the desire for a healthy economy and population (Vinger, 2012; Web Japan, 2013a).

The Japanese initially decided that sustainability issues were global problems that could be ameliorated with appropriate design choices, and as such did not see the need to modify behaviour. They were quick to see the competitive advantage that could be gained by becoming market leaders in clean technologies. It was only when it became clear in 2005 that their strategy would not enable them to meet their target under the Kyoto protocol that they sought to encourage behavioural change (Vinger, 2012).

Energy

The need to adopt renewable energy is not only considered to be an environmental issue. The Japanese recognise it is required in order to help reduce their dependency on imported resources and thus provide greater economic stability. Economic prosperity is also achieved through the

development of the associated industries (Ministry of Economy, Trade and Industry, 2013d).

The Japanese dependency on imported resources also shapes their attitude to energy production. Consequently they exclude electricity produced from types of biomass that are utilised in other industries from their incentives to encourage the development of power production facilities (Ministry of Economy, Trade and Industry, 2012a).

Pollution

The Japanese recognised that pollution was a direct result of prioritising economic development and subsequently introduced steps to protect the environment in the 1960s. However, whilst they understood the need to manage emissions and pollution to protect human health, they did not initially recognise the same need to preserve flora and fauna (Vinger, 2012).

The initial measures taken were command and control, “end-of-pipe”, which was in line with the thinking of the time. This enabled the Japanese to become market leaders of the associated technologies (Vinger, 2012), which constrained their willingness to move to more efficient processes. This is illustrated in their reluctance to develop passive air conditioning measures because it would undermine the technologies they had developed to achieve the same ends (Townsend, 2010b).

Waste management

The cultural concept of “mottainai”, an abhorrence of waste, instils a respect for resources (Web Japan, 2013b). A further approach developed by the Japanese is the propagation of what has now become known as the waste hierarchy: reduce, reuse and recycle (Ministry of the Environment, Government of Japan, 2007; Vinger, 2012). Having developed the concept, they encouraged its adoption at an international level.

Transport

The Japanese accept the harmful effect from transport, noting not only the release of greenhouse gases and other pollutants, but also that of noise and vibration (Ministry of the Environment, Government of Japan, 2014b), demonstrating societal welfare is considered alongside environmental, but there is no mention of the issue of land use.

The Ministry of the Environment (2014b) declared its intention to align with the position of OECD in its management and contributed to the development of guidelines produced by OECD (2007). These guidelines call for a goal-oriented change that is envisaged to span a 30-to-40-year period. Critically, OECD recommended that the current trends towards road and air freight should be checked (OECD, 2007).

The ministry's advice to others, however, suggests determining the financial viability of adding an extra layer of facilities in order to reduce the fuel involved in transferring waste to processing centres, suggesting financial expedience supersedes environmental consideration in motivating action (Japan Environmental Sanitation Centre, 2012).

Building design

As yet, building policy does not cover the environmental performance of buildings apart from the need for them to be earthquake-resistant. The term "eco-house" has traditionally related to the inclusion of technologies that monitor and manage power use within the property, but do not render it sustainable; rather, these properties are simply more energy-efficient than properties without the technology installed (Townsend, 2010a).

6.3.2 Summarising sensitivity to ethical issues

The Japanese clearly consider environmental factors with respect to the core activities of energy production, resource use, building design and transport. They also see the advantage in gaining international cooperation and dissemination of good practice. However, apart from resource use which is influenced by *mottainai*, the motivation does not appear to be primarily to care for the environment.

Of greater import to the Japanese is the need to be economically secure, and societal comfort or safety, as evidenced by the need for facilities to be economically viable and buildings earthquake-proof. Further evidence of the extent to which the environment is not a high priority is demonstrated by their slow response to the effects of industrial pollution and the manner in which their recognition of the need to protect human health was not extended to the environment.

6.4 Ethical standards and capabilities

Whereas section 6.3 investigated the fields of concern for the Japanese and associated motivation for action, this section investigates their methods of achieving their targets. This entails examination of the Japanese approach to the change process, the manner in which the government assists environmental change, the standards they have achieved and also the manner in which they monitor performance.

6.4.1 The style of change

Rather than developing radically new processes or products, the strength of the Japanese lies in their ability to improve on ideas initiated by others. *Mottainai*, an abhorrence of waste, is evident in the manner in which Taiichi Ohno developed the concept of lean production, a practice that provided sound economic and environmental efficiencies, through studying American industry and principally Ford Motors (Schiele, 2009). In conjunction with the concept of *kaizen*, or continual improvement, significant improvements are achieved.

Many people, including dedicated committees, government personnel and specialists, are included in the change process, which can also be opened to the public for comment before the final ideas are refined, incorporating all of the feedback, and introduced. This process is explained in greater detail in the discussion of renewable power production in section 6.4.3. Involvement of so many means that the design phase can appear to be lengthy but the new concept is rapidly diffused.

6.4.2 Governmental influence

The Japanese government is structured in a way that facilitates close attention to environmental issues. This is because minimum standards are set at a national level but the individual prefectures are expected to be structured in a way that addresses local issues, including management of any industry within the area (Web Japan, 2013a). For instance, Tokyo has created the Motor Vehicle Pollution Reduction Department (Web Japan, 2013a), which not only establishes local emissions standards but also actively monitors vehicles for compliance (Web Japan, 2013a).

The Japanese government has traditionally taken a highly interventionist role in business. This has been the product of the relationship between government

and the population, which has elements of a Confucian ethos. This encourages loyalty from the people who support the government's view that Japan should be a leader in industry (US Library of Congress, 2011a).

The manner in which the prefectures and municipalities are elected by the local population creates a bond that is stronger than that evident at national level (US Library of Congress, 2011b). The electorate view themselves as a family being managed by their local government and as such work with them to achieve the government's declared ends (US Library of Congress, 2011b).

Where municipalities do not have the power to invoke stricter regulation, they are able to negotiate standards with their local industry on a voluntary basis, involving the local people as well as industry management in the conversation. However, these voluntary agreements are adhered to as if they were law (Vinger, 2012).

This willingness to follow the lead identified by government places Japanese business in a strong position where environmental management is concerned. The Japanese government recognises the need to constantly shift the basis of the country's exports if Japan is to stay economically viable. It is therefore in the government's interest to set the trend in establishing technologies that address environmental issues and can be exported during the growth stage of the industry, and in the 1970s it began to encourage research and development and knowledge-based industry. Since then, it has intervened less, but by the end of the 1980s Japanese industry had a strong legacy of research and development and an awareness of the need to adapt to the trading environment (US Library of Congress, 2011a).

With a culture that takes a long-term view, the Japanese government is also prepared to see gradual improvement to environmental problems, supporting phased improvements that address the most critical issues first. However, this approach has attracted criticism for being both too little and too late (Dhakal, 2003; Vinger, 2012).

Progress for Japanese strategy development is also potentially undermined by the political system in that strategies developed by one government are reviewed and revised when there is a change of government (Institute for Sustainable Energy Policies, 2014b). Whilst this may result in improvements to

the strategy, it delays progress, as evidenced by a complete review of renewable energy strategy resulting from a change of government in 2012 that had not occurred at the time of publishing a report in 2014, having gone once again to open consultation and attracted 19,000 comments to be considered (Institute for Sustainable Energy Policies, 2014b).

Local government research institutes were established to provide SMEs with technical support as they sought to adopt measures to reduce pollution. They were also provided with funding by the government (Vinger, 2012).

- The New Energy and Industrial Technology Development Organisation (NEDO) was created in 1980 by the Ministry of Economy, Trade and Industry in order to research alternative energy to reduce Japan's dependence on imported fuels (Vinger, 2012).
- The Research Agency of Innovative Technology for the Earth (RITE) is tasked with developing specifically environmental technologies such as carbon capture.
- The Japan Science and Technology Agency (JST) supports NEDO through scientific research and co-ordinates disparate areas of research through its Centre for Research and Development Strategy, a division that maps all areas of research. Whilst not specifically focussed on environmental sustainability initiatives, it includes them in its remit, such as investigating the use of biomass for fuel (Vinger, 2012).

6.4.3 The standards achieved

In spite of focussing their efforts on incremental change, the Japanese have achieved considerable development that supports sustainable behaviours.

Renewable power production

In recognising that the nuclear fuel industry was too vulnerable to be a long-term solution to Japan's energy requirements, the Agency for Natural Resources and Energy determined to phase out reliance on the industry. However, the need to maintain a competitive business environment for the industry during its decline was recognised (Ministry of Economy, Trade and Industry, 2014c).

The Japanese government went to the public for their opinion with respect to closing the gap between sustainable power production and demand. The government provided details of the options available together with their implications, both electronically and in forums across the country (Ministry of Economy, Trade and Industry, 2013a; Ministry of Economy, Trade and Industry, 2013d), and also established sites demonstrating the different technologies including biomass conversion, hydropower, wind power and photovoltaic power production (Ministry of Economy, Trade and Industry, 2013b).

In response to this consultation, the government developed the final scheme (Ministry of Economy, Trade and Industry, 2014a) and published the findings and considerations supporting its final decision (Ministry of Economy, Trade and Industry, 2013d). Adoption was encouraged through a ten-year buy-back guarantee in which excess power produced using technologies that had been proven to be financially acceptable could be sold to the national grid (Ministry of Economy, Trade and Industry, 2013b; Ministry of Economy, Trade and Industry, 2013d). This system applied to both householders and businesses, but excluded those that were unduly affected by the Fukushima earthquake for one year (Ministry of Economy, Trade and Industry, 2011).

CO₂ emissions and air quality

Japan's CO₂ emissions stem from numerous sources beyond that of transportation, which accounts for 20.3% of the total (Research Institute of Economy, Trade and Industry, 2014a). This compares well against other leading economies of the United States, Canada, the United Kingdom, France and Germany, where the only country to better Japan is Germany, which achieved 19.3% from transport (Research Institute of Economy, Trade and Industry, 2014a).

Japanese cities struggle to meet acceptable levels of air quality, especially in relation to particulate matter. However, the Research Institute of Economy, Trade and Industry (2014a) found that the particulate matter readings did not alter significantly over the weekend, when there was appreciably less traffic on the roads. They therefore considered there to be other sources of particulate matter. They also noted that vehicles tended to emit the smaller particulate matter which is more damaging to health than the larger size from other sources.

Using the logic that congestion increase fuel usage (Research Institute of Economy, Trade and Industry, 2014a) and calculations for the optimal speed for fuel efficiency (Ministry of Land, Infrastructure, Tourism and Transport, 2011), the government established a policy to improve the road layout in order to speed the traffic up (Sone, 2008; Ministry of Land, Infrastructure, Tourism and Transport, 2011). However, the Research Institute of Economy, Trade and Industry identified that the trend that improved road systems tends to increase passenger miles and believes that the Japanese government is over-optimistic in its perceived benefits of the action (Research Institute of Economy, Trade and Industry, 2014a).

Further approaches proposed

The Japanese are considering a range of approaches that could further reduce the fuel demand for transport. These include hi-tech solutions that could provide business opportunities such as in-car technology that analyses driving behaviour and advises accordingly. Other approaches include facilities to promote the use of public transport, park and ride, the use of the bike and pedestrian safety including electronic road pricing and converting the fuel used for public transport and delivery systems (Sone, 2008; Ministry of Land, Infrastructure, Tourism and Transport, 2011).

Resource and waste management

Underlying Japan's waste management approach has been the motivation to change the focus of industry from that of a mass consumption society to that of a "materials-cycle society" from as early as 1991 (United Nations Environment Programme, 2011; Waste Management World, no date), which was followed by the development of the concept of the "three R's": reduce, reuse, recycle. Legislation relating to industrial waste management was initially based on the "polluter pays principle", whereby the entity generating waste had to pay for its disposal. However, this approach did not address the manner of disposal and gave rise to illegal fly tipping (United Nations Environment Programme, 2013).

The law was augmented by legislation demanding responsible use of resources, promoting "extended producer responsibility", and introducing what is now referred to as the "waste hierarchy" and individual legislation for specific kinds of waste. It was also tightened with respect to the management of the

waste-handling plants. The mix of legislation, together with transparent monitoring, was seen to be core to successful waste reduction, providing industry not only with compulsion to adopt appropriate measures, but also with guidance regarding expedient action.

The Japanese have considered every category of waste and developed a technology to handle each one. They have also paid attention to the manner of waste collection, combining action to ensure it reduces the environmental impact. Their motivation to achieve the best value from their waste has resulted in significant steps towards robust materials management:

- PET plastics are sorted to enable the better-quality resources to be recycled into new bottles rather than downcycled.
- A wide range of usage has been established for downcycled PET plastics, including the creation of high-quality carpets and clothing.
- White goods are dismantled manually and their component parts sorted for recycling and where necessary, such as with CFCs, safe disposal.
- A range of techniques are used with biomass, including converting vegetable oil into fuel for municipal vehicles and fermenting farm and kitchen waste to produce electricity, heat and compost.
- Inorganic matter is used by cement facilities as an aggregate.
- Landfill is handled in a manner that stabilises quickly and can be restored as public green space or allotments within a short period of completing filling the site.

The legal system ensures that the structures are adopted by society.

(Japan Environmental Sanitation Center, 2012)

Waste in every form was analysed and it was found that even dust contained metals that could be recovered. Once this was brought to the attention of the Japanese, dust was considered in every element of their planning in order to ensure that value was not overlooked (United Nations Environmental Program, 2013).

Projects that could act as showcases were developed. These included waste treatment plants and eco-town projects, of which Kawasaki was the first.

Kawasaki is a largely manufacturing-based town with a concentration of technology-based SMEs. The government in the area stimulated the development of end-of-pipe technologies involving industry, academia, government and public in developing a target to become a zero-waste community. Industries cooperate with each other to ensure resources are utilised as fully as possible. This includes stimulating businesses into finding new uses for what is currently deemed waste, spawning new businesses providing recycling facilities in the process, aided by subsidies of up to 50% of the costs. One example of this approach is the cement industry, which is able to use reusable boards manufactured from waste plastics that last longer than traditional timber boards for its shuttering (United Nations Environment Programme, 2013).

The precise mix of technologies developed in eco-town projects is naturally dependent on the mix of industry demands and available waste, but in the case of Kawasaki these have been combined to revolutionise traditional industry, creating new recycling industries that manage the necessary conversions in the process (United Nations Environment Programme, 2013). These include industries that convert plastics back to oil, removing associated contaminants, and recycle rather than downcycle PET plastics, located close to the source of collection (Waste Management World, no date).

These combined actions led to reductions of waste going to landfill from 17% to just 4% in four fiscal years, and the percentage being recycled increasing from 37% to 53% (United Nations Environment Programme, 2013).

Building design

Technologies exist that enable the Japanese to create homes using a variety of techniques that result in their generating more power than they use, but they still emit more carbon than can be considered a sustainable level (Web Japan, 2012). In addition to this, the Japanese have developed a building style that involves a double skin facilitating warming and ventilation of their buildings, which they have been using for the last 20 to 30 years (Townsend, 2010b).

However, the Japanese are currently running the “eco-house challenge of 20”. This is managed by the Japanese Ministry of the Environment and involves building 20 eco-homes throughout the country. These are all designed by

different architects in collaboration with local government experts and the Ministry of the Environment, with the remit of designing the building to address the local environmental conditions passively. The aim of the project is to develop knowledge that will be relevant to policy development (Townsend, 2010b).

The building standards employed in the “eco-house challenge of 20” include addressing the resources used to build the property as well as designing passive management of the internal environment. The properties are designed to visually match local housing and are being used as educational centres in order to enable the local population to adopt ideas that have been incorporated into them (Takachiho Shirasu Corp, 2014a; Takachiho Shirasu Corp, 2014b). However, all of the sites are rural and as yet urban designs and the demands of urban living have not been incorporated into the project (Townsend, 2010).

6.4.4 Monitoring performance

The Japanese use a variety of techniques to encourage the adoption of best practice:

Benchmarking

With respect to guiding the development of products, the Japanese take a stance that encourages the development of low environmental impact goods. Rather than determine a minimum standard where performance is concerned, they identify the best performance that is technically possible at a given time and stipulate a time frame within which the benchmark will be introduced as a minimum standard. This forward-looking approach causes industry to aim much higher than it would if it took a stance of identifying the minimum acceptable standard at the outset (United Nations Environment Programme, 2011).

An example of this in action relates to two Tokyo producers of water heaters that were declared the market leaders where efficiency was concerned. The Tokyo Metropolitan Government declared their intention to certificate appliances using these two products as a benchmark (Tokyo Metropolitan Government, 2010).

Cap and trade

In order to meet the targets set in the master plan, the Tokyo Metropolitan Government introduced a cap-and-trade measure that involved two phased

periods in which large consumers of power were expected to reduce their emissions, principally by reducing their consumption. The first five-year period, ending in 2015, sought a 6% reduction, and the second period demanded a further 19% reduction on 2000s emissions levels by 2020. The figure differed depending on sector, with the highest target allocated to the transport sector.

SMEs were largely exempt from the cap-and-trade system due to their size. However, they were expected to assess and report on their emissions levels and, should they exceed the equivalent of 3,000 kilolitres, should take action to make reductions. Support was offered in the form of an advisory panel (the Centre for Promoting Activities for Preventing Global Warming) and low-interest loans. Half the cost of any energy-saving devices installed by SMEs following reporting would be deducted from their corporate enterprise tax.

Businesses can invest in offsets in order to meet their obligation. These include buying credits created by SMEs that reduce their consumption, installing local clean power production facilities or purchasing credits sanctioned by the government that evidence a reduction of carbon made in another sector. The government intended to monitor the purchase of offsets to ensure that the savings were made within Tokyo itself (Tokyo Metropolitan Government, 2010).

Targets

Organisations with fleets of more than 200 cars had to upgrade 5% of the fleet to adhere to low-emissions standards, and Tokyo Metropolitan Government determined to promote eco-driving practices and assist SMEs in disseminating the practices to their workforce (Tokyo Metropolitan Government, 2010).

The Japanese appear to be struggling to meet the initial Kyoto target of a 6% reduction on 1990 levels of emission. They resisted the second tranche, requiring a 50% reduction of 1990 levels by 2050, preferring to support a 50% reduction of existing levels (Vinger, 2012). The latest review of production of renewable energy leads the Japanese to believe that 9% of their energy will come from renewable sources by 2020 and 11.6% by 2030. Whilst the majority of renewable power is through hydropower, the area of future growth is predicted to be in the field of photovoltaic technology (Ministry of Economy, Trade and Industry, 2013c).

The Japanese government recognises the need to move to renewable energy supplies but, whilst proposals exist, the government does not have any idea about how to achieve this and has not revealed target figures or a concrete strategy that is likely to achieve the levels desired (Institute for Sustainable Energy Policies, 2014b).

6.4.5 The impact of geography

Not all motivation behind environmental protection can be attributed to culture alone. Many of the more environmentally focussed initiatives were forced on the Japanese by their geography.

The Japanese government recognises that nuclear fuel could be a mainstay of carbon-free power capacity, but the country's propensity to earthquakes renders it an unsafe option (Ministry of Economy, Trade and Industry, 2014i; Ministry of Economy, Trade and Industry, 2014j; Watanabe and Adelman, 2014; Watanabe and Suga, 2014). In choosing to revert to coal, the Japanese are also promoting a new technology whereby impurities are removed prior to burning the fuel. If this were adopted by both the British and the Americans, the reduction in carbon emissions would exceed all of the emissions from Japan (Watanabe and Suga, 2014).

Japan's terrain is such that it causes wind patterns that are not conducive to rooftop wind turbines because they require considerable maintenance. Whilst power companies are installing some large-scale rotors, the largest of them only have five turbines. Marine-based turbines are more feasible where wind conditions are concerned but face the disadvantage of a lack of shallow waters, meaning that they cannot be anchored to the sea bed. Pilot studies for floating wind power generators are in progress (Ministry of Economy, Trade and Industry, 2012a).

The government is consequently of the opinion that solar panels should be the principal source of renewable energy. Bearing in mind the limited flat land in the country, it is targeting the roof space of residential homes (Ministry of Economy, Trade and Industry, 2012a). Japan is also well placed to develop geothermal technology and considers this to be a resource that should be exploited, currently ranking third in the world for the quantity of power being produced from this source (Ministry of Economy, Trade and Industry, 2012a).

The capacity for hydroelectricity has steadily increased over the years, but the quantity produced has remained fairly static. The government is targeting a small increase in capacity by 2020, but recognises the additional costs caused by needing to move production into the mountainous regions (Ministry of Economy, Trade and Industry, 2012a).

6.4.6 Summarising ethical standards and capabilities

The cultural concept of *mottainai* in conjunction with a geographic terrain that provides little in respect of mineral resources has caused the Japanese to recognise the value of resources, minimising the demand for virgin materials and, at the other end of the life of the product, for landfill.

Fuelled by a desire to ensure strong economic prospects, the Japanese have a tendency to find technical rather than passive solutions. Through the application of continual development with incremental change, the Japanese have developed sophisticated solutions to passive climate control in buildings and achieved significant gains in the development of power-efficient technologies. However, they are still facing difficulties in establishing their preferred approach for power generation.

This delay is not problematic to the Japanese, who take a long-term view, although they are struggling to meet their commitment under the Kyoto agreement. The process of change management is traditionally slow, involving many players, ensuring the end result considers many perspectives and is robust. However, the family-styled culture means that governments and businesses work together towards their desired ends in a climate of trust and loyalty. Once a decision is made, diffusion is comparatively swift, aided by benchmarking and targets that encourage the development of goods that equate to the best in class. The inclusion of the consumer in the decision-making process aids “buy in”.

6.5 The provision of financial support

When planning new initiatives, the Japanese consider the affordability of new technologies and the financial implications of policies to ensure that the welfare of business is maintained (Institute for Sustainable Energy Policies, 2014b). Consideration of the manner in which renewable power is adopted illustrates their approach.

6.5.1 Financing the adoption of clean energy production facilities

One scheme under consideration was the feed-in tariff scheme promoting the adoption of renewable power generating technologies whereby owners of properties equipped with renewable power generating facilities could sell power on to the national grid, facilitating repayment for the cost of installation (Ministry of Economy, Trade and Industry, 2014a). The cost of the buy-back scheme was covered by a surcharge on electricity borne by all sectors including SMEs, providing an incentive to adopt the technology (Ministry of Economy, Trade and Industry, 2013b).

Initially the scheme applied to photovoltaic-produced electricity from residential properties alone. However, when this proved to be an effective stimulus for installation, the project was broadened in its scope (Ministry of Economy, Trade and Industry, 2012a). Subsequently, once new technologies had been shown not to place an undue burden on the taxpayer, they could be included in the scheme. Technologies that would be competitive without any support, such as large-scale hydroelectricity plants, were excluded (Ministry of Economy, Trade and Industry, 2011, 2013d).

During the consultation period it was suggested that low-income earners and SMEs should have a reduced surcharge, but it was recognised by the government that this would place added pressure on the rest of the taxpayers. The government preferred to take an approach that would eventually reduce the costs for all parties (Ministry of Economy, Trade and Industry, 2013d).

6.5.2 Environmental related aid

As early as 1989, the Japanese pledged 300 billion yen (£17 million) for “environmental related aid” for the three years of 1989 to 1991 (Vinger, 2012). Financial aid is also used as an incentive to encourage compliance with environmental requirements in the form of low-cost loans and tax breaks (Vinger, 2012).

6.5.3 SME support

Among the roles of the SME unit within the Japan Finance Corporation is “policy-based financing” whereby support is offered that is in line with the key policies of the country. 5.4% of the funding in 2012 was for environment and energy measures (Japan Finance Corporation, 2014b). Over half of the loans

given to SMEs are for periods of over five years and the interest rate is fixed to facilitate budgeting by the recipient of the loan. If SMEs are facing difficulties, repayments are handled in a flexible manner to help the enterprise recover more quickly (Japan Finance Corporation, 2014c).

The Japanese offer the highest number of credit guarantee schemes to their SMEs, equating to 7.3% of their GDP. In this respect, the Japanese provide more in terms of % GDP than other nations. These schemes are used to facilitate SMEs being granted loans for which their small size would normally preclude sufficient collateral with which to secure the loan, and support over a third of all SMEs in Japan. The corporations providing the guarantees are publicly owned and receive 76% of their funding from the government and most of the remainder from financial institutions (Centre for Entrepreneurship, SMEs and Local Development, 2013; Japan Finance Corporation, 2014a, 2014c).

Subsidies are provided to reduce the cost of installing wind power or photovoltaic power production units. The government considers these to be a profitable investment because it recognises that in increasing demand, the initiative has also resulted in reducing the production costs of the units (Ministry of Economy, Trade and Industry, 2013b).

6.5.4 Incentives

A fund of 8 billion yen was created to fund support for SMEs including subsidies to the leasing companies providing energy-saving devices. It is also possible to convert saved energy into credits that can be traded in the cap-and-trade market.

6.5.5 Taxation

The Japanese do not use taxation as a tool to encourage green behaviours much in comparison to the levying of taxation for labour. Figure 6.1 compares the environmental and labour-related taxes and shows that there has been a steady but minimal downwards pressure on environmental taxes, which were at their highest in 1995 at 1.69% of the GDP, whereas labour taxes have risen more rapidly from 7.5% to 11.8% of GDP in the same period.

Taxation as a percentage of GDP

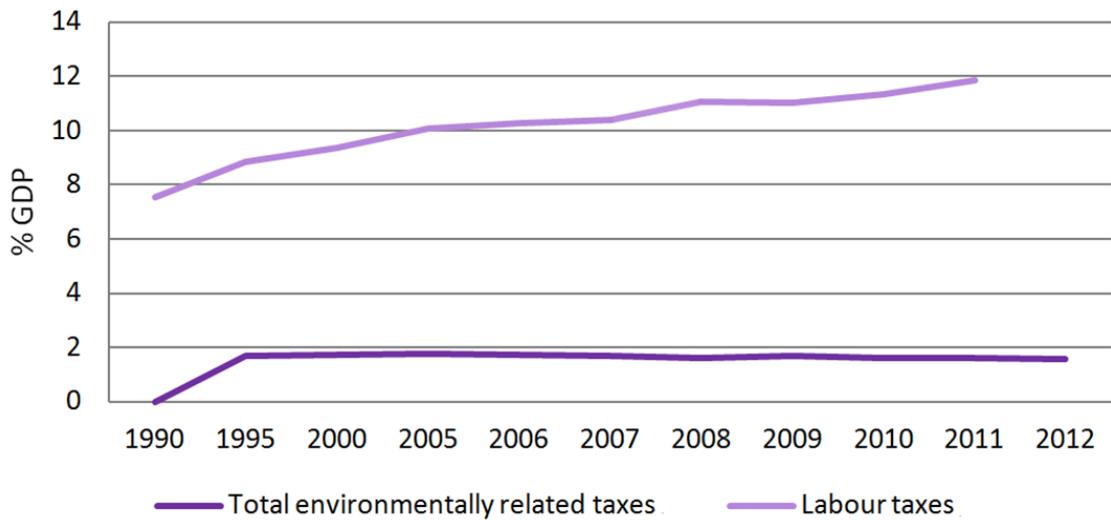


Figure 6.1: Environmental and labour taxations as a percentage of GDP (Data: OECD, 2014c. Dataset: green growth indicators)

6.5.6 Innovation and environmental R&D

Public spending in environmental research and development appears to belie the evidence. The case study has demonstrated the lengthy process and detailed care that the Japanese devote to developing their processes, yet in spite of more than doubling their spending over the period between 1990 and 2011, the Japanese only spend 1.076% of their public spending on research and development (figure 6.2), having risen from 0.47% in 1995. The rise in the proportion of public expenditure spent on environmental research and development has correlated closely with their total public spending.

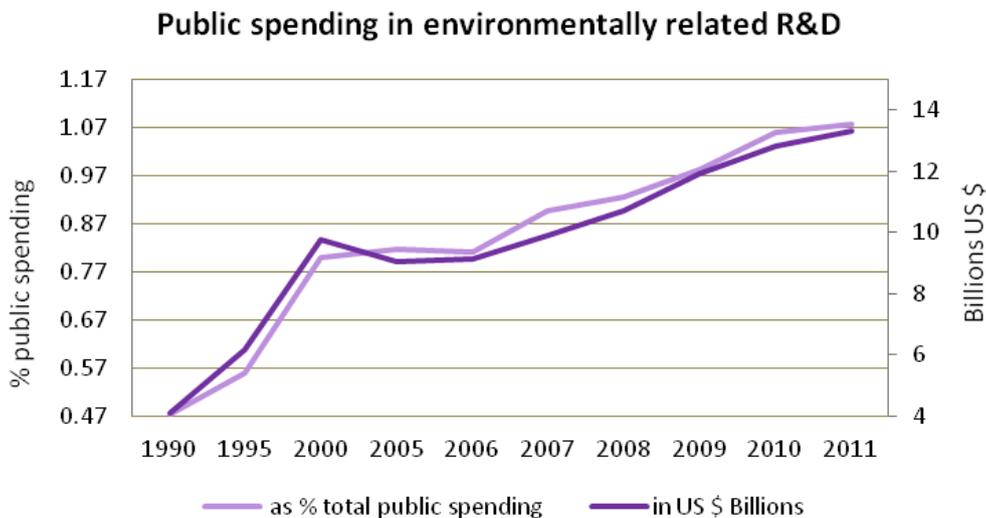


Figure 6.2: Public spending on environmentally related research and development (Data: OECD, 2014c. Dataset: green growth indicators)

6.5.7 Summarising the provision of financial support

The Japanese provide financial support strategically. They are careful to ensure that new initiatives are affordable and that SMEs are given due consideration and support. They recognise that widespread diffusion of a technology enables the producers to develop economies of scale, making the technology more affordable, and thus view it as a viable investment.

Support is given in the form of fixed-price loans, credit guarantees, subsidies, and offering the facility for those investing in power generation facilities to recoup the cost by selling power on to the national grid. Care is taken to support SMEs through any times of difficulty they may experience in repayments of loans in order to help maintain the economic performance of the country. This is in line with the paternal-style hierarchy displayed by the Japanese.

Taxation is not used as an incentive to encourage green behaviour to any great extent, but the investment in environment-focussed research and development has risen steadily in real terms, appearing to be a percentage of GDP.

6.6 Diffusion

Diffusion relates to the manner in which green initiatives are adopted by the populace and is assessed here by reviewing the manner in which recycling of small electrical devices in Tokyo is encouraged, Japan's efforts to involve the international community and OECD performance indicators.

6.6.1 An example of diffusion: recycling small electrical devices in Tokyo

In response to the objective of conserving the basis of life set out in the master plan, the Tokyo Metropolitan Government established a Panel for New 3Rs Strategy, which published its strategy in 2009.

In 2003, Tokyo became an eco-town, and, having analysed material flows and recognised the principal areas of difficulty, in 2010 the Tokyo Metropolitan Government advertised its targets with respect to waste management. It was looking for a 35% reduction by 2015 on the quantity of waste going to landfill in comparison to that of 2004. The elimination of sending plastics to landfill was prioritised. In 2003 plastics constituted half of the volume of the material in landfill. It was also targeted to increase the recycling of construction sludge by 50%. An EMS to handle hazardous waste within Tokyo was to be established,

fly tipping controlled and systems for increasing the potential value of waste explored.

The Tokyo Metropolitan Government garnered opinions from the public and found that there was a preparedness to engage with recycling, the principal motivator where electronics were concerned being that of data security. Collection boxes were installed around the city in places as diverse as railway stations and retail outlets, as well as at citywide events. These were for small portable devices (Waste Management Division, Bureau of Environment, Tokyo Metropolitan Government, 2010).

Incentives encouraging compliance

Incentives create competitive advantage for compliant organisations in a variety of forms that are summarised in table 6.1. These include financial measures to mitigate the long-term nature of much environmentally focussed investment, knowledge exchange and more tangible support. It is important to note the characteristic of knowledge exchange which, through involvement of the public in policy making, educates them about the need for the policy and complexities in finding a solution, which assists in the policy’s resultant adoption.

Table 6.1: Incentives offered to encourage compliance

Financial measures	Tax breaks Low-interest loans	Foreign exchange Grants and subsidies
Knowledge exchange	Access to latest findings	Involvement in policy development Involvement in public-private partnerships
Tangible support	Government contracts Sanctioning of cartels Prestige/awards	Administrative guidance and advice Licences/import licences

(US Library of Congress, 2011a)

6.6.2 Dissemination

Japan’s policy specifies that dissemination is to be focussed on the international community rather than the domestic alone. In this broader remit, the Japanese have been proactive, reporting many activities that they have undertaken to disseminate their ideas (see appendix 23).

Consisting of chairmen from the major businesses in Japan, and currently chaired by the chairman of the Japanese Business Foundation, the Japanese Business Alliance for Smart Energy Worldwide seeks to co-ordinate the

promotion of Japanese clean technology both worldwide and within the country, cooperating with the government and people (Japanese Business Alliance for Smart Energy Worldwide, 2014).

There are two apparent motives for this level of activity. Firstly, the Japanese can promote their technologies, increasing the market for either the product or their consultancy services. Secondly, they recognise that sustainability needs more than what they can achieve on their own. They recognise that spreading good practice reaps environmental benefits over and above the more obvious economic advantage through finding business opportunities because they are increasing the effectiveness of their improved technologies. This is relevant in the case of carbon reduction, a target they are finding hard to meet. As indicated in section 6.4.5, they maintain that if the British and Americans were to adopt their low-carbon fuel burning technology, the resultant reduction in carbon emission would exceed all Japanese emissions (Watanabe and Suga, 2014).

6.6.3 Encouraging behavioural change

At a domestic level, the government has encouraged behavioural change in the market and is supported by NGOs (United Nations Environment Programme, 2013). To this end, the “it is fun to share” campaign was run in which all levels of society, including individuals and businesses, were encouraged to share resources and knowledge rather than retain them just for individual benefit in order to support the development of a low-carbon society (Ministry of the Environment, Government of Japan, 2014a).

ANRE launched the “green power project” in 2013 and created a publicity drive at the beginning of its second year through municipal and business-based activities across the nation. The project, which is available to both industry and the individual household, creates financial incentives for the installation of small-scale local renewable power production with the price set to encourage the smaller-scale producers (Ministry of Economy, Trade and Industry, 2012a).

Japanese businesses have seen the benefit of adopting ISO 14000 but this is considered too complex for SMEs. In consequence, the Japanese government has developed Eco-Action 21, a pared-down version suitable for SMEs trading on the domestic market (United Nations Environment Programme, 2013).

6.6.5 Summarising diffusion

The thoroughness with which the Japanese approach a problem, together with the manner in which they involve society in the development of a solution, clearly assists in diffusion of good practice, ensuring the public not only feel incorporated in the change in question but are also educated in its desirability and processes. This is enhanced by the use of incentives including knowledge exchange, finance and kudos.

The Japanese also recognise the benefit of advertising their progress on an international platform, potentially leading to financial benefits through the sale of their technologies or expertise. Similarly, in ensuring their SMEs are competitive at a domestic level, the Japanese have developed a light version of ISO 14000 in order to replicate the competitive advantage the ISO standard offers larger organisations.

6.7 Performance indicators

The following measures have been established by the OECD. Its green growth indicators provided the framework that was used as a basis for this case study and it follows that its performance data are pertinent to this study, demonstrating the extent to which its actions have diffused into practice. The measures under consideration relate to energy production and use, emissions, resource and waste management, and the focus of research and development.

6.7.1 Green energy production

Japan's troubled history in the provision of renewable electricity is evident. Throughout the period since 1990, the percentage of the total primary energy supply (TPES) produced through renewable means has been roughly half that of the OECD average, being 58% of the average in 1990 and falling to 42% by 2011. Similarly, the percentage of renewable electricity production was 70% that of the OECD average in 1990 and only 59% by 2012 (figure 6.3).

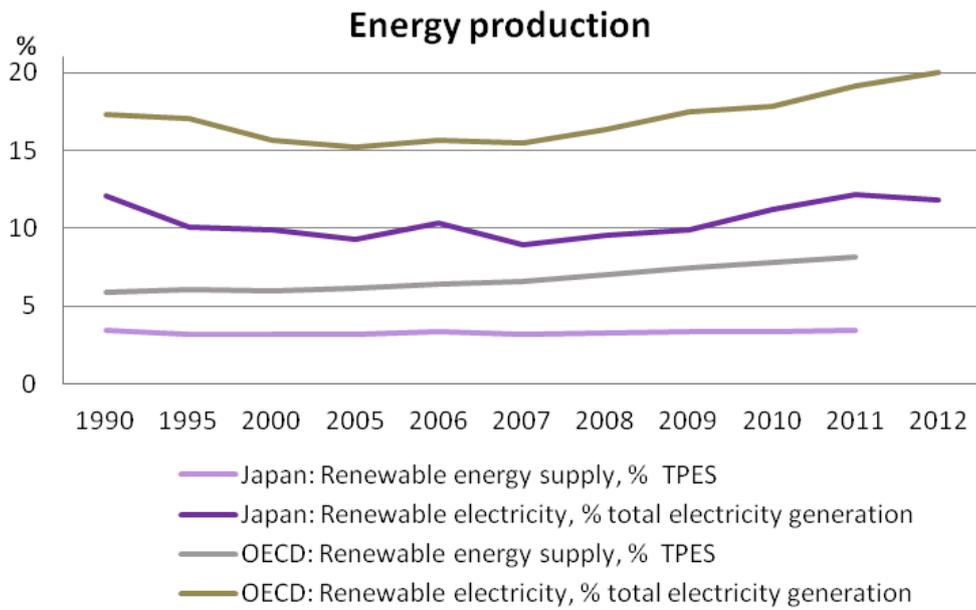


Figure 6.3: A comparison of renewable energy production with OECD (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

It is noted that the Japanese tend to look to technology to provide solutions for issues such as temperature control in housing and recycling. This has had a positive effect on their energy usage patterns (figure 6.4) where it can be seen, expressed in terms of tonnes of oil equivalence (toe), that the Japanese use less energy per head than the OECD average and achieve greater financial return from the same. The gap between the two has remained relatively constant throughout the period.

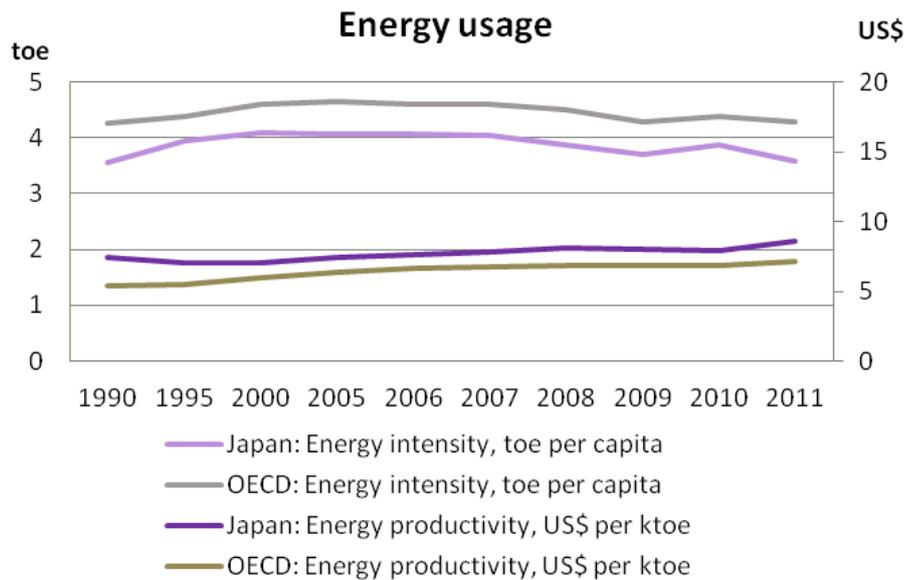


Figure 6.4: Comparison of energy usage between Japan and the OECD average (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

6.7.2 Greenhouse gas emissions

Indexed to 1990, Japanese carbon emissions have fluctuated largely in line with the OECD average, although the variation appears to be more extreme. Japan's performance was similar to the OECD average in 2002, after which point Japan was more successful in controlling emissions. By 2009, considerable reductions had been made such that Japan's emissions were 7% lower than the average for OECD countries, but these gains were lost after the earthquake in 2011 (figure 6.5). The reduced emissions recorded in 2009 appear in the datasets for many countries and it is reasonable to argue that these reflect the impact of the recession.

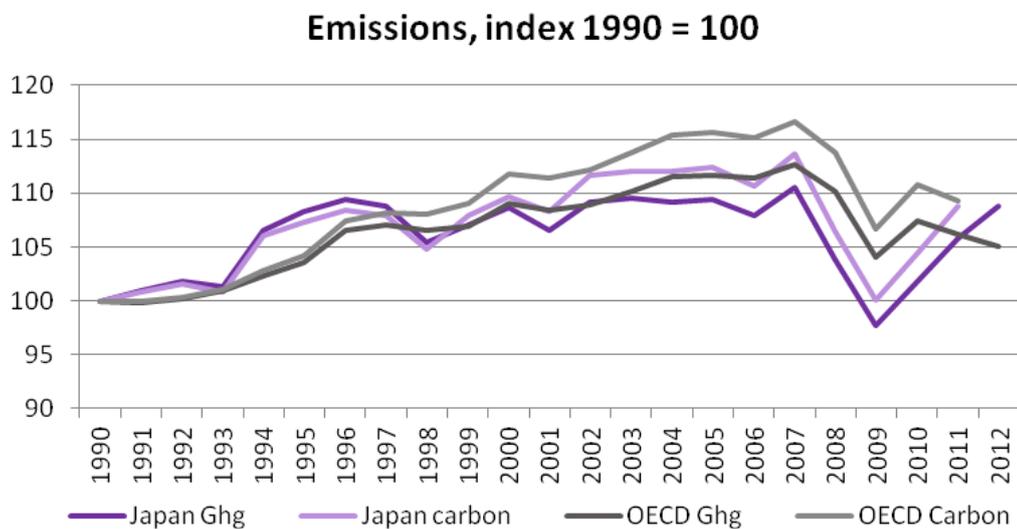


Figure 6.5: Carbon equivalence, indexed: 1990 = 100 GDP (Data: OECD, 2014c. Dataset: greenhouse gases)

In line with OECD, Japan has had more success in controlling the emission of carbon, resulting from industry and power production, than it has in the remaining emissions of which methane, a by-product of solid waste, husbandry and agriculture, especially from paddy fields, is the most prominent.

6.7.3 Resource usage

The OECD publishes performance data which it recommends should be used as a basis of comparison with GDP. Reduction of environmental impact is evidenced by a faster rate of growth of GDP than increase in the resources used to produce it. According to the OECD, productivity from power usage has gradually improved (figure 6.6). Data are not available beyond 2011 with respect to the usage of power, and it should also be noted that the Fukushima earthquake occurred in March of 2011 (Watanabe and Adelman, 2014), which

could account in part for the reduction in production-based CO₂ productivity and GDP indices in that year.

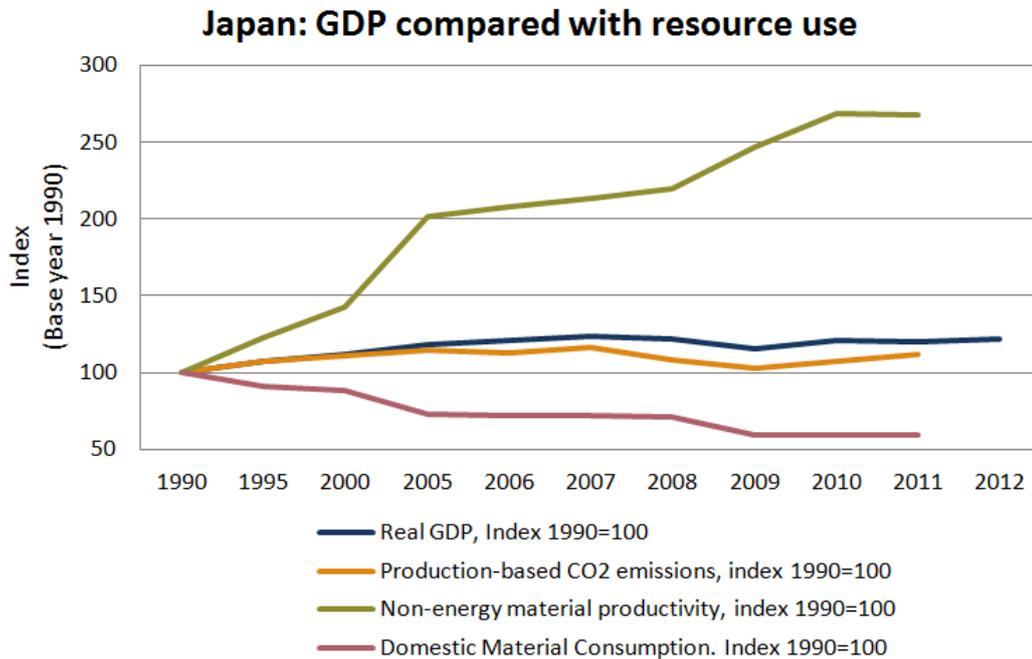


Figure 6.6: Resource utilisation compared with GDP (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

In spite of the efforts made by the Japanese, by 2011 it is apparent that they have struggled to meet the Kyoto commitment of a reduction in emissions, and also by this date there is not a single year that demonstrates reduced emissions in comparison to 1990. In that the rate of change has not matched the growth in GDP since 2000, the Japanese have been marginally successful in achieving a relative decoupling between energy and GDP.

The progress the Japanese have attained in increasing materials productivity and reducing their domestic materials consumption demonstrates considerable improvements in their materials management. There has been a marked divergence between these two indicators (figure 6.6) demonstrating a decoupling of materials from productivity.

The OECD reports that this figure is calculated by adding imports of materials and subtracting exports from the materials extracted within the country concerned in order to identify the material that is consumed by the population to support their lifestyles (OECD, 2014c). The OECD warns that the methodology is still being refined and this set of statistics should be handled with caution (OECD, 2014c).

The fall in materials consumption has been at a steadier rate which is more rapid than that of the OECD in total (figure 6.7). The latest initiatives in waste reduction do not appear to have followed through into a reduction of materials consumption, but it should be noted that the Japanese have been working on reducing materials consumption since the inception of the concept of lean production in the mid-1970s and they have succeeded in reducing it by a further 40% in the 21 years covered by these data in comparison to an 11% fall across the OECD countries combined.

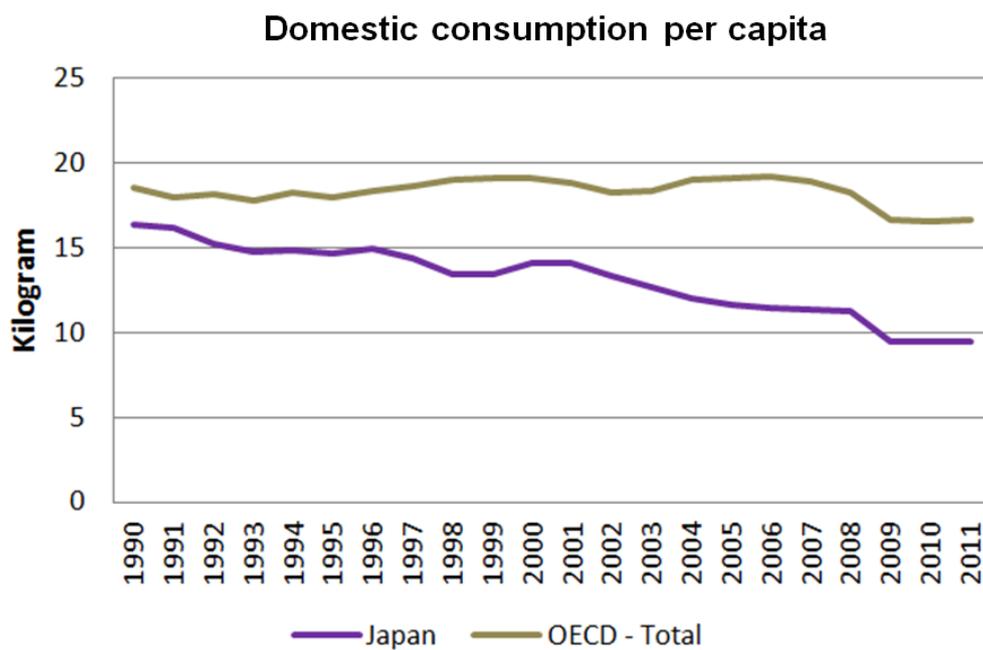


Figure 6.7: Domestic materials consumption per capita (Data: OECD, 2014c. Dataset: material resources)

With respect to non-energy materials, the Japanese have improved the productivity of their materials usage by nearly 270% since 1990 (figure 6.6). Figure 6.8 demonstrates that most materials savings have been made in the construction industry and reduction in wood and industrial mineral usage starting in the mid-1990s and 2001 respectively.

Japan: Materials input per capita

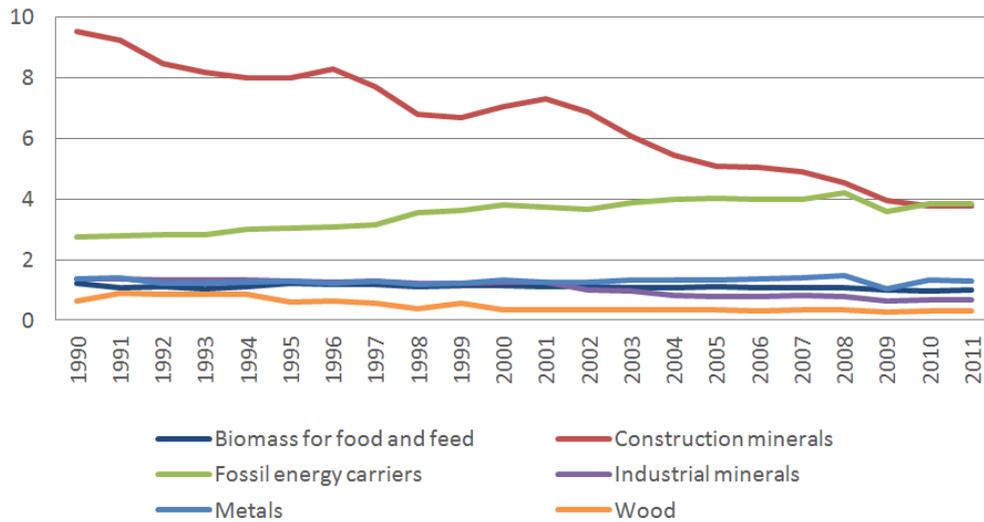


Figure 6.8: Materials input (Data: OECD, 2014c. Dataset: material resources)

6.7.4 Waste management

Waste management has been shown to be a core focus of Japanese activity. The OECD statistics demonstrate that Japan’s attitude to materials usage has created a downwards trend in domestic resource usage over time as well as in the production of waste. Figure 6.9 demonstrates that when compared to the OECD average, the Japanese had been producing nearly 20% less municipal waste per capita until 2003, when the levels of waste started to fall more dramatically. The fall in waste levels is even more apparent after 2006, the year after the launch of the “3R initiative”: reduce, reuse, recycle.

Municipal waste generated per capita

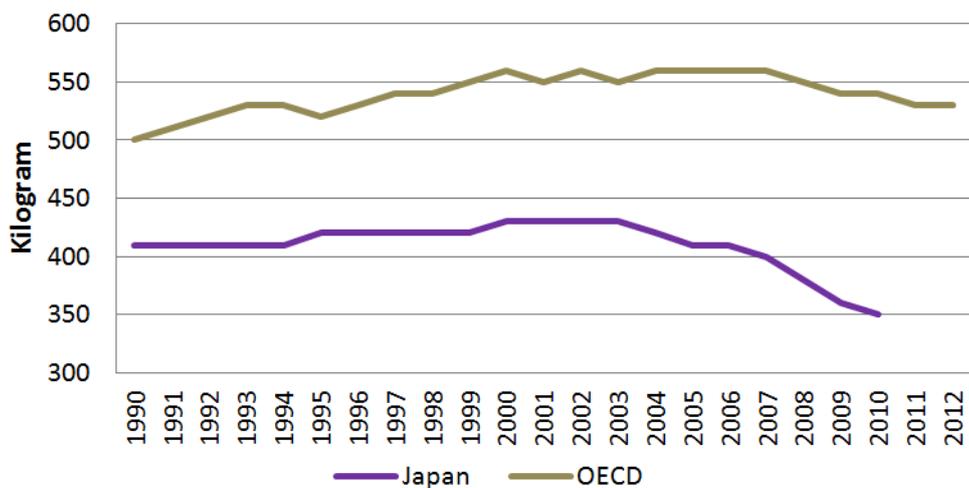


Figure 6.9: Municipal waste generation in comparison with the OECD average (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

The success the Japanese have had in minimising waste is predated by their success in reducing the quantity of material sent to landfill (figure 6.10). It is clear that steps to reduce waste were in hand before 1995 and by 2010 the quantity sent to landfill was 12% that of 1995.

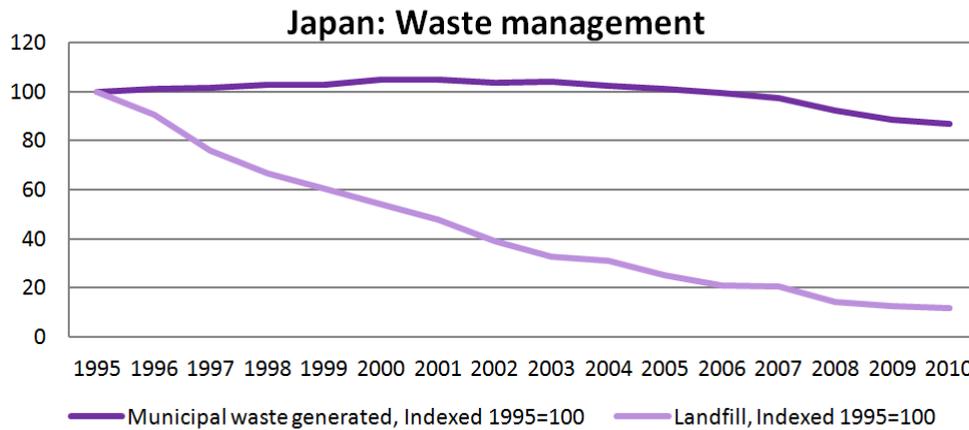


Figure 6.10: Waste management (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

6.7.5 Investment in green research and development

In spite of the low percentage of investment in research and development reported in section 6.5.6, Japanese production of green patents in the same period has burgeoned, rising by 7,000% (figure 6.11) in a curve that resembles that of funding, a peak in 2005 following from a peak in funding in 2000 (figure 6.2). It should be noted that indexed material does not demonstrate the magnitude of the number of patents applied for, rather the increase in activity. Regardless of this lack of data, the final position shows a considerable increase in activity.

Green patents, index 1990 = 100

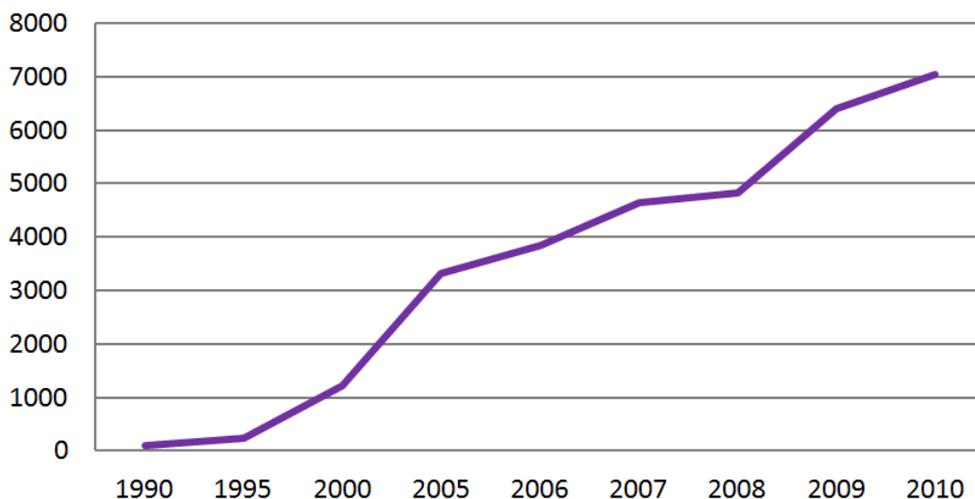


Figure 6.11: Green patents (Data: OECD, 2014c. Dataset: green growth indicators)

Global Cleantech Innovation Index

Japan ranks 12th in the Global Cleantech Innovation Index with an average score of 2.46 that includes cultural measures and environment. The index is compiled using 15 measures and the mean average is 2.11–2.12, where a higher score indicates the better performance. Table 6.2 relates to specific action, where the right-hand column provides the highest score achieved for the associated set of data:

Table 6.2: Cleantech innovation measures (Data: Pared, 2014)

Measure	Score	Highest
Cleantech-specific innovation drivers	2.47	3.12
Development to commercialisation	1.49	4.29

The low score relating to the extent to which innovation has been commercialised is mitigated to some extent by the score for emerging innovations, which was 4.51 (Pared, 2014).

6.7.5 Summarising performance indicators

The Japanese face distinct challenges where environmental performance is concerned, but it would appear that these same challenges have also ensured that their performance is consistently better than the OECD average in terms of both energy intensity per capita and productivity. Controlling emissions is proving to be more problematic, with their successes achieved before the Fukushima earthquake being eroded as they had to revert to coal-fired electricity plants, their technological solution providing an insufficient benefit.

Japanese strength with diffusion of good practice lies in their resource and waste management. Per capita, resource use has steadily declined, and introduction of the waste hierarchy has resulted in the production of municipal waste falling to 63% of the OECD average in 2010, the majority of which is recycled.

Spending on green patents started to be increased in 1995, helping them to be ranked 12th in the global innovation index where they also demonstrated a high ranking for emerging innovation.

6.8 Summarising Japan

This case study has examined the environment in which SMEs operate in order to assess the action of government in assisting the move to sustainable development. Whilst it has not necessarily pointed to the detail specific to the SME, their management is involved in the public activities of the government and is therefore influenced at a more holistic level.

The overall pattern that has emerged from this case study confirms many of the observations about the character of the Japanese provided in section 6.1 and appendix 20 and the potential impact that this would have on their ability to address environmental management. The Japanese were noted for their striving for improvements. This has been evidenced in the attention that has been given to the level of detail in their plans and illustrated clearly in the planning that went behind their efforts to reduce waste going to landfill. They did not even let dust escape their attention.

The focus on harmony has endowed them with a gift of being able to value the contribution of others, and their ability to blend disparate ideas assists them to the extent that they identify the potential in concepts garnered through the course of their networking and are able to work with them to develop innovative approaches that, because of the broad range of ideas that have been considered, are robust and effective.

Evidence of the structures that facilitate both policy development and innovation can be seen in the specific nature of the working groups reporting to the Advisory Committee for Natural Resources and Energy, and the existence of the policy research organisations supporting government action. It is clear that Japan is a highly ingenious nation, expert in developing effective incremental changes, but the Japanese do not have the same level of expertise in making radical changes.

The drawback of this approach is that the process of developing new approaches can appear to be protracted as the concept is put to the public to debate, and the feedback processed and synthesised. However, this process also prepares those contributing to the process for the change, which when adopted appears to be rapidly absorbed, as suggested by the rapid reduction in

waste after the introduction of the concept of the three R's: reduce, reuse, recycle.

Further evidence of the integrative nature of the Japanese thinking can be seen in their environmental policies and vision for Tokyo. Both of these contain relatively few policies. However, as the policy is explained in full, it becomes apparent that its breadth is far-reaching and virtually every aspect that could be considered has been woven into it, demonstrating a sensitivity to many environmental issues.

Whilst the Japanese were reported to have had little respect for the environment, their society has suffered the impact of pollution and radiation to the extent that the Japanese have been forced to realise the environment must be cared for. In this respect, it is feasible to suggest the Japanese's environment and circumstances have forced them to behave as they do. Their lack of resources, including the difficulty in generating clean power, together with their high-density living, places demands on them to which they have to respond. The need for the economic viability of resource use is therefore an imperative.

However, the Japanese culture has enabled a response that is highly successful. The need for economic welfare together with their drive for improvement and ability to synthesise ideas causes them to find value that others might miss. Whereas other nations might be creative, the Japanese are highly innovative and business-minded.

The business approach has potentially held the Japanese back where it comes to passive solutions for reducing the environmental footprint of buildings. Their first approach was to resort to technology which enabled them to find profit in the development of associated equipment. This, however, was not a solution that provided the lowest environmental impact and this has come to their notice. The first steps towards passive housing have been made.

The communal nature of the Japanese means that they appear to work together in order to achieve the declared ends. Their style of writing looks to the western mindset to be overly idealistic, but it should be noted that only sources written in English were used, and these could be written in a style that differs from the communication to the inhabitants of Japan.

In encouraging diffusion, it is clear that the government involves public debate in the development of policy and prefers to use incentives rather than penalty to achieve the changes in behaviour. The results achieved in their waste management programme which required the cooperation of all of society demonstrate the manner in which the nation responds.

This case study has therefore demonstrated the manner in which culture has been a significant factor in the way in which the Japanese have coped with the constraints that their land has placed on them, and in enabling them to adopt technologies and processes that integrate the needs of the environment with the needs of the people in order to continue seeking a sustainable mode of living. However, there are grounds to suggest that the Japanese culture would have steered a very different course had those constraints not been in place.

Chapter 7. Sweden

Located on a peninsula, Sweden has a large exposure to coastal waters and a total landmass of 410,000 sq km, slightly smaller than Japan. The average land to population ratio for the entire country is 48.8 sq km per 1,000 people (Nationmaster, 2014a) or 20.9 people per sq km (OECDb), but this is misleading because Norrland, comprising three fifths of Sweden's landmass, stretches north into the Arctic and only 12% of Sweden's total population of 9.5 million live in this area (Encyclopaedia of the Nations, 2014; Högmans, 2014; World Population, 2014c).

Stockholm is situated just south of Norrland and has a population of 2.1 million people, which is nearly twice that of the entire Norrland region (World Population, 2014d). Named European Green Capital 2010, Stockholm is one of the leading cities where carbon emission reduction policies are concerned (Stockholm Stad, no date). The centre of Stockholm consists of 14 islands connected by bridges (Stockholm Business Region, 2010), making it highly sensitive to rising sea levels.

Economically, the GDP is \$4.52 trillion, which equates to \$55,244 per capita (Nationmaster, 2014d) and is the second highest in the sample. The country is rich in resources including metals, timber and terrain that supports hydropower (Nationmaster, 2014d). 99.8% of businesses in Sweden are SMEs, and these employ 63.22% of the workforce (European Commission, 2012).

The Swedes were the first to identify the threat caused by the release of greenhouse gases, their Nobel prize-winner Svante Arrhenius discovering the problem in the 19th century (the Swedish Institute, 2013). They were also at the forefront of identifying other environmental problems caused by emissions because their geographic location led them to being exposed to many environmental problems before the rest of Europe. Firstly, prevailing winds carried associated industrial emissions from Britain, Germany, Poland and even Russia over Scandinavia (Jutterström, 1993), where their ill effects were identified as early as 1872 (National Atmospheric Deposition Programme, 2014). Secondly, the effects of acidification damaged both Swedish timber and water supplies such that the Swedes were aware of the greater threat to

sustainability itself in the 1960s and were at the forefront of promoting sustainable development (the Swedish Institute, 2013). Stockholm first developed an environmental policy in 1998 (Stockholm Stad, 2012).

7.1 Characteristics of the Swedish and their impact on sustainable development

With respect to protecting the environment, Sweden ranks second to Denmark of the 23 countries involved in the survey (Hampden-Turner and Trompenaars, 1994, p.262). A number of cultural indicators show why this could be the case:

- Stakeholders beyond the shareholder were considered by nearly three quarters of Swedish managers in the survey (Hampden-Turner and Trompenaars, 1994, p.32), suggesting there is scope for consideration of environmental needs.
- An outward-directed focus is believed to have enabled the Swedes to become more resilient to change (Hampden-Turner and Trompenaars, 1994, p.49), suggesting a greater tolerance of change.
- In being free to develop technology beyond the requirements of the customer (Hampden-Turner and Trompenaars, p.233), the Swedes can incorporate environmental protection in the specification of goods.
- The “first-generation” industry that was established by Swedes as they started to industrialise was largely in the field of technology (Hampden-Turner and Trompenaars, pp.260–261). Coupled with their conscientious application to work, aligning it with both national pride and the basis for approval, they have become world leaders in quality.
- The Swedish have one of the most highly feminine-oriented cultures, which would suggest they are sensitive to environmental needs (Hofstede, 1984, pp.190 & 209).
- The strong outward-facing feminine culture coupled with the recognition of the need to balance the individual with the needs of society forms a foundation for corporate projects.
- Banks take a supportive role facilitating the development of new technologies.
- The Swedish are likely to challenge authority (Hofstede, 1984, p.99). This could suggest that they are also prepared to challenge the status

quo and be proactive in seeking remedies for environmental problems at every level rather than leaving it for the acknowledged experts.

A full cultural profile including factors that are not considered by theorists to be relevant to sustainable development can be found in appendix 24.

7.1.1 Swedish government

Sweden is governed by a democratically elected government (Government of Sweden, 2011a), legislation being created at national level in the Riksdag. The structure, enshrined in the constitution, protects the interests of the people and specifies the promotion of sustainable development (Government of Sweden, 2012a). The Riksdag is subject to EU directives (Government of Sweden, 2011c), sets the rate of taxation and monitors the government, discussing bills created by government and developing them as appropriate into legislation (Government of Sweden, 2011d).

The Swedish strategy for sustainable development (2003) clearly demonstrates the priorities of the Swedish government. It maintains that all policies should take into account the three elements of sustainability: economic, social and environmental.

Within Sweden there are three levels of government: national, regional and local. Most of the powers that would be relevant to the adoption of clean technologies are devolved to the lower two levels.

Local government

There are 290 municipalities with elected councils. They have a broad remit covering the provision of facilities and services including housing, roads, water supply and wastewater processing, and are co-ordinated when necessary by regional government. The municipalities are free to set income taxes and charge for various services. Under their remit to provide social care, municipalities are legally responsible for health and the environment as well as water and sewerage provision and refuse collection (Government Offices of Sweden, 2011f). The autonomy of the local government is established within the Swedish constitution, but local governments are subject to EC directives (Council of Europe, 2005; Government Offices of Sweden, 2011a). Their duty to industry and commerce, and with these to SMEs, is only on a voluntary basis.

7.2 Policy development

As outlined in the opening of the chapter, the Swedish government has a history of being proactive where environmental protection is concerned, including hosting the first UN conference on the environment in 1972 (the Swedish Institute, 2013a). This section reviews the policy-making bodies and summarises the policies themselves: those that apply at a national level and those specifically developed for Stockholm.

7.2.1 Policy-making bodies

The Riksdag has 15 committees. Of these, the Committee on Environment and Agriculture is relevant to protection of the natural environment (Sveriges Riksdag, 2011a); however, environmental issues that are relevant to the SME have also been embedded in the remit of other committees, notably the Committee on Industry and Trade and the Committee on Transport and Communications (Sveriges Riksdag, 2011a; Government Offices of Sweden, 2014a), the latter of which overtly places environmental issues alongside those of business. The Riksdag is supported by roughly 400 agencies and state-owned companies.

7.2.2 Environmental policy

Policies are divided into 18 subject areas including “environment energy and climate” and “industry, trade, regional growth and consumer affairs” (Government Offices of Sweden, no date a). The climate policy is one of Sweden’s highest priority policies.

The environmental policy (provided in appendix 25) consists of 16 objectives, namely:

- Reduced climate impact
- Clean air
- Natural acidification only
- A non-toxic environment
- A protective ozone layer
- A safe radiation environment
- Zero eutrophication
- Flourishing lakes and streams
- Good-quality groundwater
- A balanced marine environment, flourishing coastal areas and archipelagos
- Thriving wetlands
- Sustainable forests
- A varied agricultural landscape
- A magnificent mountain landscape

(Swedish Institute, 2013)

The Environmental Objectives Council (later replaced by the Swedish Environment Protection Agency) was tasked with ensuring these objectives, which are supported by interim goals, are met. These objectives are ambitious and exceed European Commission targets, including in the need to preserve specific ecosystems and environmental demands such as zero eutrophication, a standard that demands close attention to the individual causes of environmental harm.

To further these ends, legislation was introduced in 1999 in the form of the environmental code. This requires a wide-ranging environmental impact assessment to be carried out before any potentially harmful activity is undertaken and promotes careful management of resources including reusing and recycling materials (the Swedish Institute, 2013a).

7.2.3 Stockholm's environmental policy

As a signatory to the European mayors' agreement Covenant of Mayors, the mayor of Stockholm committed the capital to achieving emissions reduction targets ahead of those agreed by Europe, creating a target of over 20% reduction by 2020, and submitting an action plan to show how the target would be achieved. Having been through three planning periods since the first in 1998, Stockholm has by this point already achieved a reduction of 23%, which when accounting for the growth of the capital equates to a 37% reduction per capita.

The Swedes have two principal areas of activity that are believed to be pivotal to this success, namely their development of infrastructure and their transport policies.

7.2.4 Stockholm's development of infrastructure

The Swedes ascribe their success in reducing carbon emissions largely to their investment in district heating and cooling facilities which reach almost 80% of the city's heating demand and include co-generation of heat and electricity, with 80% of the fuel originating from renewable sources including waste.

Stockholm's planners concentrated on creating areas of high-density living, ensuring that maximum facility was obtained from the associated infrastructure. In addition, retrofitting will bring their existing housing stock up to the same standard.

7.2.5 Stockholm's transport policy

The other field of activity related to transport, with the replacement of cars and buses by vehicles that ran on green fuels. The range of fuels included wind and hydroelectricity for rail and biofuels for buses. The Swedes were encouraged to use public transport such that less than 20% of commuters used their cars. The remainder used public transport or walked. The target was to achieve a 15% reduction of carbon emissions by 2015.

Collaborating with business, the government improved the provision of green fuel and electricity charging points across the capital, making their use more viable. The city's government also established an energy centre to co-ordinate activities supporting the residents of Stockholm in the adoption of cleaner technologies, including the testing of new technologies before dissemination.

The current action plan seeks to facilitate delivery of Stockholm's targets within four disciplines: transport, buildings, energy use and energy production. It also anticipates future demands in order to assist understanding of the focus of appropriate research to inform future plans. The plan augmented activities in progress rather than superseding previous plans, meaning that it could appear to be somewhat limited, when in fact the foundations of good practice were in place.

(Stockholm Stad, 2012)

7.2.6 Summarising Swedish policy development

Swedish policies are focussed on individual elements of the environment, and therefore demonstrate a methodical approach that clearly considers environmental needs at every level. At a national level, and with targets that exceed those required by the European Union, the Swedes can be seen to be protecting the fabric of their environment, including the visual impact of their wildernesses. At a local level, the focus of future activity rests on transport, buildings, energy use and energy production, building on a history of controlling the resources required for the provision of internal temperature control and transport.

7.3 Sensitivity to ethical issues

Sweden has been at the forefront of international moves towards corporate social responsibility, in part because of its vulnerable position where acid rain is

concerned (Jutterstrm, 1993; National Atmospheric Deposition Program, 2014). The government has proactively supported sustainable development initiatives, including that of hosting the first UN conference on the environment in 1972 (the Swedish Institute, 2013a).

Development of definitions

Definitions are a useful device because they reflect the full value attributed to a term or concept. As I identified in section 2.2 of the critical review of literature, the Swedish government through the Brundtland commission was behind the world's first attempts to provide a definition of sustainable development. It follows that sensitivity can be assessed in the manner in which concepts are expressed and terms defined. Sweden's government's explanation of how it envisages a sustainable society to operate places environmental considerations first:

A sustainable society is distinguished by sound management and efficient use of its natural resources. Its business sector is competitive and economic growth is healthy. Its welfare systems can readily be adapted to demographic changes.

(Government Offices of Sweden, 2003)

7.3.1 Swedish action and associated ethos

The Swedish appear to be highly sensitive to environmental issues, clearly evidenced at both a political and a public level.

Policy development

The Swedes clearly place environmental welfare as a high priority, as evidenced by the legislation which ensures that environmental considerations are embedded in each policy developed as outlined in 7.2.2 above.

Climate change

Climate change poses the triple threats of rising sea levels, more extreme weather systems, and threats to flora and fauna as habitats change. Sweden is vulnerable to warmer temperatures in that its arctic regions will experience considerable change. However, it is not affected by the more pressing threat felt elsewhere in the world of rising sea levels. As the downward force of the ice layer is relieved, so land in the Baltic states is rising. Records have been kept in Stockholm since 1774, since when the land has risen by an average of 0.52 cm

a year. This is not as extreme as some locations further north where land has risen by 1 cm a year (Hammarklint, 2009).

In spite of its relative safety from the effects of rising sea levels, when asked to rank the threat posed by world problems (namely poverty with an associated lack of food and drinking water, economic crisis and climate change) in an EU-wide survey, Sweden was one of just two nations that ranked climate change as the most important one to address. This opinion was shared by 82% of the citizens in a broader survey that included the threat of international terrorism and population growth. There is a strong belief that this is a reversible issue, which would make associated action more attractive.

(Eurobarometer, 2009)

Energy

Half of Sweden's electricity is generated from nuclear power. This has been gradually growing in acceptance in spite of the impact of the disaster at Chernobyl which followed the accident at Long Island. Indeed, in a survey across Europe, the Swedes registered the highest confidence in nuclear power.

In addition to a propensity to accept nuclear power, the Swedes are among the most proactive nations in seeking other renewable sources of power (OECD, 2010).

Stockholm Climate Pact

Stockholm has developed a pact with nearly 100 local businesses in which they publish their environmental targets and commit to match Stockholm City's reduction targets. It serves as a source of inspiration to other organisations and highlights activities that may not otherwise have been considered.

(Previously published in Vandergert, Sandland and Newport, 2013)

Pollution

Swedish sensitivity to pollution was heightened when they recognised the damage caused to their forests through acid rain, stimulating an attention to pollution control that has extended to their coastal waters. Their vulnerability to the activity of other countries has prompted development of international cooperation in order to achieve the standards they desire (the Swedish Institute, 2013a; Swedish Environmental Protection Agency, 2014).

The Swedish government clearly recognises the need to safeguard natural resources as well as the physical health and abilities of the people. It identifies that the existing infrastructure is also a resource that requires preserving.

Waste management

Waste management is highly regulated where both producers and users are concerned (Vandergert, Sandland and Newport, 2013). Sweden has reduced its waste production to a level lower than the European average. Coupled with their approach to energy, the Swedes recognise the residual value in waste to the point that they have reduced their waste to landfill to 1%. However, there is a slightly concerning development of importing waste from neighbouring countries where the political or legislative climate does not support similar action to feed Sweden's power generators (Impact Canada, 2015). This points to a potential conflict with materials usage because further economies in waste production will place pressure on Sweden's ability to generate power, and the process undermines the ability of the other nations to develop the environment under which similar waste recovery technologies can be used locally.

Transport

Transport management is an aspect of life that has not had such a long tradition (Vandergert, Sandland and Newport, 2013). The climate change action plan recognises the economies in carbon emissions that can be made through encouraging the move away from the use of private cars. This is balanced by the recognition that such a move will only be successful if viable alternatives are offered (Stockholm Stad, 2012).

Building design

The Swedes rank societal welfare highly and their northern latitudes have entrenched a tradition of developing buildings with high levels of insulation. Their current attitude is evident from their efforts to retrofit old buildings with their latest technologies and develop "cleantech communities" designed to minimise the impact of urban dwelling and business (Stockholm Business Region, 2010).

7.3.2 Summarising sensitivity to ethical issues

The Swedish are clearly sensitive to issues that could potentially harm the environment, at both governmental and private level. This is in part stimulated

by their geographic location which renders them vulnerable to ill effects caused by the activities of other nations. They value their flora and fauna and are consequently proactive in collaborating with other nations in order to secure their protection further. This is an outworking of the recognition that strengthening the community will strengthen the ability for the individual to flourish at a national level.

This outward collaboration to a certain extent appears to be self-serving, evidenced by the Swedes' preparedness to import waste material from other countries for energy production, depriving those countries of a potential resource and incentive to adopt a similar approach themselves.

7.4 Ethical standards and capabilities

Having established that the Swedes are at the forefront of identifying the parameters of sustainable development, this section examines the standards that they have set and their ability to deliver those standards, including the supporting agencies.

7.4.1 The style of change

The Swedish are an innovative people, adopting both radical and incremental approaches to good effect. They have a history of developing technologies around sewage sludge and manure treatment that have enabled them to produce methane to fuel their vehicles, using this for a range of vehicles including public transport. Many of these vehicles are dual fuel and can be converted to run on other forms of fuel as they come available. Further research is being conducted to identify other waste processes that could add to the range of available fuels.

(Premia, 2005)

The Swedes are proactive in looking outside their boundaries for solutions. Their model for new developments in Stockholm is to an extremely high specification (see 7.4.3 below). The ideas were garnered from visiting international "showcase" developments and improving on them to ensure that they incorporated appropriate solutions for the locality. These developments themselves have become advertisements of what can be achieved (Stockholm Business Region, 2010). Similarly, work on cleaning their coastal waters has

demanded considerable interaction with international bodies in order to gain their cooperation (Swedish Environmental Protection Agency, 2014a).

7.4.2 Government influence and supporting agencies

By 2012, the Swedish government had developed 14 interim targets relating to air pollution, the use of hazardous materials, waste management and the protection of biological diversity. These targets were developed in order to clarify and assist in the management of the societal changes necessary to achieve their objectives (the Swedish Institute, 2013a) and now have been increased to 24 (Swedish Environmental Protection Agency, 2014a).

The Swedish government is supported by the Stockholm Environment Institute, a think tank that advises on policy creation and facilitates change towards sustainability through the provision of tools and knowledge exchange (Stockholm Environment Institute, no date) not only in Sweden itself, but worldwide, influencing the environmental impact of its imports exchange (Stockholm Environment Institute, 2011). It is reputed to be within the world's top ten environmental think tanks (Sasnet, 2013), enhancing the capability of the Swedish government and businesses alike.

The Swedish Standards Institute led the development of ISO 26000, a standard that all sizes of business can attain and based on the fundamental requisites of corporate social responsibility, namely “transparency, ethical conduct, respect for stakeholder interests, the rule of law, international standards of conduct and human rights” (Ministry of Foreign Affairs, 2014).

7.4.3 The standards achieved

The Swedes have achieved notable success in reducing their environmental impact, although they acknowledge more work is needed if they are to achieve their targets. A major success is the cleaning of their coastal waters, which are now proclaimed to be pollution-free in spite of the heavy shipping (Swedish Environmental Protection Agency, 2014a). Waste management is such that 99% is recycled (Lumm, 2014). Examination of activities within Stockholm, including Botkyrka, a municipality within Stockholm, illustrates further achievements.

Carbon emissions

Stockholm's action plan for climate change establishes a target of a 20% reduction in greenhouse gas emissions between 1999 and 2020. They have already achieved a reduction of 23% of greenhouse gas emissions expressed in carbon equivalence, which, taking into account the growth in population, equates to a per capita reduction of 37%. However, reporting does not necessarily give a true picture because emissions involved in the production and import of goods have not been included in the calculation. The Swedes attribute much of this reduction to the development of district heating.

Stockholm's government has set a long-term target to be free from fossil fuel dependency by 2050 with an interim target of 3 tonnes of carbon emissions equivalence by 2015, representing a reduction of 44% since 1990. The authorities understand that reductions after this target has been achieved will be much harder. Attention to a wide range of factors facilitates achieving their targets, which are considered by the Swedes to be realistic.

(Stockholm Stad, 2012)

Energy

Much energy is extracted from waste materials (see "Waste management", below), including marine sludge. District heating and cooling is provided using the same infrastructure and the remaining power requirements are provided by solar panels or are certified "green" (Stockholm Business Region, 2010).

Waste management

Waste disposal is largely automated, with disposal chutes and local recycling collection points provided. Organic waste is turned into fertiliser, combustible waste is used for combined power and heat generation, and the remaining materials such as glass and metals are recycled (Stockholm Business Region, 2010).

Transport

Stockholm's authorities have worked with manufacturers, retailers and owners of fleets of vehicles to promote the purchase of clean vehicles which will run on biofuels. It is also promoting the development of renewable fuels including biogas which will reduce emissions by 85%.

(Previously published in Vandergert, Sandland and Newport, 2013)

The plan for Stockholm also includes moves to improve public transport, park and ride, bicycle and pedestrian provision together with increasing the density of housing in order to reduce the distances entailed in travel. Private car use is deterred by limiting parking spaces near workplaces. New car sales must include 50% that are fossil-free, and a premium is paid to encourage the scrapping of old cars. It is proposed that the categories of vehicle allowed in environmental zones that are already established in Stockholm should be adjusted to prevent more of the poorer-performing vehicles from entering the city, carpooling should be encouraged and congestion charging should be introduced (Stockholm Stad, 2012).

The wording of the plan is to be noted. Where the action is within the authority of the government, the phrase “the city will” is used, whereas the phrase “the city will strive to” is used when the authority lies elsewhere (Stockholm Stad, 2012). However, most of the actions relating to travel are introduced with “the City of Stockholm can”, suggesting the activities are mere suggestions and recommendations.

Water

The drainage infrastructure is protected by channelling rainwater and treated effluent into a lake, both biogas and heat having been captured from wastewater. Water-efficient technologies are installed in properties (Stockholm Business Region, 2010).

Buildings

The Swedish government has planned the redevelopment of two areas. It has encouraged cooperation between builders and service providers in order to develop a holistic approach to providing necessary facilities to the residents and business alike, at a level that could not be achieved by the individual service providers alone.

Botkyrka

Botkyrka has developed a sustainability plan at area level. Its plan is tailored to the resources and requirements of the area. It involves knowledge exchange and planning, as well as embracing new technologies, with aspects such as planning a city greenhouse that facilitates the production of food within an urban environment with minimal transport, thus avoiding associated carbon emissions

(Sweco, 2011). This municipality is reported to have halved its carbon emissions between 1990 and 2009 (Radio Sweden, 2012).

7.4.4 Monitoring performance

Two instances support Hampden-Turner and Trompenaars' assertion that the Swedes are conscientious in their work ethic and are prepared to speak out. Both of these involve their ability to report failure and use of such failure to promote improved practice.

The Klimp programme

In their assessment of the success of their Klimp programme (referred to below in 7.5), the Swedes identified that they could have managed the allocation of grants with greater cost-effectiveness. Firstly, they found that the mechanism of self-reporting of the anticipated benefit of investment encouraged over-optimistic estimates, and secondly, with the framework lacking a definition of "long-term", over 75% of the projects funded would not have qualified for funding had "long-term" been taken to equal five years. Administration proved to be costly and failed to ensure that Klimp funding was only received in instances where no other funding was available.

Monitoring the potential to achieve targets

This illustration relates to the manner in which the Swedes report their progress in achieving their environmental targets. Their reporting style addresses the longer term, focussing on targets set for 2020 with the question "will environmental quality objectives be achieved?" (Milijomal, 2012) which was responded to by the selection of one of three possible responses.

- "Yes" indicated that the action currently undertaken would achieve the desired objective, and in 2012 applied only to the reduction of the hole in the ozone layer.
- "Close" indicated that the target would nearly be achieved and action was planned to revise policies in line with achieving the target prior to 2020. In 2012 this response was applied to "a safe radiation environment". The remaining objectives were given the answer of "no".
- "No" indicated that the existing plans and policies were not sufficient to ensure that the target would be met. The report included an analysis of the problem, such as the need to involve emissions management in other

countries as well as the management of Baltic shipping in order to ensure that the target of zero eutrophication was achieved.

(Milijomal, 2012)

The analysis included in the report resulted in necessary modification of policies and action as well as the milestone targets in order to help ensure the targets would be met (Swedish Environmental Protection Agency, 2014a).

Sweden has already achieved its 2020 target for the production of renewable energy, aided by its policies supporting environmental innovation. Whilst the Swedish report that they are not on target for the majority of their objectives, they are still among the leaders within the OECD countries (OECD, 2014).

7.4.5 Summarising ethical standards and capabilities

The Swedish match their sensitivity to ethical issues and in particular environmental concerns with targets that at least match those set by the European Commission and, where greenhouse gas emissions and pollution are concerned, exceed them. They recognise the difficulties that will have to be faced as they progress towards their objective of a zero-carbon capital. They are an innovative people, developing new concepts and improving on the ideas of others, with universities and environment agencies offering expertise. Their targets are thorough, addressing areas that require international collaboration including the successful cleaning of their coastal waters. Their strengths also lie in their willingness to highlight where they are having difficulties in achieving their targets so that remedial action can be taken.

7.5 Provision of financial support

Examination of the standards and capabilities of the Swedes revealed the use of financial incentives to adopt environmentally friendly behaviours. These are examined in this section

7.5.1 Financing the reduction of CO₂ emissions

The Swedish government sought higher reductions in CO₂ emissions than required by the Kyoto protocol, and established “Klimp” as a means through which municipality governments could apply for subsidies to attract investment into greenhouse gas emission reduction that would not yield short-term profits (Johansson, Samakovlis and Treich, 2011). This programme expired in 2012, but resulted in contributing SEK 1.8 billion (nearly £1.5 million) to a total of over

SEK 8 billion (£6.8 million) invested into 913 projects involving over 60% of Sweden's municipalities (Swedish Environmental Protection Agency, 2012). Success of these projects was determined by the resultant reduction in carbon emissions (Swedish Environmental Protection Agency, 2009).

7.5.2 SME support

The OECD recognises that the Swedish government makes a lot of financing opportunities available to small businesses, but it is suggested that the wide range makes it harder for the small business to select the most appropriate, and their comparatively small size impedes the development of the larger-scale project (OECD, 2014).

7.5.3 Incentives

The Swedes do not make great use of incentives, although their action plan for climate change refers to the potential of offering funding to encourage the scrapping of old cars. It was suggested that this might take the form of a free introduction to public transport or a carpooling scheme (Stockholm Stad, 2012).

7.5.4 Taxation

The green tax system has resulted in a reduction of labour-related taxation with an associated rise in taxation related to carbon emissions and a congestion charge within Stockholm. These taxes are balanced by reduced tax for the usage of biofuels and the usage of tradable electricity certificates that have encouraged the development of combined heat and power production and district heating schemes (OECD, 2014a).

In spite of adopting green taxes, the Swedes do not appear to use them as a tool to change behaviour much in comparison to the levying of taxation for labour. Environmental taxes have varied between 2.52% and 2.87% of GDP throughout the period (figure 7.1), ending at the lowest point. In comparison, taxation on labour has ranged between 14% and 15.7% of GDP, falling slightly at the beginning of the recession and slowly rising in the subsequent years.

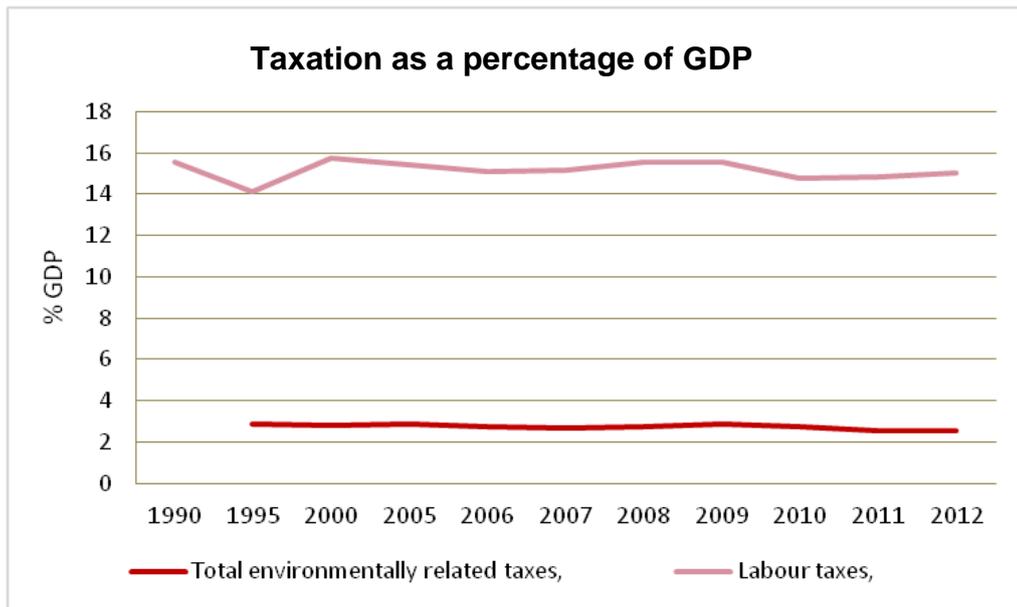


Figure 7.1: Environmental and labour taxation (Data: OECD, 2014c. Dataset: green growth indicators)

7.5.5 Innovation and environmental R&D

Public spending in environmental research and development has ranged from 1.3% to 3.2% of total public expenditure (figure 7.2). At the beginning of the period expenditure represented the highest percentage of public spending for the entire period, and by 2000 it had dropped to the lowest, not only as a percentage but also in real terms. The funding was restored by 2005, although it continued to fluctuate at a greater rate than the total public spending, which rose at a fairly consistent rate throughout this period.

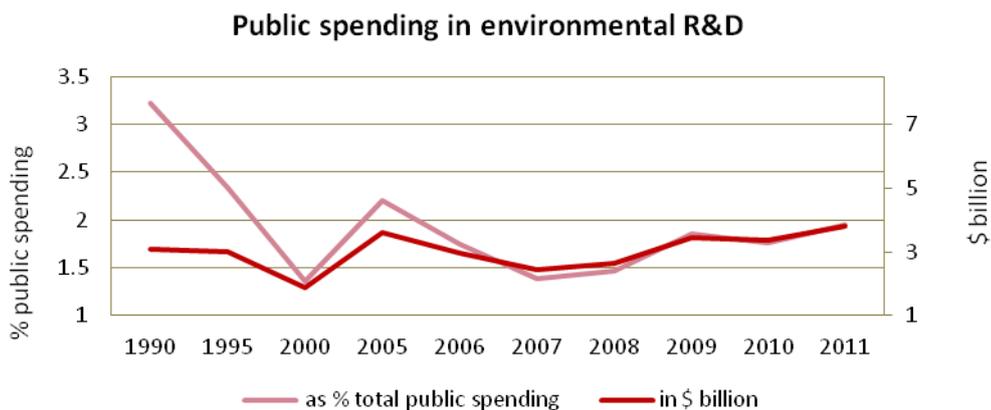


Figure 7.2: Public spending on environmentally related research and development (Data: OECD, 2014c. Dataset: green growth indicators. Quandl, no date)

7.5.6 Summarising the provision of financial support

The Swedes appear to value the SME and also address the need to make investments with long-term returns financially viable. Their methods in providing

both these types of support, however, have not been entirely successful, resulting in investment that has not been as profitable as envisaged and a confusing amount of variety of support for SMEs which do not have the resources to identify the most appropriate support.

Taxation is used flexibly with Pigouvian taxes adopted to encourage appropriate travel solutions, but environmental taxation is roughly one eighth that of labour. In the decade between 1990 and 2000 there was a substantial cut back in the investment into environmental R&D, which after that date tended to track the changes in public spending.

7.6 Diffusion

The Swedes have taken active steps to facilitate diffusion of environmentally sensitive behaviours. Their 2003 strategy for sustainable development included recognition that the three layers of government needed co-ordination and the more regional levels needed support. They also committed to working with the other Nordic nations in achieving the aims of the OECD (the Swedish Institute, 2013a). The Swedes promote free access to information relating to the environment that helps promote diffusion of good practice. Sweden's people record the highest satisfaction among the European OECD countries where information relating to the environment is concerned (OECD, 2014a).

7.6.1 Labelling

In furthering the provision of informing the public, product labels were introduced. Two of the more widely recognised are the KRAV label that certifies organic quality of foodstuffs, food outlets and textiles (Krav, no date) and the Swan label, a Nordic eco-label originating in Sweden. The Swan label confirms that the environmental impact of the product or service has been considered at every stage of its lifecycle and has stricter standards than the European Ecolabel (Ecolabel, no date).

7.6.2 Urban planning

Stockholm's municipal government has sought to develop an infrastructure that supports environmentally sustainable life. It is retrofitting buildings with technologies to enable them to perform to the same environmental standards as more modern buildings, aided by the world's largest district heating and cooling infrastructure. It is seeking to integrate both housing and business areas in its

new developments, creating a “cleantech” business sector that already has over 3,000 businesses working within it to improve existing technologies further (Stockholm Business Region, 2010).

7.6.3 Transport

The Swedes have taken a few approaches to assist the diffusion of good transport practice.

- There has been a greater provision of cycle tracks.
- 75% of public transport has been adapted to run on clean fuel, either in the form of ethanol and biogas or, in the case of trains, electricity sourced from wind power.
- The public are assisted in the use of the public transport with information systems provided to aid journey planning.
- A congestion charge was introduced in 2007.

Together, these initiatives have seen an 18% rise in the use of public transport, cut traffic to and from the city centre by 20% and sped up transit through the city considerably. In addition to this, the Swedes recognise that performance will not be improved without education. Campaigns have been conducted to educate residents about efficient driving practice such as ensuring correct tyre pressure is used. It is estimated that this has reduced carbon emissions by 4,300 tonnes.

(Adapted from Vandergert, Sandland and Newport, 2013)

7.6.4 Waste management

This is a highly regulated activity at national level, placing obligations on producers and users. Stockholm charges for waste removal and requires producers to facilitate the recycling of all their packaging, including ensuring that the end user has access to a collection point. The same regulations apply to newspapers.

(Previously published in Vandergert, Sandland and Newport, 2013)

7.6.5 Summarising diffusion

The Swedish government has taken active steps to aid diffusion by co-ordinating its action at the different levels of government and informing the public of good practice in various ways, including the use of labelling. It has promoted two activities that have had great effect on its performance measures. Firstly, its urban planning facilitates green living. Secondly, it has promoted the

development of recycling facilities that incorporate energy production and have been expanded to include processing sludge.

These actions achieve change with minimal change demanded from the people. Action taken to facilitate moving away from use of the private car has demanded more change from the Swedish public, and attention has been taken to make it the easier choice.

7.7 Performance indicators

Performance indicators established by the OECD demonstrate the extent to which the plans of the Swedish government have diffused to the point of yielding measurable results. The OECD framework has been adopted for guidance in the development of the case study; its indicators are a good fit, addressing energy production and use, greenhouse gas emissions, resource use, waste management and investment in research and development.

7.7.1 Green energy production

The Swedes' strength in producing energy from renewable fuel is clearly evident when comparing their performance with the average for OECD, their percentage of renewable energy being four times the OECD average throughout the period in question, this figure being substantially enhanced by their production of biofuels. Their percentage of electricity produced from renewable sources in 1990 and 2012 was 2.9 times as great as the average achieved by OECD countries (figure 7.3).

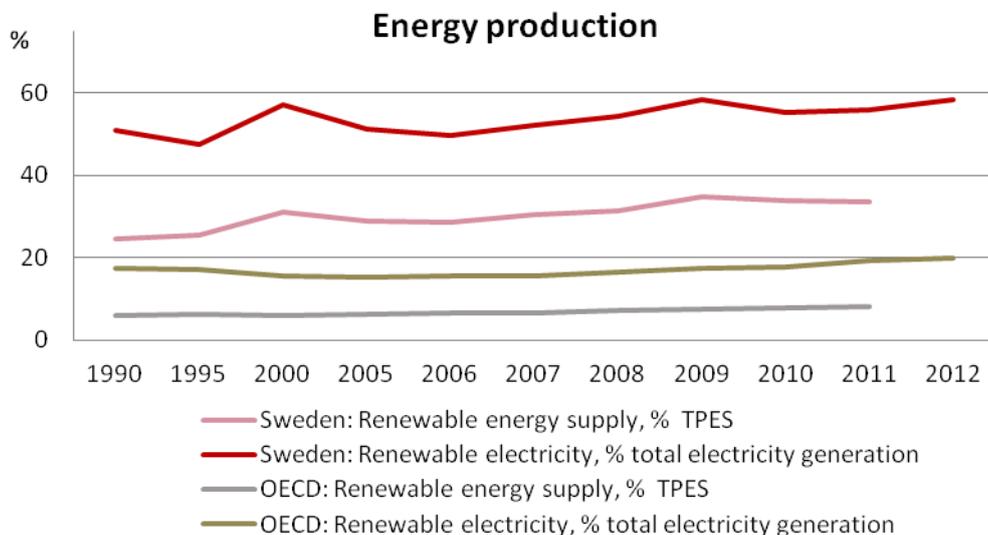


Figure 7.3: A comparison of renewable energy production with OECD (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

Whilst they keep a close eye on energy production, the Swedes are not so restrained with its use. In terms of tonnes of oil equivalence (toe), Sweden uses considerably more fuel per capita than the average for OECD countries, requiring 23% more in 1990, and reducing the figure to 18% by 2011. Similarly, the Swedes do not achieve the same level of financial benefit from their use of fuel, being marginally lower than that achieved for the OECD average throughout the period (figure 7.4).

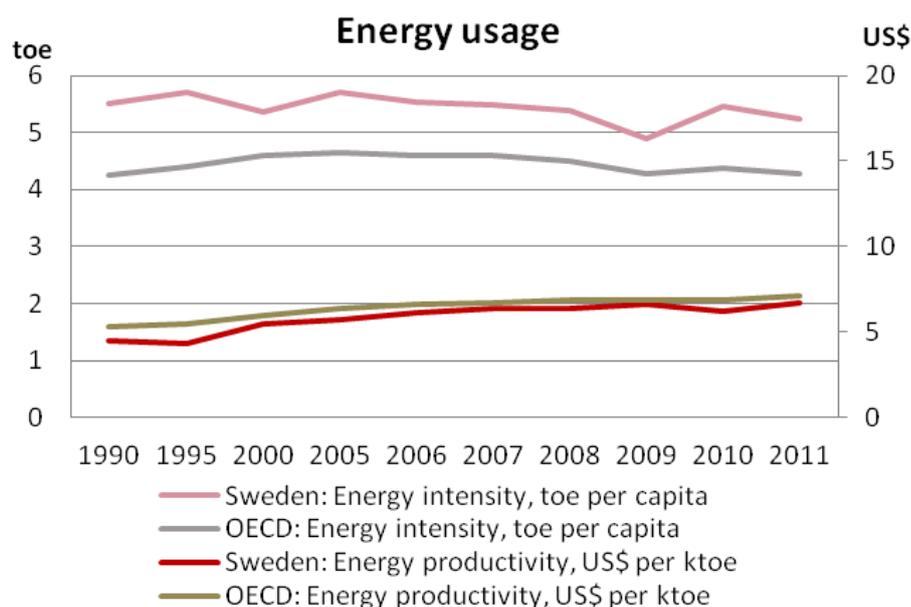


Figure 7.4: Comparison of energy usage between Sweden and the OECD average (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

7.7.2 Greenhouse gas emissions

In spite of the extent to which Sweden’s energy usage is higher than the OECD average, its excellence in producing renewable power has resulted in a steady decline in its carbon emissions, commencing in 1996. By 2012 Sweden’s emissions were 85% that of those in 1990, whereas the average for the OECD had risen by 5% over the same period.

Whereas OECD countries in total achieved greater success in reducing the release of carbon than in reducing the remaining greenhouse gases, the Swedes achieved virtually the same improvements in both areas. This would be accounted for by their concentration on the development of fuel from waste.

Emissions, index 1990 = 100

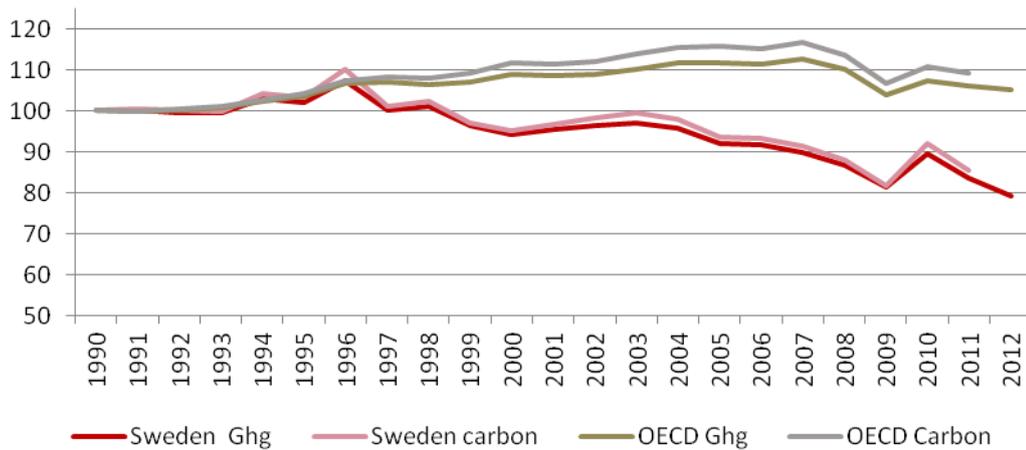


Figure 7.5: Carbon equivalence, indexed: 1990 = 100 GDP (Data: OECD, 2014c. Dataset: greenhouse gases)

7.7.3 Resource usage

According to the OECD, emissions underpinning production have fallen steadily through the period, reaching their lowest level of 20% below that of 1990 in 2009, although they rose slightly in subsequent years (figure 7.6). Whilst this suggests that the Swedish are moving towards achieving an absolute decoupling between emissions and the GDP, the rise in the year of 2009–2010 shows that it is somewhat tenuous.

Sweden: GDP compared with resource use

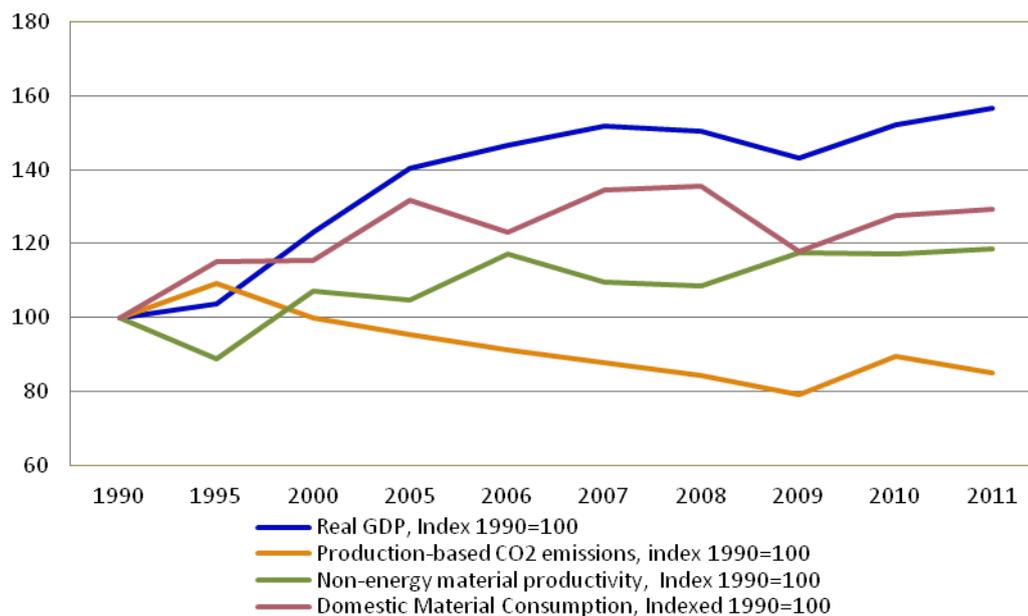


Figure 7.6: Resource utilisation compared with GDP (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

The domestic materials consumption index nearly mirrors the non-energy materials productivity, although the magnitude of change is greater and it exceeds the rise in GDP, ending the period with an 85% rise in productivity. This demonstrates a decoupling of carbon emissions and productivity.

With respect to non-energy materials, Sweden has not achieved as dramatic an improvement in productivity as the other three nations in this study. It finishes the period with improvements of 18.5% in its non-energy materials productivity, but the fluctuating levels of domestic materials consumption do not give grounds to suggest that it has managed to decouple materials consumption from productivity. The caution advised by the OECD in interpreting these figures (section 6.7.3) should also be considered at this point.

Not only have the Swedes not managed to achieve more productivity from their materials, but they have not managed to reduce their per capita consumption of materials over this period. Starting the period 0.5 units lower than the average for OECD, it rose in an irregular fashion, fluctuating between 1 and 5 points higher than the average for the rest of the period, and has not managed to achieve the improvements after 1980 that have been achieved by other nations, ending the period 5 points (27%) higher than the OECD average (figure 7.7).

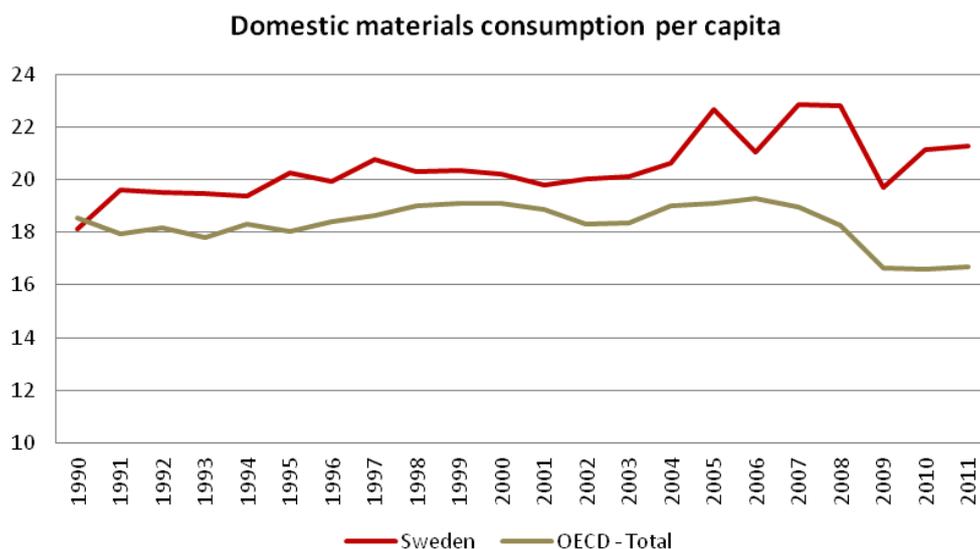


Figure 7.7: Domestic materials consumption per capita (Data: OECD, 2014c. Dataset: material resources)

The fluctuation in materials usage throughout the period from 1990 to 2010 has been principally in the use of construction minerals, biomass for food and feed, and wood (figure 7.8).

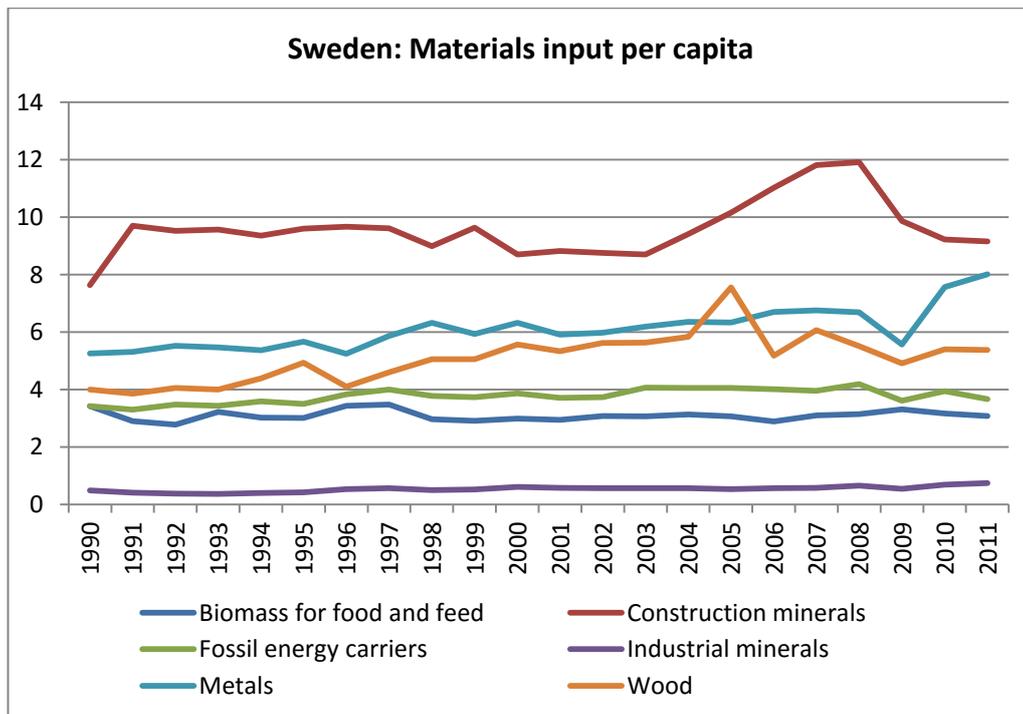


Figure 7.8: Materials input (Data: OECD, 2014c. Dataset: material resources)

Waste management

Municipal waste generation has increased over the majority of this period, peaking in 2008 at 510 kg before falling back to 460 kg per capita (figure 7.9). In spite of this rise, the performance of Sweden ended the period 70 kg per capita lower than the average of OECD countries.

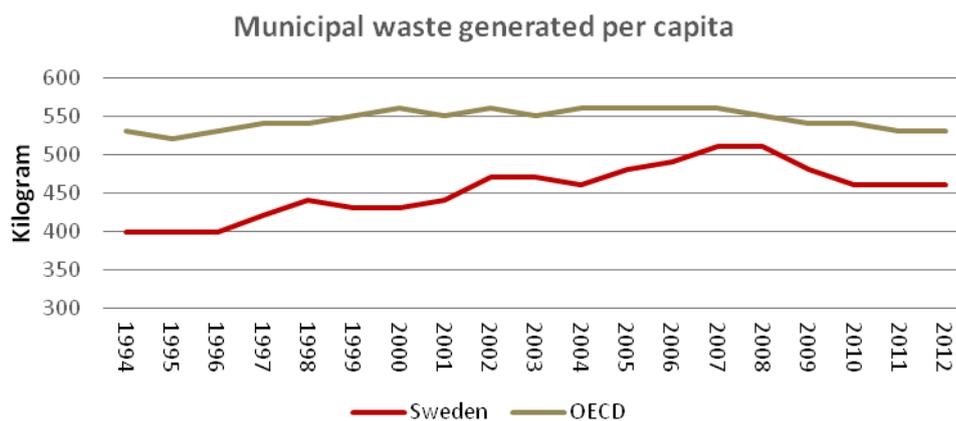


Figure 7.9: Municipal waste generation in comparison with the OECD average (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

Not only are the Swedes producing less waste than the OECD average, but by 2012 they had reduced the total that was sent to landfill to 2.25% of the quantity sent in 1995 (figure 7.10), with visible reduction becoming evident after 1997.



Figure 7.10: Waste management (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

7.7.4 Investment in green research and development

The production of green patents in Sweden also saw a reduction in 2005, and no change of note between 2008 and 2010 (figure 7.11). With these periods following a fall in funding in 2000 and a lesser one in 2007 respectively, it is feasible to ask whether this was the cause.

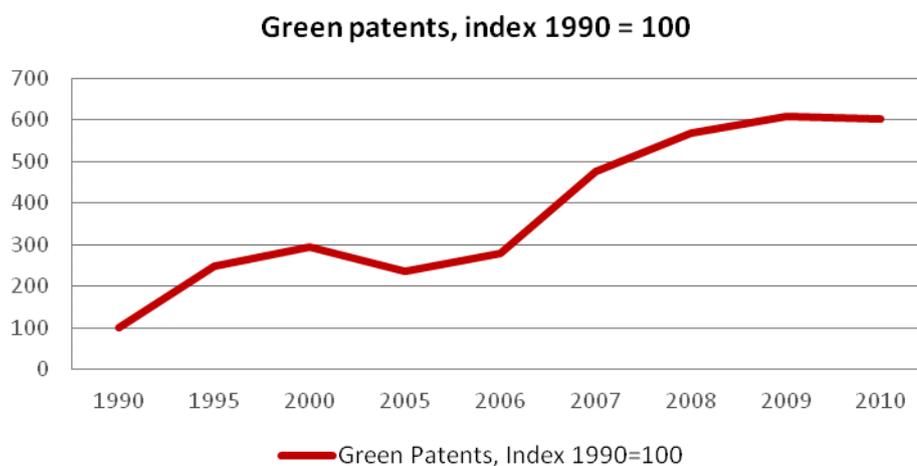


Figure 7.11: Green patents (Data: OECD, 2014c. Dataset: green growth indicators)

Global Cleantech Innovation Index

Sweden ranks fourth in the Global Cleantech Innovation Index with an average score of 3.55 that includes cultural measures and environment. As explained in section 6.7.5, this compares with a mean average for all countries included in the study of 2.11–2.12. Table 7.1 relates to specific action, where the right-hand column provides the highest score achieved for the associated set of data:

Table 7.1: Cleantech innovation measures (Data: Pared, 2014)

Measure	Score	Highest
Cleantech-specific innovation drivers	2.37	3.12
Development to commercialisation	2.68	4.29

The low score relating to the extent to which innovation has been commercialised (table 7.1) is mitigated to some extent by the score for emerging innovations, which was 5.56 (Pared, 2014).

7.7.5 Summarising performance indicators

Performance indicators substantiate the successes the Swedes have attained. The percentage of renewable energy is four times the average for OECD countries, and by 2012 carbon emissions have fallen to 20% below their 1990 levels. 70 kg less waste each year is produced per capita than the average for OECD countries, although waste production has risen since 1995. The quantity of this that goes to landfill has been reduced to 2.25% of that in 1995. Against these successes is a level of consumption of resources, including energy, that exceeds the OECD average by about 20%.

7.8 Summarising Sweden

The Swedish feminine culture is predicted to make Swedes sensitive to environmental needs. This has been augmented by their location, which has made them vulnerable to emissions and acid rain caused by neighbouring nations, causing them to take early action in drawing international attention to environmental sustainability.

The interaction between a feminine culture and individuality that is tempered by an outward focus causes them to consider the needs of society with the understanding that this would support the welfare of the individual. Behaviours that can be seen to align with this outlook include the planned urban development, including district heating and structures to minimise the demand for transport, demonstrating social intervention that facilitates the individual in adopting appropriate lifestyles with the minimum level of inconvenience.

These characteristics can also be seen to run even deeper, underpinning the government's endeavours to embed environmental needs in every policy, placing the needs of the environment above those of society and the economy. This suggests recognition of the extent to which the environment underpins their

welfare in a similar way to their belief that a strong society supports the individual.

They are also seen to operate with a level of information exchange that supports the public in their efforts to make wise choices. This takes the form of labelling, as well as individual organisations publishing their environmental targets in an effort to inspire others. SMEs are supported in this respect through the development of ISO 26000 enabling them to advertise their environmental credentials.

The ability of the Swedes to speak out has supported the manner in which they monitor progress towards their targets. This enables them to identify where performance is of concern, demonstrating a need for adjusting an approach. Their national pride in industry and work ethic has resulted in considerable advances in technologies for waste management and energy creation. Their outward focus has enabled them to garner ideas such as the use of sea water for district cooling and refine them further.

The 600-fold increase of green patents between 1990 and 2010 is also testimony to their innovation and growing concern to find solutions, supported by finance for long-term projects and expertise from the Swedish Environmental Protection Agency and Stockholm Environment Institute, as well as a proactive drive to seek out solutions.

The Swedes' outward focus together with the recognition that their environmental degradation was caused by other nations has enabled them to elicit cooperation that has resulted in the removal of pollution from their shipping lanes and considerable reductions in acid rain. Similar cooperation on a smaller scale was encouraged in order to adopt a holistic approach to the design of urban developments.

In some respects the Swedish culture and situation do not prompt action that is sustainable. Sweden is a wealthy nation, rich in resources and with a healthy GDP. Coupled with their individual focus, this wealth has meant that resource use has not been constrained. The Swedish also have not extracted as much value from their energy as the average OECD country.

Chapter 8. Denmark

Located on a peninsula, and including islands, Denmark has large exposure to coastal waters and a total landmass of 410,000 sq km, and is the smallest country in the sample, being one sixth the size of Britain. However, with a population of 5.56 million the density is nearly half that of Britain with 7.84 sq km for every 1,000 people (Nationmaster, 2014b; Nationmaster, 2014c), or 129 people per sq km (OECD, 2014b). With a population of 1,940,000 (EAAP, 2014), Copenhagen, Denmark's capital city, accommodates nearly as many as Stockholm, the capital of the largest country by landmass in this study. Copenhagen is one of the wealthiest regions in Europe (Ebdrup, Nielsen and Nielsen, 2014).

99.7% of businesses in Denmark are SMEs, and these employ 66.3% of the workforce (European Commission, 2012b). Economically, the GDP is \$164 billion, which equates to \$56,210 per capita (Nationmaster, 2014c), the highest in the sample. The nation has benefited from resources that include petrol and natural gas as well as arable land (Nationmaster, 2014c). The Danes have published their intention that Copenhagen is to become one of Europe's first carbon-neutral cities, and are developing the infrastructure to support this ambition (Denmark, no date a).

8.1 Characteristics of the Danish and their impact on sustainable development

Denmark ranks highly in its preparedness to accommodate sustainability measures and a number of Danish cultural characteristics point to why this is the case.

- Their tendency towards individualism means that the Danes can accommodate change (Hofstede, 1984, p.132).
- Low uncertainty avoidance means that the Danes are more prepared to take risks (Hofstede, 1984, p.132), a prerequisite for embracing radical change.
- Danes are prepared to break rules, provided there is a practical justification (Hofstede, 1984, p.132). This would facilitate moves towards sustainability even if it requires ignoring regulation.

- The Danes are adept at “adaptive entrepreneurial planning”, enabling them to respond to changes in environmental conditions (House et al, 2004, p.310).
- The environment that fosters ambition fosters people who are prepared to be proactive and follow a vision.
- The Danes have a feminine-oriented culture which would suggest they are sensitive to environmental needs (Hofstede, 1984, pp.190 & 209).
- The Danes are long-term oriented, which means they evaluate the impact of their actions over time (House et al, 2004, p.310). This characteristic is believed to accommodate environmental need.
- The Danes believe they should support themselves using their own resources (House et al, 2004, p.568). This mindset is fundamental to sustainability where environmental resources are concerned.
- The lack of hierarchy would allow any member of society to instigate action including that focussed on sustainable development.

A more complete profile of their culture is in appendix 26.

8.1.1 Danish government

As with Britain and Sweden, the Danish government is democratically elected and the country has a monarch whose power is constrained by the constitution (Folketinget, 2012). The Danish government structure is one in which many parties are represented, and since 1909 administration has been undertaken by minority parties in loose coalitions or with the tacit support from others. The governmental system is based more on consensus than on an adversarial approach, to the extent that all parties signed an agreement regarding environmental protection, removing it from the political arena and ensuring consistency of support (Denmark, 2012; Green-Pederson, 2014).

The Danish government includes 19 ministries (Statsministeriet, 2014), of which the principal one responsible for developing environmental regulation is the Ministry of the Environment (Djurhuus et al, 2014). Three agencies report to the Ministry of the Environment: two that are environment-facing, the Danish Geodata Agency and the Danish Nature Agency, and one focussing on its protection, the Environmental Protection Agency (Djurhuus et al, 2014).

In addition to the ministries with an overt remit to protect the environment, its care is also embedded in the activities of the ministry responsible for buildings, the “Ministry of Climate, Energy and Building” (Statsministeriet, 2014). This ministry recognises its role in ensuring targets relating to the Kyoto agreement are met (Danish Ministry of Climate, Energy and Building, 2014).

Regional government

Danish administration was restructured in 1970 and again in 2007, reducing the number of administrative regions from 24 to 14 and 5 respectively (Local Government Denmark, 2009). It is only comparatively recently that regions have become of an effective size to enable them to operate competitively in the national and international arena (Local Government Denmark, 2009). The councils at both regional and municipality level are democratically elected.

Local government

The reforms in the Danish local government undertaken in 1970 and 2007 reduced the number of local authorities from 1389 to 275 and subsequently to 98. As with the regional government, these recent changes have facilitated the economies of scale necessary to operate effectively (Local Government Denmark, 2009). Municipality councils are free to create sub-councils as they deem appropriate. As yet, the practice is not widely observed, although in 2009, Copenhagen was reported to be in the process of developing 12 (Local Government Denmark, 2009).

Municipalities are responsible to the Ministry of Welfare, but they are free to undertake any activity they choose, provided that it is not the remit of regional or national government and is within the law (Local Government Denmark, 2009). Their area of concern is that of social welfare and 3% of their budget is allocated for roads and the environment (Local Government Denmark, 2009). Enforcement of environmental legislation is devolved to the local governments, a principal tool being that of permits regulating potentially harmful activity that are applicable to all industrial processes as well as agriculture and waste-handling activities (Djurhuus et al, 2014; OECD, 2014d).

Management of complex issues including environmental planning was the joint remit of regional and municipality government until the latest reforms that have given local authorities autonomy. They are in consequence responsible for

spatial planning and the management of utilities (Local Government Denmark, 2009).

8.2 Policy development

The overriding policy embedded in all Danish action is to become carbon-neutral by 2050. This embodies an ambitious target beyond that set by Europe (the Danish Ministry of Climate and Energy, 2011).

Further policies guide the development of strategies, and NGOs including Greenpeace and the Danish Society for Conservation contribute to their development, also having a right to appeal against decisions (Djurhuus et al, 2014). Examination of the nature of the Danish government explains an apparent paucity of policies.

8.2.1 Autonomy and government

The Danish government is reported to take a pragmatic approach to government, with few formalities, preferring for necessary control to be exerted at a local level. This differs in the case of EU directives because of two underlying factors. There is quite a strong anti-Europe voice and a tendency for minority or coalition governments. When combined, these two characteristics augment the difficulty of debating EU policies, giving voice to dissenters and making the position of the ruling party vulnerable.

In response to this, sophisticated structures have been put in place whereby work is undertaken at committee level, focussed on influencing EU policy making in a manner that balances the various needs of the Danes. Once the policy is developed and the directive received, it is embedded in law with little further discussion (Christensen, 2010).

8.2.2 The impact of change

There are further reasons why policies are not overtly apparent. The Danish have been described as being “in constant reform mode” for the five years prior to the 2009 publication of a Local Government Denmark fact sheet (Local Government Denmark, 2009). However, changes appear to have been undertaken over a longer period and these apply to their development of environmental policy.

As each layer of regulation was added, a burdensome level of environmental regulation started to impede businesses, and in 2001 steps were taken to streamline it. This was undertaken through public consultation after which a refined strategy was developed (Brave Project, 2013). Hence it would appear that regulation and specific strategies, rather than policy, drive action.

This observation is supported by evidence that the autonomy given to the individual municipalities (Local Government Denmark, 2009) could be instrumental in explaining why the strategies published by the Danes appear to be more pertinent to individual ministries than to the government itself. As with the case of environmental control, the strategy is only necessary once the government adopts targets dictated by the European Union.

The current strategy has set the following targets:

- To cease relying on coal, oil and gas by 2050.
- To reduce greenhouse gas emissions by 80–95% of 1990's levels by 2050.
 - 20% reduction by 2020.
- Greater innovation and diffusion of green technologies.
- To be one of the top three OECD energy-efficient countries by 2020.
 - Energy consumption to be 4% less than that of 2006 by 2020.
- To increase the contribution of renewable energy.
 - 30% of total energy consumption.
 - 10% within the transport sector.

(Danish Ministry of Climate and Energy, 2011)

8.2.3 Environmental regulation

The fundamental regulation underpinning environmental protection is the Environmental Protection Act and it embodies the directives of the European Union. This is a “framework act” providing objectives, the manner in which the objectives are to be attained and supporting guidance (Djurhuus et al, 2014; OECD, 2014d). This works in conjunction with the Heat Supply Act and the Power Supply Act. Together they include management of waste (appendix 27).

8.2.4 Danish building standards

The construction of buildings was first regulated in 1961 and compliance was expected by 1982. The current standards are such that computer modelling must be used in the design of all new builds and both boiler performance and energy retention of the building is monitored. The aim is for buildings to be 75% more efficient by 2020 based on 2005's figures (Global Buildings Performance Network, 2013).

8.2.5 Copenhagen's plan

Copenhagen's principal plan is to become carbon-neutral by 2025. Its delivery is supported by strong public-private partnerships enabling eco-innovation and sustainable employment, involving universities as well as business (Ebdrup, Nielsen and Nielsen, 2014). The drive for carbon neutrality has promoted moves to make Copenhagen a city of cyclists with a target of 50% of the populace commuting by bicycle by 2015 (European Commission, 2014e).

Copenhagen's authorities have collaborated with business in order to develop their targets for 2025 (appendix 28) which include:

- Reductions in heat and energy consumption.
- Renewable energy production.
- Removal of plastic from the incineration stream.
- Reduction in the use of the private car.
- Council offices to reduce energy consumption by 40% in comparison with 2010.

(European Commission, 2013)

Copenhagen's progress is supported by its strength in environmental research, accommodating the European Environment Agency and having a world-class research arm in relevant areas in the University of Copenhagen (European Commission, 2014f).

8.2.6 Summarising Danish policy development

The Danes appear to value autonomy above developing overarching policy. This is evident from their fragmented governmental structure that devolves local management to the municipalities with the remit to undertake any activity

provided it is legal and regulation is observed. It is only relatively recently that targets have been streamlined in collaboration with the public.

Two policies are evident, namely the removal of environmental care from party politics, and the automatic adoption of directives from the EU with an associated development of strategies to aid their delivery. This has resulted in a strategic approach to environmental management that has set stringent targets on the development of alternative energy sources and the reduction of energy demand. Waste management is also seen to be critical, as is the ambition for Copenhagen to become carbon-neutral by 2025.

8.3 Sensitivity to ethical behaviours

The Danes have cause to be sensitive to environmental needs. They recognised their vulnerability where power was concerned in both world wars and, more critically, during the Suez crisis of the 1970s when their supply of oil was threatened (Vestergaard, Brandstrup and Goddard, 2004).

In summarising their view about responsibilities, the Danes state “Danish responsibility means striving for a sustainable future, while building competitive companies and a stronger society” (Danish Ministry of Business and Growth, no date a).

This view refers to sustainability but does not specify the needs of the environment, although elaboration refers to “social and environmental responsibility” (Danish Ministry of Business and Growth, no date b). Denmark’s claim to being a sustainable society rests with its level of societal welfare, its lack of corruption and its transparency enabling the people to participate in the democratic process and have freedom of speech (Danish Ministry of Business and Growth, no date c).

Danish businesses are encouraged to focus on their environmental impact by the demand that all large organisations are to incorporate corporate social responsibility performance reports in their annual reports and the adoption of ISO 14001 and EMAS is promoted (Danish Ministry of Business and Growth, no date c).

8.3.1 Attitudes to ethical issues

The Danes are clearly concerned about environmental issues and examination of their strategies reveals the extent to which they are prepared to develop approaches to mitigate environmental damage.

Climate change

Climate change results in three areas of change that need to be managed. Firstly, climate change changes the growing cycle, influencing agriculture including the management of pests. Secondly, it can cause more extreme weather conditions, with heavier rainfall and stronger winds, and finally it causes rising sea levels. The Danish attitude to climate change reflects a similar level of pragmatism to that seen elsewhere in their approach to government (Christensen, 2010).

University studies into the effect of climate change have demonstrated that it could have a beneficial effect on Danish agriculture (Fenger et al, 2008). The situation where rising sea levels are concerned is not so clear-cut. As with Sweden, the northern regions of Denmark are lifting, having risen between 15 and 20 cm over the last century. This rate is sufficient to counter anticipated rises in sea level, but the southern districts are not lifting at the same rate and it is anticipated that they will experience up to a 1.4 m rise in sea levels, and worse in the event of a storm surge (Danish Ministry of the Environment/Danish Nature Agency, 2010). However, at a seminar conducted in 1996, after these findings had been made known, there was no mention of their coastal vulnerability, there being a preference to “wait and see” (Fenger et al, 2008).

In 2008 the local authorities of Copenhagen included development of grass roofs as part of a larger project incorporating the management of a drainage system that minimised the risk of flooding during periods of heavy rain. This occurred at the same time as Copenhagen hosted a conference on climate change. Many reasons were provided as the core drivers for the different projects, including those of bringing green space into the city, reducing the heat island effect and temperature control within the buildings concerned. However, of the 13 projects described, only three referred to their role in mitigating the effects of climate change influencing the decision to install them (City of Copenhagen, 2012b).

In 2013, however, the Danish government published its climate plan and associated legislation, focussing much of its attention on the reduction of carbon and capitalising on the steps already taken to mitigate the vulnerability caused by needing to import fuel, but also recognising the need to manage waste and agriculture to augment performance (Danish Ministry of Climate, Energy and Building, 2014). The government also states that the success of any policy Denmark has towards the climate is subject to action taken at a European level, prompting the country's participation in that arena (Danish Ministry of Climate, Energy and Building, 2014). The Danes' current definition of sustainability refers to their position as a "climate nation" because of their stance against carbon-based fuel (Ministry of Business and Growth, Denmark, no date c).

Energy

Whereas the Danes take a somewhat ambivalent view of most of the directives from Europe, adopting the minimum standards that are accepted in order to placate the anti-Europe voice (Christensen, 2010), they are much more proactive where energy use is concerned. The Danish government has assessed the impact of the strategy for moving towards carbon-free power production and concluded that it will support "business as usual" with any added cost being less than that which would be incurred as fossil fuels are anticipated to become more expensive. It is placing all of its trust in alternative energy supplies, 50% being that of wind, 20% biomass by 2020. By that date, it is only looking to reduce demand by 4% compared with that of 2006.

Its strategy states:

In 2050 Denmark could well be a wealthy society which uses considerably less energy than at present and which covers its energy needs with renewable energy sources. This is clear from the analyses by the Danish Commission on Climate Change Policy. The great challenge is to ensure an appropriate transition process. Over the next 40 years more or less the entire energy system will be replaced. In some areas, the consequences of investments and decisions made now will have an impact right up to 2050. Therefore, it is important that energy policy supports the goal of fossil fuel independence. Without this, the goal will be harder and more expensive to reach.

(The Danish Ministry of Climate and Energy, 2011)

The Danes anticipate that most technologies will finally become driven by electricity rather than other fuels but do not try to predict best technologies. However they see a growing need for wind power, biomass, biogas, photovoltaic power and wave power, the last two being recognised as offering potential but in 2011 these were considered too expensive to be viable (the Danish Ministry of Climate and Energy, 2011). This would suggest that economic viability is of more importance than environmental care.

The Danes consider a nuclear power plant to be an inappropriate technology to rely upon because it does not accommodate the flexibility needed to augment the vagaries of wind power. However, they anticipate importing power from neighbouring countries that opt for this technology. Similarly, they have not ruled out retaining coal-produced electricity, augmented by carbon capture and storage technologies (the Danish Ministry of Climate and Energy, 2011).

Pollution

The manner in which water pollution has been managed by the Danes demonstrates that they are prepared to observe European directives at the cost of financial productivity. However, their attention has been drawn to pollution late, when compared with the action taken to preserve their energy supplies.

The Danes have legislated that their drinking water should be abstracted from groundwater resources and only require minimal purification. This places a pressure on the nation because its farming practices, which apply to over 60% of the landmass, have used increasing quantities of chemicals that leach into aquifers, resulting in the closure of over 1,000 wells between 1991 and 2005, and there are concerns about long-term supplies.

The remaining water reserves have been mapped and protection zones placed around their deep aquifers that have as yet not been polluted. In addition, certain chemicals have been withdrawn from the market and farmland has been removed from production (Danish Ministry of the Environment, 2014).

Air quality is one area where the Danes go further than the minimum set out in directives from Europe. The directives are observed for the known pollutants such as NO₂ and particulates, although Denmark does not yet meet NO₂ limits. However, the Danes are also aware that new technologies such as nanotechnologies could present as yet unknown problems. They maintain they

monitor the situation and will seek to influence Europe accordingly (Ministry of the Environment/Environment Protection Agency, no date). Whilst the Danish government presents a clean image for the country, reporters are concerned by the slag and emissions from their waste incineration plants (Cooperberg, 2012).

Waste management

Landfill has posed another problem for the Danes because it contributes to pollution that can leach into the water table (Ministry of the Environment/Environment Protection Agency, no date), and uses land. The Danes maintain that after power production and transport measures, waste management is the third necessary activity to promote sustainability. Whilst they admit they produce a lot of waste, the Danes believe that the manner in which it is used for CO₂-neutral energy production mitigates the position. They claim a long history in the development of wind power, and aim to increase this from its current level of 15% gross energy provision to 30% by 2025.

Transport

The Danes have invested much in the promotion of bicycle use within Copenhagen. They have achieved behavioural change in promoting the use of the bicycle (Danish Ministry of Business and Growth, no date c) by rendering the car the less convenient mode of transport (City of Copenhagen, 2012a). This would suggest that behavioural change was deemed necessary but could only be achieved by ensuring that the social cost was minimal.

Whilst the Danes have encouraged appropriate private transport, they have facilitated use of roads rather than shipping by building bridges between their islands and to Malmö in Sweden, and subsequently increased the levels of commercial traffic passing through their country (OECD, 2007b).

Building design

The high standards placed on building performance were designed to reduce energy demand within the building whilst maintaining a comfortable environment, not demanding behavioural change (Global Buildings Performance Network, 2013). Improved performance is enhanced further through the use of district heating, although there is evidence of economic rather than environmental priorities with guidance to identify the cut-off point at

which it becomes economically viable to retain individual gas-powered heating (the Danish Ministry of Climate and Energy, 2011).

8.3.2 Summarising sensitivity to ethical issues

Apart from curtailing farming which posed a direct threat to their relatively imminent needs, the Danes are clearly sensitive to any issue that would undermine their ability to conduct business as usual. Each move to protect the environment is tempered by the need to be economically viable and require as little behavioural change as possible. The Danes are fully aware of areas where their environmental impact could be reduced, but choose not to take steps to reduce the production of waste, preferring to recycle and use it to power energy production.

8.4 Ethical standards and capabilities

Section 8.3 revealed that the Danes appear to take the most action in the regions where they consider their national interests to demand it, namely with energy production, transport measures and the management of both waste and pollution. However, the Danes pride themselves on setting standards that will place them among the three top performing countries where climate control is concerned (the Danish Ministry of Climate and Energy, 2011). This ambition is at odds with their pragmatic style of incorporating European directives as they are issued, reported in 8.2 above. This section explores their mode of operation in order to ascertain which position is the more tenable, commencing with an examination of specific examples of technology development.

8.4.1 The style of change

The practical approach to government has also shaped the style of change in Denmark. The people themselves are innovative, but radical change has the potential to upset the status quo, something the Danes appear to resist. This is illustrated in the case of the development of wind power and district heating (see appendix 29) where innovation was driven by individuals and diffusion, supported by cooperatives. This style of change is one that addresses perceived need rather than proactive drive for improved performance.

Innovation is supported by the Danish government, through the provision of public-private enterprises and a growth fund to assist in development. In spite of an amenable climate for innovation, the Danes have a poor record in

development. It is argued that this is because the individuals fail to work towards a central vision, resulting in small-scale projects lacking a central focus that would enable them to be developed into solutions that address the needs of the country (Ebdrup, Nielsen and Nielsen, 2014).

8.4.2 Governmental influence

Section 8.2 contained an explanation of the pragmatic approach Danes have to government, preferring local autonomy. This hands-off attitude is also evident in the support of new technologies. In both the cases described in appendix 29, the government only became involved following action taken by grassroots activists who had to prove the financial viability of the projects, resulting in a style of change that can be described as “bottom-up top-down”.

At a local level, the Copenhagen authorities have devolved facilitation of business growth to the capital region growth forum and can no longer initiate independent action. Copenhagen has been a world leader with respect to innovation, investing 27% above the European average in research and development, with clean technologies considered a priority (Ebdrup, Nielsen and Nielsen, 2014). This has created a fertile culture for the development of new cleantech industries, a position that is supported by the Nordic Investment Bank, which underwrites new eco-projects (Nordic Investment Bank, no date).

8.4.3 The standards achieved

The Danes seek to achieve the standards required by the EU, and have a reputation for achieving them (Christensen, 2010). In spite of its comparatively small size, in 2010 Denmark had the highest number of organisations registered with EMAS. This is a management scheme that was promoted in the place of ISO 14001 and that businesses were encouraged to take up through financial incentives (Brave Project, 2013).

In some respects, the autonomy given to local authorities does not drive performance. Where the issue is not governed by an EU directive, there is an absence of minimum standards. There is also an associated lack of precision in targets such as “20–30% of passenger cars and 30–40% of heavy vehicles using renewable fuels” (European Commission, 2014f).

Renewable power production

Denmark is a world leader in the production of wind-powered electricity. In 2013, 33.2% of Denmark's electricity was produced by wind power, excess energy from neighbouring countries was purchased and the remainder was produced from coal (Morris, 2013; Morris, 2014).

Denmark is ideally situated for the production of wind power. The evening of November 3, 2013 was the first point in time at which its production exceeded its demand. Whilst this occurred on a Sunday evening, a time when demand tends to be low, it illustrates the extent to which wind power could satisfy Danish needs (Morris, 2013). The problem with wind, however, is that it is transient, and wind power generation needs to be supported by technologies that store power such as converting it to hydrogen.

CO₂ emissions and air quality

Danish CO₂ emissions are showing a steady level of dropping, with a figure of 60 million tonnes in 1990 dropping to just over 40 million tonnes in 2013. The Danes, however, only measure the carbon emissions that they emit from the landmass, which means they do not account for all the carbon emissions involved in the production of goods consumed by them. This is evident from their explanation of rising emissions in 2013 being simply due to the fact they produced more electricity that year rather than importing from elsewhere (Danish Energy Agency, 2014).

Resource and waste management

The Danish Ministry of Business and Growth (no date c) admitted that the people created a lot of waste, but did not see this as a factor to be managed because it was recycled effectively. This means that they omit "reduce" from the waste hierarchy. Should "reduce" become a priority, then their dependence on waste to augment the power supply creates a vulnerability.

The Danes' attention to detail is not as precise as that of other countries. In their application to become a green city, the officials of Copenhagen stated that they landfill "asbestos, insulation materials and other inert materials" (European Commission, 2014g). In Britain, asbestos is considered hazardous waste and not grouped with inert material (Netregs, no date b).

Building design

Where building standards are concerned, Denmark ranks equally with the top-performing nations in Europe (Global Buildings Performance Network, 2013). However, the code only applies to new builds and is not so stringent in regions that are not served by district heating, with smaller dwellings not compelled to include solar panels. Where renewable energy is concerned, Denmark only performs half as well as the best-performing nations of France, Ireland and Germany, concentrating entirely on electricity rather than addressing the use of other fuels.

8.4.4 Monitoring performance

The most recent environmental report by the OECD (2007b) is rather dated. It identified an inadequate level of monitoring of environmental performance in Denmark. Overall there was a downwards trend in the frequency of inspections since 1996, in some instances equating to a reduction of 50%, although this was mitigated to some extent by a reduction in farming activity.

The report highlighted a narrow focus for monitoring, resulting in an absence of monitoring for hazardous substances such as heavy metals in water, and monitoring of air quality is similarly limited. Monitoring appears to have migrated towards assessing the condition of wildlife rather than the conditions in which it exists. However, introduction of an “early warning system” was reported for the monitoring of leaching of pesticides and appeared to have had a beneficial effect on drinking water quality.

The OECD reported a lack of assiduous attention to following the recommendations provided in its previous report, although some of the recommendations in the previous report have now been acted upon, such as the development of protection zones around waterways, and improving the scope of testing to include more pollutants.

In keeping with Denmark’s policy to observe EU directives, Danish monitoring and reporting improved as the directives from the EU included a requirement for increased stringency (Ashley, 2014). This included reporting and the associated monitoring of the development of green technologies (Danish Energy Agency, 2012).

8.4.5 The impact of geography

The Danes have a favourable climate and terrain for wind power, being surrounded by waters that facilitate offshore wind farms (the Danish Ministry of Climate and Energy, 2011; Hvelplund, no date). Their position, however, has left them vulnerable to air pollutants from Britain and Germany and the added transport facilitated by the construction of the Øresund Bridge to Malmö.

8.4.6 Summarising ethical standards and capabilities

In most respects, the Danes operate to the standards established by Europe and, because of the small majority within government, do not increase them, apart from their ambitious plan to become carbon-neutral by 2050. They are innovative but their government has proved to be slow to support critical developments that now underpin their current strategy.

Further characteristics have undermined their achievements. Firstly, the Danes have stated that they intend to buy power from other countries, but that is based on the assumption the other countries can satisfy their home demand at a time when the Danes are unable to do the same. Their neighbours share many of the same climatic conditions, meaning that they are likely to suffer shortages of wind or solar power at the same time.

Secondly, the Danes value autonomy to the point that government can vary considerably from one region to another. It is only with the concerns that have been mandated by Europe that there is a consistent approach, including the manner in which monitoring is conducted. Similarly, innovation has been hampered by the individual approach limiting scale and cohesion.

Thirdly, the Danes do not appear to be concerned with consumption beyond reducing energy usage. Their justification that waste powers their energy undermines their success in becoming a carbon-neutral society because those resources could have been more effectively utilised.

Finally, the target of being a zero-carbon nation is somewhat hollow because it omits the carbon footprint of imports, including that of electricity. As already indicated, the Danes are not concerned about their consumption levels and this omission can seriously undermine their claim to be a carbon-neutral society.

8.5 Provision of financial support

The Danes use finance as a coercive mechanism, offering both financial support and penalties.

8.5.1 Financing the adoption of clean energy production facilities

Appendix 29 describes how it took lobbying from grassroots activists to encourage the Danish government to support the diffusion of wind power and district heating and cooling. Before their intervention, the development of these technologies depended upon the actions of cooperatives at a local level.

The intervention by the Danish authorities encouraged cooperation from their people for initiatives that might otherwise be opposed, such as wind power and district heating, by creating consumer ownership or public ownership, so that the consumer receives tangible benefits from the scheme either in the form of a share in the profit or in using profit to reduce prices in subsequent years (Dyrelund and Steffensen, 1999; European Commission, 2014e).

8.5.2 SME support

The Danish Growth Fund was established to support SMEs, especially in their start-up stage. This is not specifically for environmentally conscious activities, but these would be included in its general terms and are a growth area recognised to be important by the government. Finance is offered through a variety of packages (Mondur, Penn and Collins, 2014)

8.5.3 Taxation

The Danes use finance as a coercive tool, with taxation placed on the use of landfill (Kjær, 2013) and on emissions that varies according to both specific substance and quantity (Confédération Fiscale Européenne, no date).

Resources that are in short supply, including water, are also taxed. This means that most of the environmental tax burden is borne by companies that can reduce their liability by changing their practice (Confédération Fiscale Européenne, no date). Totalling between 4 and 5% of GDP, their environmental taxation is over four times labour taxation, which is marginally over 1% of GDP (figure 8.1).

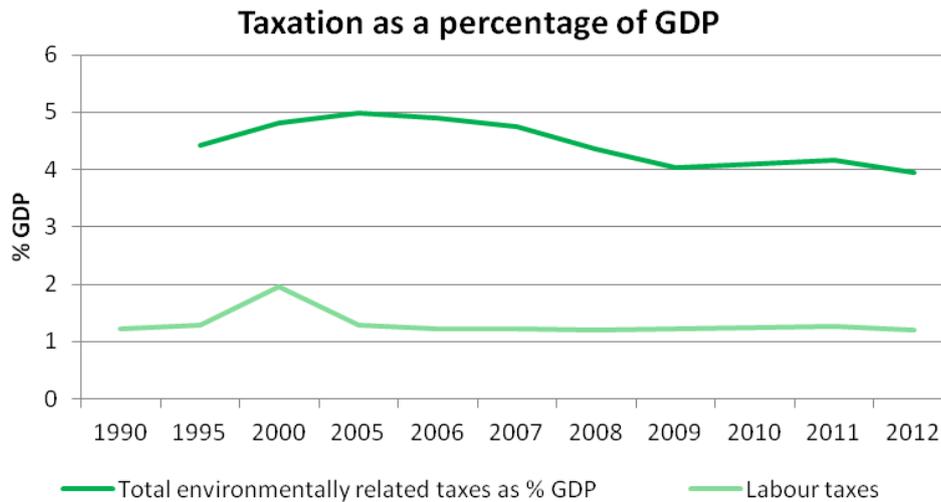


Figure 8.1: Environmental and labour taxation (Data: OECD, 2014c. Dataset: green growth indicators)

8.5.4 Innovation and environmental R&D

The Copenhagen cleantech cluster received a budget of €19.3 million over a four-year period and is tasked with co-ordinating the development of networks to facilitate innovation, at an international level. Clean technology is one of Copenhagen’s three priorities, but the primary aim of the funding body is to aid the development of business (Ebdrup, Nielsen and Nielsen, 2014).

Businesses are directed to the Nordic Investment Bank for funding of projects that will result in improvements that increase competitive advantage by reducing the environmental footprint (Nordic Investment Bank, no date).

Figure 8.2 shows that public spending in environmental R&D fluctuated between \$16 billion and \$26 billion over the period between 1990 and 2011. However, public spending increased substantially during this period. As a percentage of public spending, environmental R&D more than halved between 1995 and 2005 and did not rise above 2.5% of public spending for the rest of the period.

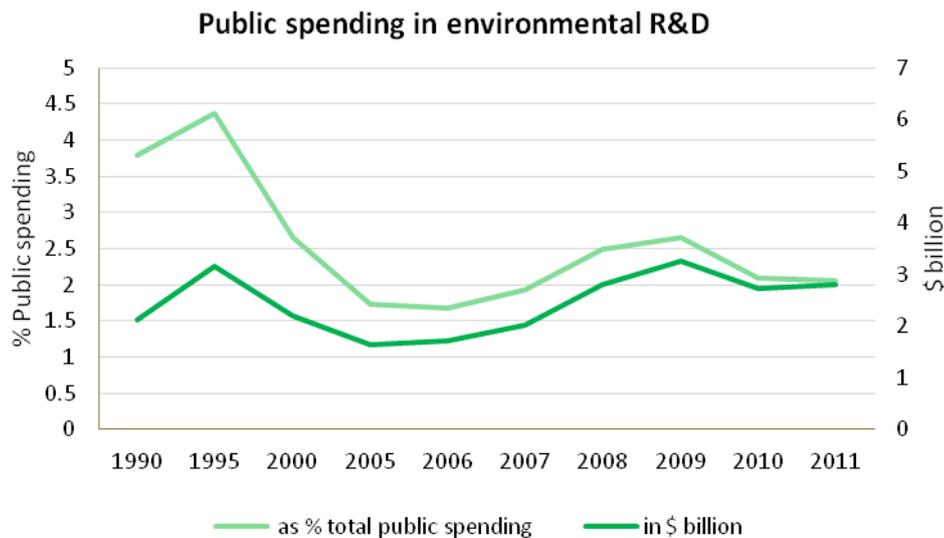


Figure 8.2: Public spending on environmentally related research and development (Data: OECD, 2014c; Quandl, no date d)

8.5.5 Summarising financial provision

The Danish government has traditionally left the funding of innovation to individuals until it can be shown that there is a need for the technology in question and there is economic sense in funding its adoption. Similarly, any support given to promote innovation in the area of sustainable technologies falls under the wider remit of improving the economic performance of the country and mitigating the trend for individual innovations that do not fit the needs of the country. Taxation, however, is recognised as a tool to encourage behavioural change where sustainable behaviours are concerned.

8.6 Diffusion

It has been seen that the Danes use taxation to encourage change to sustainable behaviours, but finance is not the only tool. This section explores the breadth of their action within Copenhagen and assesses the results through reference to OECD performance indicators.

8.6.1 An example of diffusion: Copenhagen

Supporting its determination that Copenhagen will become the first carbon-neutral city in the world (Denmark, no date a), the Danish government seeks to assist its businesses in achieving this by offering SMEs support in the form of tools to aid in the planning and management of their activities. These are:

- The CSR Compass, a tool that aids in the development of responsible supply chains.
- The Global Compact Self-Assessment Tool, which helps companies assess their performance in four regions relating to human rights, one of which is the environment.
- The Climate Compass, which provides guidance and ideas for the development of climate strategies, measuring and managing emissions, and saving energy.
- The Ideas Compass, which helps SMEs “innovate and evolve” in the area of corporate social responsibility.

(Danish Ministry of Business and Growth, no date d).

These tools are not only self-assessment tools, but also advertise the best available technologies utilised elsewhere in the world, aiding knowledge transfer (Danish Ministry of Business and Growth, no date e).

In recent years Copenhagen’s authorities have systematically reviewed the provision of services to its residents. Some activities have benefit in a variety of sectors, and many contribute to reduction of the heat island effect. Whilst not specifically targeted at SMEs, they benefit SMEs, causing them to automatically adopt clean technologies.

8.6.2 Dissemination

As identified in 8.4, the Danes tend to work in isolation of each other, resulting in innovation in disparate fields that fails to materialise as useful technologies for the nation. The Danish authorities have taken steps to counter this trend.

Innovation is supported through a variety of clusters. Copenhagen Cleantech Cluster includes universities and businesses and offers a “one-stop entry to Danish Cleantech”. It has worldwide recognition and builds on Denmark’s history of developing environmentally responsible solutions. It supports start-ups as well as established businesses with innovative concepts to be developed. It helps businesses find test and dissemination facilities for their products as well as supporting networking (Ebdrup, Nielsen and Nielsen, 2014).

Copenhagen’s authorities have developed Copenhagen Cleantech Park, situated 30 minutes outside Copenhagen on a site with planned transport links

into the city. Its remit is to become a centre of business reflecting the benefits developed by the cleantech cluster and fostering synergies between businesses that become established practice (Copenhagen Cleantech Cluster, 2009).

Diffusion is aided by “the State of Green”, a website that encompasses all of the environmental information that the Danes seek to publish, including their clean technologies and news of events. This not only aids in the dissemination of good practice but also provides a vehicle for businesses to promote their clean technologies (State of Green, no date).

8.6.3 Developing the infrastructure

The Danes have undertaken substantial projects that automatically result in savings by their residents and businesses.

Electricity

Denmark has a history of leading the world in wind power generation. Denmark has been using wind turbines to produce electricity since the beginning of the 20th century and had developed a three-bladed turbine similar to those used today by 1957 (Hvelplund, no date).

Danes produced the first commercial megawatt turbine, enabling them to dominate the market, and, supported by the economies of scale that followed, refined the technology (Hvelplund, no date). Their large coastline also facilitated the development of wind farms in advance of other countries. This is supported by a target to produce 50% of Denmark’s electricity through wind power by 2030 (European Commission, 2014e).

(The above material on Copenhagen was adapted from Vandergert, Sandland and Newport, 2013)

Heating

Denmark started to adopt district heating schemes in 1925 and these were developed further during the fuel crisis in the 1970s (Hvelplund, no date). These have become increasingly clean tech as greater efficiencies are achieved and low-carbon fuels including the use of mixed fuels are introduced (Danfoss, no date).

The Danes have developed a boiler that effectively burns straw, thus broadening the range of biomass that is a viable fuel. Research is being

undertaken to assess the viability of geothermal heat production (Danfoss, no date). End-of-pipe technologies clean flue emissions and the extracted matter is used in other products.

The result of district heating is a 40% reduction in CO₂ emissions in comparison with individual gas boilers and 50% in comparison with individual oil boilers. In producing electricity and heat together, fuel use is cut by 30% and the cost to the consumer is reduced by about 50% (UCL, 2012).

(The above material on Copenhagen was adapted from Vandergert, Sandland and Newport, 2013)

Cooling

It was recognised that the demand for air cooling would rise as the predicted rise in global temperature occurred. Already Copenhagen sees temperatures of 35°C, and planners sought a centralised solution. Areas where there was a sufficient concentration of demand were identified. A cooling plant was developed that utilised sea water that was treated appropriately according to its initial temperature. Surplus heat and heat exchange technology provide further cooling. This saves 67% of the CO₂ produced by traditional methods of cooling and uses less fuel. Businesses are allowed to develop networks provided their viability is proven (Gerdes, 2012).

(The above material on Copenhagen was adapted from Vandergert, Sandland and Newport, 2013)

Waste handling

Both Denmark and Sweden started to consider sustainability long before other regions of Europe. In the 1960s and 70s waste was seen to be an environmental problem, which led to Denmark being the first country to pass environmental legislation in 1973 (Scandinavian Incentives, 2013) and the first to ban the use of landfill for material that could be incinerated in 1997 (Kamuk, 2013).

In the early 1980s, with capacity of landfills becoming scarce, the authorities started to assess the situation and manage it with recycling and incineration. In 1992, their first waste plan at a national level was developed, which included targets for recycling, incineration and landfill. A landfill tax was introduced in 1987, although a subsequent rise in the duty appears to have had little effect

(Kjær, 2013). Only 1.8% of Copenhagen's waste goes to landfill (European Commission, 2014f).

(The above material on Copenhagen was adapted from Vandergert, Sandland and Newport, 2013)

The Danes themselves have recognised that their solution is not the best option. A report in the Copenhagen Post highlighted the manner in which the extensive incineration of waste for cogeneration of heat and power has enabled the Danes to become complacent about reducing the waste produced and looking for more effective ways of recycling their materials than reducing them to a slag that can only be used in road construction (Cooperberg, 2012).

Water provision

Copenhagen authorities recognised that the demand for water was outstripping supply. This was addressed by strict planning regulation covering aspects such as the sewerage of water, ensuring that rainwater at roof level and road level and black wastewater are handled in three separate streams. This has provided the additional benefit of reduced flooding risks, and preserves groundwater for uses where its purity is essential (City of Copenhagen, 2014b).

Within the planning regulations is a mandatory green roof policy. This applies to all new buildings with a roof pitch below a specified angle. Its principal advantage is that of absorption of roof water, and ground-level water being channelled into a wide range of outlets, including filtering plants for non-potable use (Greenroofs, 2013).

Software has been developed to control water pressure (Ramboll, no date), which in conjunction with leak detection technology has reduced loss through leaks to 6–7% in comparison with 40–50% in other cities. This has been accompanied by financial incentives for businesses and residents in the form of payments if they reduce their sewerage usage by collecting and reusing run-off from their properties, and a high cost of drinking water. The average water savings are 26%.

(The above material on Copenhagen was adapted from Vandergert, Sandland and Newport, 2013)

Transport: promotion of bicycle use

Denmark has a relatively flat terrain and is quite compact, facilitating the use of bicycles. Dedicated lanes have been used since the late 19th century, but by the 1980s their use had diminished considerably. The need to make bicycles safer, more convenient and faster was paramount if they were to compete with the facility of car use (City of Copenhagen, 2012a).

Copenhagen's city officials developed their first strategy for promoting the use of the bicycle in 2002 (City of Copenhagen, 2002). A network of designated cycle tracks was developed alongside roads and speed was facilitated by "greenwaves", a technology previously used for cars: the cyclist who travels at 20 km/h will always arrive at traffic lights when they are green. Some roads and bridges are exclusively for bicycle use, and routes have been shortened by taking them through parks whenever possible (City of Copenhagen, 2012a).

Information is provided to other road users to heighten awareness of cyclists, and "cargo bikes" that accommodate either children or goods have been designed and promoted (City of Copenhagen, 2012a). Use of bicycles has been integrated into the public transport system with provision for storage provided on the vehicles (City of Copenhagen, 2012a). Similarly, e-bikes are being promoted for the longer commute and business use (City of Copenhagen, 2012a).

As of 2014, 36% of commuters commute by bike and 55% of the population use it as a common means of transport (European Commission, 2014f). Restrictions are being placed on roads preventing access by cars and parking charges are citywide. The train network is being developed to ensure that all residents are within 600 m of a station and bicycles are permitted in special compartments, facilitating onward travel (European Commission, 2014f).

(The above material on Copenhagen was adapted from Vandergert, Sandland and Newport, 2013)

8.6.4 Summarising diffusion

The Danish government offers businesses tools to aid the takeup of good environmental practice as well as knowledge exchange. Steps have been taken to overcome the isolated activities of entrepreneurs by facilitating networking

and assisting in the clustering of innovations that can address cleantech challenges and aid the growth of SMEs into multinationals.

Residents and SMEs alike are caused to adopt sustainable practice through the development of district heating and cooling and of electricity production that uses a variety of fuels and will adapt in the future to new technologies as they are developed. Similarly, structures such as green roofs and electronic leak detection assist in water management

Active steps taken encourage the use of the bicycle within Copenhagen. This was the only activity that was specifically focussed on achieving behavioural change, and this change was achieved through making it the most convenient method for commuting.

8.7 Performance indicators

The review of Denmark's activities, including its target to become carbon-neutral by 2050, would suggest that its performance indicators as recorded by the OECD would register considerable improvements since the base year of the Kyoto protocol of 1990. The green growth indicators register the improvements and demonstrate that the Danes do not manage all of their performance as successfully as desired.

8.7.1 Green energy production

Denmark's renewable electricity as a percentage of total electricity demonstrates their considerable success in the installation of their wind farms, with the OECD recording that over 47% of their electricity production was from renewable sources, having increased from 3% in 1990 (figure 8.3).

Their percentage of renewable energy in comparison to their total energy requirement was also nearly 20% higher than the European average in 2012, having risen from 6% in 1990 to 23%.

The Danes also use their fuel more effectively than the European average. The usage of fuel expressed as tonnes of oil equivalence (toe) shows that throughout the period from 1990 to 2011 the Danes used 1 tonne less per head, the 2011 figure being the first time it dropped below the intensity of 1990, with a reduction of 0.23 tonnes (figure 8.4).

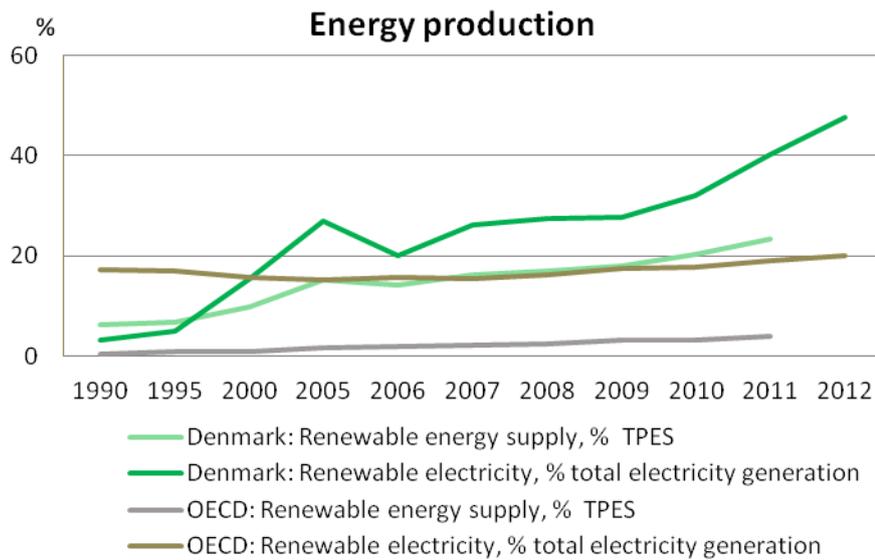


Figure 8.3: A comparison of renewable energy production with OECD (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

This performance means that they are in a good position to meet their target of a 4% reduction in energy usage by 2020 because their base year for this target was 2006, when their per capita usage was at its highest. 2011 saw a reduction of 15% on that figure. However, population growth still needs to be factored in to the total to ascertain success for their energy reduction target.

The Danes have also gained more financial profit from their use of energy than the European average, achieving between 28% and 33% better returns across the period.

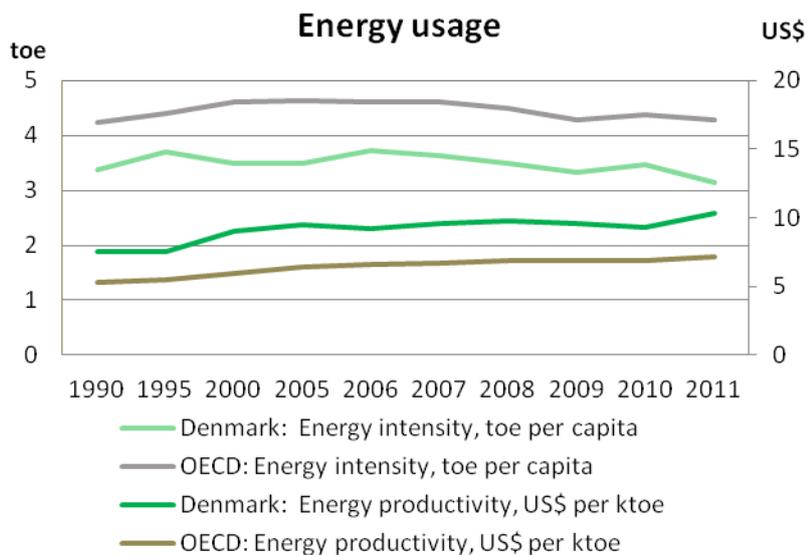


Figure 8.4: Comparison of energy usage between Denmark and the OECD average (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

8.7.2 Greenhouse gas emissions

In the period between 1990 and 1996, Denmark's emissions of greenhouse gases rose by 40%, with carbon emissions accounting for three quarters of the rise. This rise was notably higher than the average rise seen throughout Europe, which peaked at 12% above 1990's levels in 2007. Since the peak of 1996, Danish carbon emissions have fallen to 83% of their 1990 level in 2011, and total greenhouse gas emissions have dropped to 75% by 2012, outstripping the European average by 30% (figure 8.5).

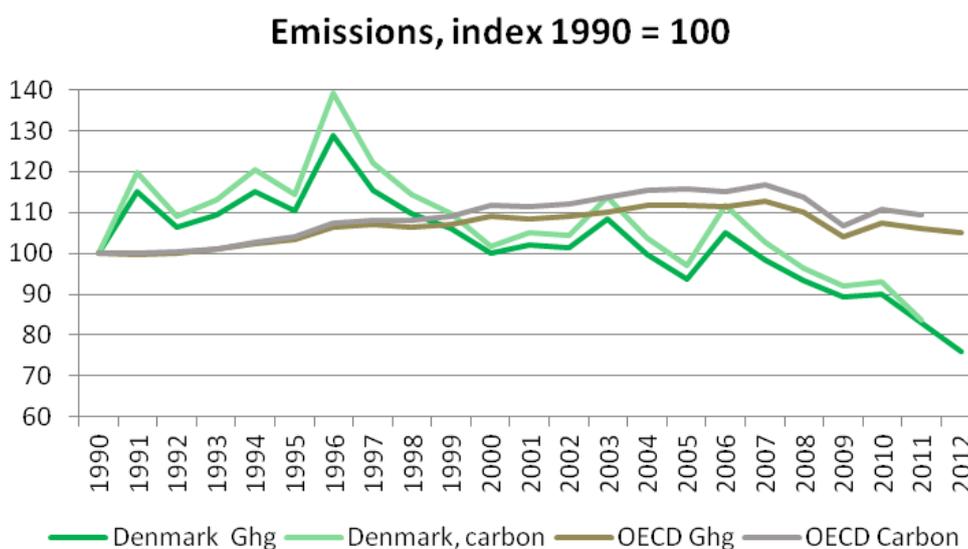


Figure 8.5: Carbon equivalence, indexed: 1990 = 100 GDP (Data: OECD, 2014c. Dataset: greenhouse gases)

8.7.3 Resource usage

According to the OECD, emissions underpinning production have fallen by nearly 20% since 1990, in spite of two periods at the outset when they increased by around 15% (figure 8.6). The figure presents these two occasions as if they are similar in character, but it should be noted that the first increase was over a five-year period, and the second just one year. Over the entire period the Danes have achieved a reduction of their production-based CO₂ emissions, but any gains in decoupling CO₂ emissions from their GDP achieved between 1995 and 2005 were lost in 2006 and only regained in the year of 2010 to 2011.

With respect to non-energy materials, the performance of the Danes differs substantially from the other countries reviewed. Until 2007, Denmark was the only country where domestic materials consumption kept track with the GDP, matched by little increase in non-energy materials productivity. In 2007 this

trend started to reverse and by 2009 decoupling had started to become evident. Overall, during the period from 1990 to 2011, decoupling of materials was only relative, not absolute, because it did not drop below the usage in the base year.

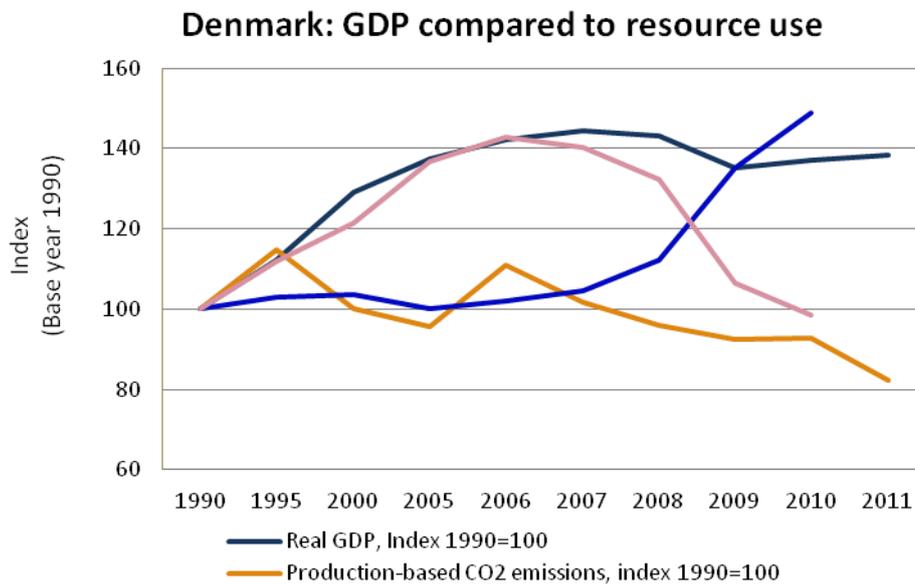


Figure 8.6: Resource utilisation compared with GDP (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

This pattern observed above is clarified by the per capita figure for domestic materials consumption where it peaks in 2006 at 51% higher than the average for OECD countries. By 2010, this figure had dropped to 19% higher than the average (figure 8.7). However the caution about the accuracy of these figures referred to in section 6.7.3 should be noted when considering this analysis.

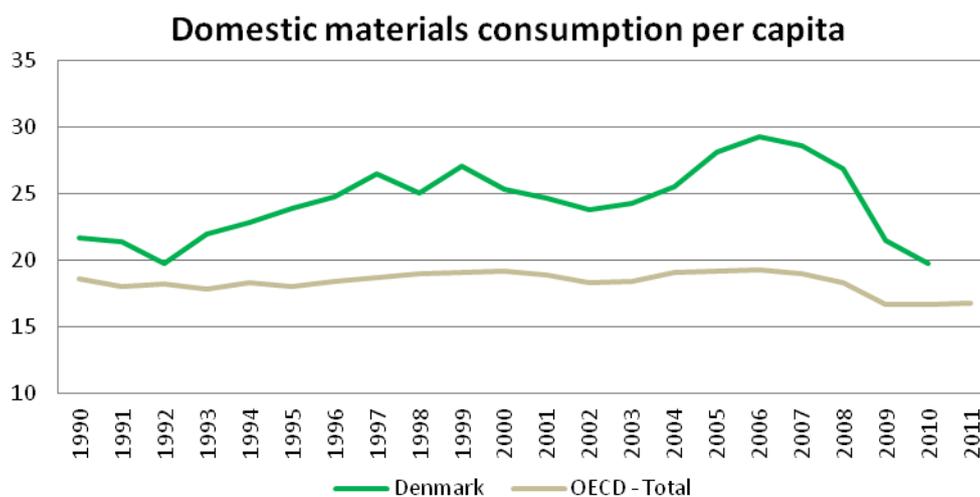


Figure 8.7: Domestic materials consumption per capita (Data: OECD, 2014c. Dataset: material resources)

The fluctuation in the materials consumption is principally in the region of construction minerals (figure 8.8) and therefore might be attributable to building

projects. However, Denmark is the only one of the four countries where the usage of fossil energy carriers has increased, a figure that was reflected in the production-based CO₂ emissions. This is at odds with their claim to be working towards being fossil-free by 2050. It should be noted, however, that in section 8.4 it was established that the Danish do not include the carbon footprint of their imports in their calculations, whereas the OECD does.

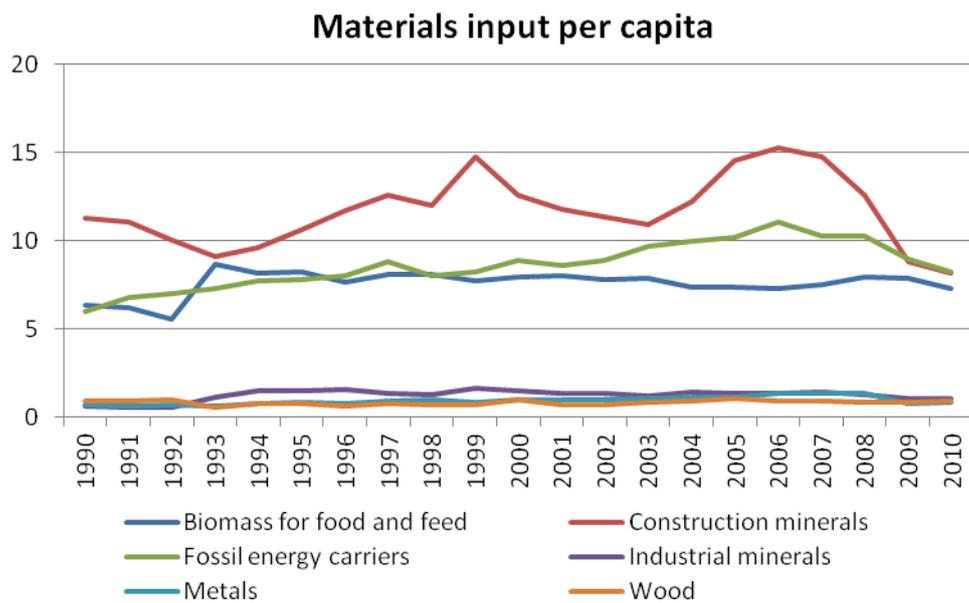


Figure 8.8: Materials input (Data: OECD, 2014c. Dataset: material resources)

Waste management

Not only has materials usage increased, but so has waste production. At no point during the period since 1995 has municipal waste generation fallen below the quantity generated that year (figure 8.9).

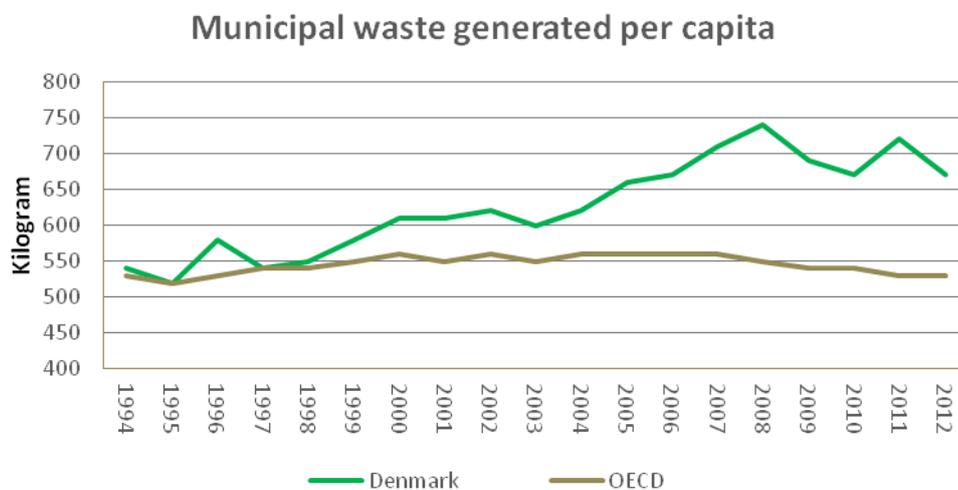


Figure 8.9: Municipal waste generation in comparison with the OECD average (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

The level of waste generated per capita has also not fallen below the average of all of the OECD countries combined, and it finishes the period 26% higher than the average. The level of waste generated started to increase at a faster rate in 2003, rising to a peak of 200 kg higher than the average figure in 2007. After this, the quantity drops, and this timing correlates with the greater use of construction minerals, suggesting that their building industry is not resource-efficient. Further research outside the remit of this thesis would be required to establish this.



Figure 8.10: Waste management (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

In spite of the rise in waste, the Danes have reduced the quantity sent to landfill to 19% of that sent in 1995 (figure 8.10). There appears to be little improvement since 2008, where the reduction virtually mirrors that of waste creation.

8.7.4 Investment in green research and development

Production of green patents in Denmark rose steadily until 2008 when they were 8.5 times more numerous than those in 1990. The number of patents fell during the recession years to 5 times the number of 1990 by 2010.

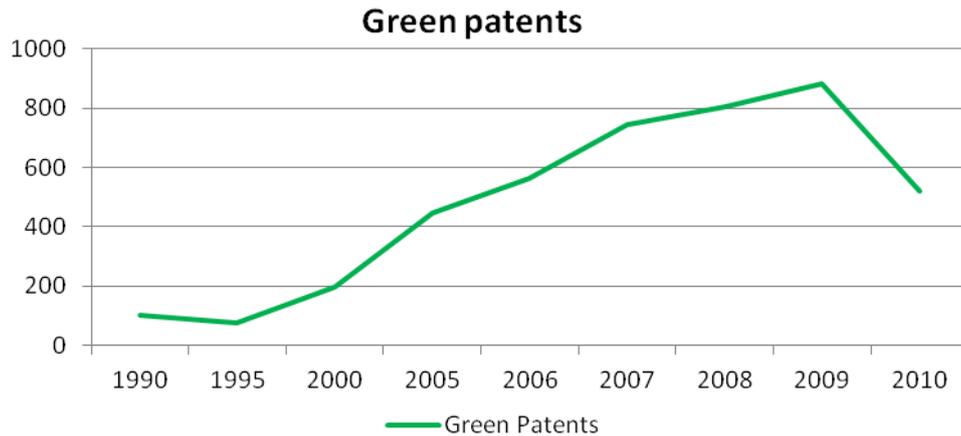


Figure 8.11: Green patents (Data: OECD, 2014c)

Global Cleantech Innovation Index

Denmark ranks fifth in the index with an average score of 3.45 that includes cultural measures and environment.

The index is compiled using 15 measures and the mean average is 2.11–2.12, with the higher score indicating better performance. Of the measures relating to specific action, it was scored:

Table 8.1: Cleantech innovation measures (Data: Pared, 2014)

Measure	Score
Cleantech-specific innovation drivers	3.12
Development to commercialisation	4.29

Denmark was the leading country in both these measures. The extent to which cleantech has been commercialised is considerably greater than in the other three countries, being scored 4.29 compared with 3.03, the next highest score.

8.75 Summarising performance indicators

Denmark was one of the first countries to look to renewable resources for energy production and by 2012, 40% of its total energy requirement was produced from renewable sources. Energy usage and productivity are both more effective than the average for Europe.

Whilst the Danes proclaim success with respect to their waste management, it is riding on a high level of consumption and production of waste. This means there is little restraint on the use of resources which, when entering the waste stream, are downcycled to the final point in the waste hierarchy, namely energy and ash. The carbon footprint of their imports has not been included in their

calculations with respect to being carbon-neutral, and their emissions for some years were considerably higher than the average for Europe.

Whilst investment in green research and development has not risen in line with public spending, their green patents rose by 850% until the recession years, and Denmark ranks fifth in the Global Cleantech Innovation Index, with a high score for the diffusion in innovations.

8.8 Summarising Denmark

This case study has explored the activities of the Danish government with a view to identifying the manner in which it intervenes in order to create an environment in which the SME can adopt a sustainable style of operation. It has shown that the Danish government seeks to create economic conditions in which SMEs can become established, but there is difficulty in encouraging their growth into the multinational arena.

The cultural profile of the Danes would suggest that they have a lot of characteristics that would underpin the nation's moves towards sustainable development. However, it has been shown that some of these characteristics have had the opposite effect.

Hofstede recognised that their individualism enabled the Danes to accommodate change, that they were entrepreneurial and prepared to take risks, and that, with little hierarchy and low regard for regulation, individuals were empowered to initiate activity that promoted sustainability with greater freedom. The Danes have seen a rise in green patents and are ranked highly with respect to diffusion. However, the autonomy and freedom they value prevents cohesive and large-scale action. This has been compensated for by the development of cooperatives, but their government is slow to support the diffusion of promising technologies.

Both feminine cultures and long-term orientation are seen to underpin sensitivity to the environment. However, in the case of the Danish, this sensitivity appears to relate more to social rather than environmental difficulties. The Danish view that they should be self-sufficient was heightened during World War II when they were faced by a potential lack of electricity. This, rather than the environmental need, stimulated their attention on the development of wind

turbines. This grassroots action was facilitated by proactive innovation and their entrepreneurial attitude.

Similarly, social rather than environmental needs underpinned the Danes' attention to addressing pollution of their water in order to preserve the quality of their drinking water, and few moves were made that demanded behavioural change beyond encouraging the use of the bicycle. To achieve this, the use of the car was rendered less convenient than use of the bike.

As with creating the environment to encourage the use of the bicycle, most activity undertaken by the government has been in the form of developing the infrastructure that delivers a more sustainable lifestyle without impinging on individual freedom. This approach is underpinned by minimal regulation beyond directives from Europe, and has resulted in substantial regional difference.

The Danes' long-term view has been fixed around a policy to lead the way to being a carbon-neutral country, with a target date of 2050. However, their insular perspective means that their view of their carbon footprint does not include emissions created in the creation and delivery of their imports. These are considerable when taken in conjunction with their comparative wealth, facilitating consumerism.

The Danes admit that they are wasteful but justify it by incinerating their waste in order to assist their low-carbon status. However, this does not negate the carbon footprint of the incinerated material although they do not incorporate it in their calculations. There is therefore a discrepancy between their claims and the performance recorded by the OECD, which shows that their domestic materials consumption per capita is higher than the average European and their greenhouse gas emissions are only 25% lower than those of 1990.

Denmark therefore makes an interesting case study because it demonstrates that a sustainable attitude is one that addresses the breadth of issues that are interrelated. By not being accountable for their resource use, the Danes undermine the very goal they consider paramount, that of being carbon-neutral. It can be argued that the extent to which they cherish individual freedom is instrumental in this failure.

Chapter 9. The United Kingdom

The United Kingdom is an island nation with a total landmass of 241,600 sq km and 63 million inhabitants (Nationmaster, 2014a; Nationmaster, 2014b), giving a ratio of 3.94 sq km for every 1,000 inhabitants. With a population of at least 8.1 million, Greater London is the largest urban district in the EU (World Population Review, 2014a). 99.9% of businesses in the private sector in the United Kingdom are SMEs, and these employ over 47% of the private sector workforce. The highest concentration of these is in London (Federation of Small Businesses, 2013). Economically, the GDP is \$1.48 trillion, which equates to \$38,514 per capita (Nationmaster, 2014c), the lowest in the sample. The country has its own resources of metals, petrol, natural gas and arable land (Nationmaster, 2014b).

9.1 Characteristics of the British and their impact on sustainable development

Of the four countries in this study, the United Kingdom was the lowest-ranking country with respect to its attitude towards the environment. A number of cultural characteristics could explain why this might be the case. The UK's culture is such that characteristics have been identified that could potentially undermine all three of the pillars underpinning sustainable development.

- The laissez-faire style of government, together with the individualistic approach of extracting finance from business at any cost, is undermining the financial prosperity of business, leaving little scope for the economy to flourish (Hampden-Turner and Trompenaars, 1994, p.323).
- The British tend to be highly individualistic, a characteristic that is not conducive to economic prosperity (Hampden-Turner and Trompenaars, 1994, p.306), limiting financial freedom to invest in ventures supporting the social and economic bottom line.
- Their inner-directedness undermines the ability of the individual to cope with major changes (Hampden-Turner and Trompenaars, 1994, p.306).
- Individualism in the British culture drives comparison of lifestyles and an associated level of consumption as individuals seek to surpass each other (Hampden-Turner and Trompenaars, 1994, p.312).

- The British have shown the ability to develop innovations, but tend not to carry them through into long-term profitable businesses, frequently resorting to selling their innovations abroad (Hampden-Turner and Trompenaars, 1994, p.315).
- The British prefer to consume rather than manufacture (Hampden-Turner and Trompenaars, 1994, pp.309–310) and are divorced from the social and environmental conditions of resourcing their demand.
- The tendency to generate new products also requires stimulating demand in order to create a market, potentially creating a new demand on the environment.
- Short-termism and the need to constantly attain a profitable position constrain long-term investment for future gains or knowledge creation (Hampden-Turner and Trompenaars, 1994, p.315).
- The need for a quick profit focusses business efforts on the more “low-tech” arenas that avoid complexity (Hampden-Turner and Trompenaars, 1994, p.318). However, complexity is a quality associated with technologies that lower environmental demands.
- The polarised style of thinking that prevents compromise inhibits the development of a holistic solution that addresses an entire problem. The British struggle to balance one of the three pillars of sustainability (Hampden-Turner and Trompenaars, 1994, p.335). To balance all three at once is foreign to their culture.
- The British distinguish between art and science, and confer more status on the sciences that are the furthest from practical application. This renders engineers and technicians, practitioners of the very disciplines that could engender a more sustainable technology, the lowest status (Hampden-Turner and Trompenaars, 1994, p.329).

The British demonstrate two cultural characteristics that would support the ability to change:

- The British are prepared to voice their opinions (Hofstede, 1984, p.99). This gives any individual freedom to promote and instigate change.
- In spite of their apparent short-term orientation, the British can also develop a long-term view and can plan accordingly (House et al, 2004,

pp.288–289). This is a characteristic necessary to underpin sustainable development.

A more complete profile of their culture is in appendix 30.

9.1.1 The British government

The British political system is a “parliamentary democracy” whereby a party or coalition with a majority of elected MPs forms a government that is monitored by parliament, which passes any associated legislation. The two-house system facilitates debate that includes all elected members of the House of Commons, and peers in the Upper House (UK Parliament, no date a).

London’s government

Overview of the administration within London is managed by the Mayor who in turn is monitored by the London Assembly, representing the interests of the inhabitants of the city (Greater London Authority, 2014a; Greater London Authority, 2014b). The Mayor has an objective to foster business needs in order to maintain the prosperity of the city (Greater London Authority, 2014c).

Alongside this is his objective to maintain and protect resources, including air quality (Greater London Authority, 2014d).

Working to deliver the Mayor’s vision are the 32 London boroughs’ councils, which are responsible for anything between 160 and 350 thousand residents (City of London excepted) (Office for National Statistics, 2013) and are supported by London Councils, an agency that seeks to diffuse good practice and facilitate joint ventures between the local authorities, in order to achieve economies of scale (London Councils, 2014).

The role of local authorities

The Localism Act 2011 requires local authorities to work together towards sustainable development and the strategic provision of infrastructure at a local level (Department for Communities and Local Government, 2011; GLA, 2013). Devolution of power was phased in over a period of time, with many measures in place by 2012 (Department for Communities and Local Government, 2011). A critical change introduced by the act is the freedom from restriction in the scope of local authorities’ activities to those specifically permitted by law, allowing them to act in whatever manner is deemed expedient, provided it is within the

law (Department for Communities and Local Government, 2011). Appendix 31 gives more details on the responsibilities of local authorities.

9.2 Policy development

The UK government is subject to directives and policies established by the EU. It must therefore work towards reducing its emissions to 80% of 1990's levels by 2050 (Committee on Climate Change, no date c). The UK's government is reported to be the first to bring in legislation designed to deliver the EU's long-term targets in the form of the Climate Change Act 2008 (Committee on Climate Change, no date a). The legislation embeds the EU's target of an 80% reduction by 2050 and establishes the first four five-yearly "carbon budgets" that limit the amount of greenhouse gases produced in each five-year period (Committee on Climate Change, no date a).

This, however, is the bottom line, and the British government has developed a number of policies to aid the achievement of this target. This section examines the bodies that support the development of policies as well as the scope of their policies, and in particular those that apply specifically to London.

9.2.1 Policy-making bodies

The government consists of 24 departments, four of which are overtly relevant to sustainable development and business. Of these the Department for Environment, Food and Rural Affairs (DEFRA) and the Department of Energy and Climate Change (DECC) are the principal departments where sustainable development is concerned (Committee on Climate Change, no date a). Appendix 32 gives more information on the relevant departments.

The Environment Agency has a broad remit with specific business-facing activities which involve monitoring emissions and pollution caused by business activity, managing permits, incentives and associated knowledge exchange including the promotion of EMS (Environment Agency, 2014; Committee on Climate Change, no date a).

The Department for Business, Innovation and Skills focusses largely on economic prosperity but offers advice and support relating to an eclectic mix of environmental topics such as the management of renewable energy, waste and emissions. However, this support is delivered at local level and is not all business-facing.

9.2.2 Environmental policy

Examination of policies gives the clearest overview of the focus of government action. There are currently 224 policies (Gov.UK, no date c) of which 1 policy addresses both business and environmental needs (see appendix 33), 13 are facing business and enterprise and 14 face the environment (Gov.UK, no date d).

Of these 28 policies the following involve encouraging sustainability within business, both directly and indirectly. Their date of inception is indicated.

- “Encouraging business to manage their impact on the environment” (March 2014)
- “Reforming the water industry to increase competition and protect the environment” (August 2013)
- “Reducing and managing waste” (March 2014)
- “Making sustainable development a part of all government policy and operations” (December 2013)
- “Improving the energy efficiency of all buildings and using planning to protect the environment” (September 2013)
- “Reducing the UK’s greenhouse gas emissions by 80% by 2050 [from a baseline of 1990]” (June 2013)

(Gov.UK, no date d)

Two policies, however, potentially undermine sustainable development. Firstly, a policy relating to the manner in which companies report to their shareholders concentrates on the financial performance rather than environmental reporting (Gov UK, 2013a). Secondly, there is a policy focussed on “reducing the impact of regulation on business” (Gov.UK, no date d). There is no indication of whether such reduction simply eliminates duplication.

Transport policies were not listed among the policies for either business or the environment. Twelve policies address transportation issues, of which two consider its sustainability through the reduction of emissions and improving the environmental performance of aviation (Gov.UK, no date d).

9.2.3 The Mayor of London’s strategy for sustainable development

The Mayor of London’s strategy is the principal vehicle controlling action undertaken by the London boroughs. It sets out targets and indicates provision

of budgets. It provides a benchmark against which to assess the performance of the individual London local authorities (see appendix 34).

In two respects, London is typical of many cities. Firstly, it is relatively carbon-efficient, with the average per capita carbon emission being half the UK average (Mayor of London, 2009). Secondly, waste management has been reported to be relatively poor. Consequently the Mayor has targeted the rate of recycling for action, but also recognises the need to reduce the carbon footprint further, seeking to reduce London's emissions to 60% of the 1990 levels by 2025 (Mayor of London, 2009).

The Mayor recognises the dual need of reducing environmentally harmful activities alongside that of developing resilience to cope with environmental change which is predicted to bring greater risk of flooding, droughts, heat waves and rising sea levels (Mayor of London, 2009). The Mayor believes that care for the environment will improve the stability of business and society alike. His plan includes steps to improve social welfare in terms of safety and encouraging volunteering to address social need (Mayor of London, 2009).

Further environmental objectives established in the Mayor's environmental strategy to assist in reduction of the carbon footprint are:

- Decentralise energy production.
- Improve the energy efficiency of homes, including retrofitting.
- Address emissions from transport.
- Capture the energy in waste.
- Improve the efficiency of the infrastructure.

Underlying this is a desire to ensure economic benefits of the above activities are captured. £100 million was budgeted to support his initiatives (Mayor of London, 2009).

Decentralise energy production

The Mayor is seeking to reduce London's dependence on fossil fuel. His policy is to encourage the development of small-scale innovative and renewable energy production, including heat capture and the installation of solar technologies enabling the development of district heating and cooling along the Thames Gateway region (Mayor of London, 2009).

Improve the energy efficiency of homes, including retrofitting

The building policy for new builds pre-empts that of a European directive by four years. It requires all buildings built after 2016 to be “nearly zero energy” and specifies three areas of action, firstly ensuring the fabric of the building satisfies specified thermal properties, and secondly designing the property to a standard that ensures emissions from heating, cooling, fixed lighting and ventilation within the property fall beneath a level determined by the European Commission (Mayor of London, 2009).

However, thirdly, the remaining carbon emissions calculated for the building should be offset by an “allowable solution” which is either in the form of investment in an existing carbon reduction project such as district heating or done by involving a third party and paying the required sum into a fund. In effect, the zero-carbon building’s status is achieved in part through the build design and quality and in part through an offset tax (Mayor of London, 2009).

Address emissions from transport

Transport produces one fifth of the CO₂ emissions in London, along with other health-impairing pollutants including nitrous oxide and particulates. The Mayor is taking action to reduce this pollution, which should also ease congestion, assisting in the ability for business travel (Mayor of London, 2009). This, however, includes resorting to electric vehicles (Mayor of London, 2009), which addresses local pollution from transport but, because the country is still dependent upon fossil fuel based electricity, does not reduce carbon emissions related to transport. The Mayor, however, does support the development of hydrogen-powered transport (Mayor of London, 2009), a cleaner fuel on both production and use.

Capture the energy in waste

80% of the waste is generated by business and industry. Of the waste that was sent to landfill in 2009, 60% could have been recycled. The Mayor planned action to reduce this figure. He noted that the area of greatest need for support was that of small businesses and developed a policy to promote combined heat and energy capture from waste (Mayor of London, 2009).

Improve the efficiency of the infrastructure

In addition to retrofitting buildings to improve their performance and imposing higher performance standards for new buildings, the strategy included detailed action to improve the carbon efficiency of the road infrastructure and to plant trees and green roofs to reduce the heat island effect (see appendix 34).

9.2.4 Summarising policy development

In the analysis of culture, section 5.5.1, it was suggested that British culture is not as strong as Scandinavian culture where policy development is concerned, but that it would prove to be stronger than the Japanese. The British government, however, is under a duty to accommodate directives from the European Union.

The above review of policy development in Britain has shown that the process is devolved to different departments largely focussing on energy usage and the associated reduction of the release of climate change gases.

Policy development is largely top-down, with the caveat that, provided they are legal, policies can be developed at a local level. 3.5% of the policies developed at national level are focussed on encouraging businesses to adopt sustainable measures or facilitating such activity. Within these is the policy to include sustainability needs in all policy development and government operations, but a policy to minimise the burden of regulation on businesses could potentially undermine progress.

The Mayor's policy for London included addressing issues that were unique to the city, such as reducing the heat island effect. It embedded all of the policies that applied at a national level and clearly included the need to manage performance at an infrastructure level. Underlying the policies was a supportive element that made it clear business interests were to be protected.

9.3 Sensitivity to ethical behaviours

The British were front runners in the industrial revolution, a period that recognised endeavours could produce significant wealth. However, the environmental damage that followed in its wake was accepted as a natural by-product (Kasa, 2009) and ultimately earned Britain the title of "the dirty old man of Europe" from the Scandinavian countries in recognition of its contribution to their acid rain (DEFRA, 2001). This section explores the extent to which the

British are sensitive to environmental needs, including reference to their definition of sustainability and attitudes evident in reporting progress.

Defining sustainable development

The British government defined sustainable development as “encouraging economic growth while protecting the environment and improving our quality of life – all without affecting the ability of future generations to do the same” (Gov.UK, 2013b). Business interests are listed before those of society and the environment.

9.3.1 English action and associated ethos

The British were late in beginning to recognise their responsibilities where the environment was concerned, long believing that market forces and property rights would regulate behaviour (Ellerman, 1999). The British government has now accepted that the environment should be given due consideration and has charged DEFRA with ensuring that all government departments embed the concept within their policies and operations (Gov.UK, 2013b). The motivation behind the creation and adoption of policies in a range of arenas is examined here in order to assess British sensitivity to the issues concerned.

Climate change

The British social attitudes survey revealed that 76% of the population believe that climate change is exacerbated by human activity. Of these, the greatest level of understanding was demonstrated by the more educated and younger respondents as well as those identified as Liberal Democrats (Humphrey and Scott, 2011). This, however, did not necessarily translate into concern to address the problem.

Rising prices together with legislation have stimulated retailers to make improvements to the environmental performance of their operations. The two appear to have worked in conjunction to greater effect, with the publication of the Stern review on the economics of climate change and the adoption of the EU-promoted emissions trading scheme between 2005 and 2007 being seen as critical drivers of change (Sullivan and Gouldson, 2014).

Energy

A review of the last 30 years of government attitudes to energy reveals priorities and sensitivities which echo the government’s attitude to climate change,

demonstrating a greater sensitivity to threats to economic prosperity and social welfare.

To a certain extent the British were protected where energy resources were concerned because of their reserves of both coal and North Sea oil and gas. However, two periods of dramatic price rises in crude oil between 1973 and 1980 highlighted the need for energy security, and the first of these, between 1973 and 1974, stimulated the development of the Department of Energy (Pearson and Watson, 2012).

By the early 1980s the British government was investigating the feasibility of nuclear power to compensate for anticipated reductions in production of North Sea gas. The focus moved to energy-efficient technologies following the trend in Japan and the need to remain competitive (Pearson and Watson, 2012).

Under the Conservative government and influenced by Friedman and Hayek's concept of the market economy, Lawson privatised energy production in order to enable its economic and efficient production. This heralded the decline of British coal production, which was undermined by cheaper imports and displacement by gas. It was not until 1993 that the government produced a white paper that included reference to the harmful emissions caused by burning coal (Pearson and Watson, 2012).

The British government resisted the call to constrain the release of sulphur in order to reduce acid rain suffered by Scandinavia and only accepted targets to control it in 1988. However, action did not occur for another two years and the vehicle was taxation, which was acknowledged by the government as a means to raise finance and was criticised for penalising the poor and for taxing the use of energy rather than emissions of carbon (Pearson and Watson, 2012).

Further liberalisation of the market occurred under the Labour government together with compensation to the less well-off. The public, however, resisted the use of an escalator tax to curb fuel use, demonstrating anger by blocking the movement of fuel from refineries. With respect to energy production, the interests of the economy and society were placed above those of the environment for the remainder of the century (Pearson and Watson, 2012).

In 2004, Britain became a net importer of fuel, at a time that coincided with significant rises in energy prices. Supplies were seen to be threatened. The following year, Blair announced the Stern review, followed by a white paper in 2007 that announced that his energy policy would recognise the need to address climate change. The needs for energy efficiency and the development of renewable electricity production were subsequently promoted (Pearson and Watson, 2012).

Despite David Cameron's claim he would lead "the greenest government ever", his government has reduced energy efficiency regulations and, in contrast to public opinion, believes it expedient to halt the development of wind farms and remove subsidies from the existing ones. It intends to pursue fracking and nuclear electricity. These are both considered to be retrograde steps (Lean, 2014).

Pollution

It was only as the health effects and associated costs caused by environmental damage and principally through air quality became clear that the British started to address the causes. Initially attention focussed on the most visible problem, smoke within urban areas, and in 1997 the country started to address further pollutants (Parliamentary Office of Science and Technology, 2002). Britain was subject to the daughter directives of the Air Quality Framework Directive issued by Europe, but maintained standards in excess of these, which by 2003 were seen to be a principal measure of sustainability within the nation (DEFRA, 2003).

Waste management

Reviewing the manner in which the British started to accommodate waste management reveals the extent of their sensitivity to the problem. Historically waste has been an issue that has had to be managed by governments. As with other countries, waste was put into landfill sites in the country. The quantity of waste increased significantly with the industrial revolution. Household waste collection was mandated by the government in the 1870s, and rolled out to include trade waste 30 years later (Newry and Mourne, 2010).

There were complaints about the nature of waste and its potential impact on health as early as the 1930s but no action was taken for some decades.

However in the 1930s the nature of waste changed, because more synthetic materials, including plastics, had entered the system. Twenty years later, quantities of household waste increased further as a result of the Clean Air Act, which stopped the practice of burning household waste on fires within the home.

It was not until the 1970s that the polluting nature of landfill was recognised and regulated, followed in 1977 by the first bottle banks (Newry and Mourne, 2010). This was also the decade in which sites for nuclear waste were being sought and received grassroots opposition. The initial thoughts were to bury high-level waste beneath the Scottish Highlands (Parliamentary Office of Science and Technology, 1997).

By the 1980s, concerns were more apparent about the potential threat of hazardous waste, and in 1986 its impact on the environment became of note and was included in the Treaty of Rome (Newry and Mourne, 2010), prompting the management of waste to be regulated through taxation and regulation regarding the recycling of packaging. A survey on sustainable living found that the distance that had to be travelled in order to recycle waste at street collection points was critical to the success of the initiative (Icaro Consulting, 2009).

This overview of the development of waste management reveals that concerns for the environmental impact were subordinate to those for human health and adds weight to the observation that the British government's definition of sustainable development does not put the environment on an equal footing with the economy or society.

Transport

In spite of the fact that belief that car use created a significant environmental threat halved between 2000 and 2010, there was a marginal increase in the effort to reduce mileage over that period (National Centre of Social Research, 2011). Knowledge of the type of environmental threat was also poor. Research commissioned by the Department of Transport revealed that in 2006, few of the public understood the link between transport and climate change (Anable, Lane and Kelay, 2006). This would suggest a low level of sensitivity to the environmental impact of transport, largely grounded on a lack of knowledge.

Building design

The National House-Building Council (NHBC) Foundation commissioned research into the attitudes of the British public to sustainable housing, testing initial reactions as well as more considered responses. The issues that were considered necessary were those of energy source, district heating, water efficiency and waste management.

The responses were largely in favour of all of the technologies mentioned. However, where community heating was concerned, 42% of the respondents did not like the concept of the all-electric property with no gas cooker and a third would resist because of the associated disruption. Most water conservation technologies were considered favourably, where the use of recycling grey water for utilities such as the washing machine attracted the lowest level of favourable responses at 65% (Icaro Consulting, 2009).

Building design is one area where UK action pre-empted European directives. However, in spite of the government target of all new buildings achieving near-zero energy performance by 2016, the Conservative party promised to remove this criterion for new starter homes sold to the “under-40s” if they were elected in 2015 (BBC, 2014). There has not been the same level of attention to upgrading old housing stock. A few regions were targeted as pilot low-carbon zones and loans offered to improve the performance of inefficient buildings with repayments scheduled to be taken from subsequent savings.

9.3.3 Underlying sensitivity

The activities reported above clearly demonstrate sensitivity to the demands of sustainable development. However, the manner in which it expresses progress (appendix 35) would suggest that the government is more interested in reporting success than it is in highlighting issues of concern.

A review of British attitudes to environmental issues demonstrates that in most respects, the perceived threat from environmental damage together with an associated recognition of the need to modify behaviour has reduced between 2000 and 2010 such that in 2010 there was less concern than that shown in 1993 (National Centre of Social Research, 2011).

In the ten years between the two reports, Britain suffered damage that was attributed to climate change, but the growth of terrorism over the same period

and recession in the latter half of the decade are reported to have become a more critical concern (National Centre of Social Research, 2011).

9.3.4 Summarising sensitivity to ethical issues

The British have not demonstrated much sensitivity to environmental needs, resisting the need to control energy production and usage, waste management and air quality until economic or social welfare was threatened. Concern that had been evident at the turn of the century was associated with the growing dependency on imported fuel, but as the decade progressed, so the needs of the environment were subordinated by terrorist threat and the need for economic expedience.

The range of policies provides an indication of the behaviours the government considers to be ethical. There is, however, a mixed message given about what is considered acceptable practice. On one hand, the government has clearly articulated its intention that sustainability will be embedded in all policies and the needs of the environment considered within its decision making. However, a number of details in both content and terminology water down the extent to which action should be limited by the demands of sustainable development.

The British government is not always representative of public opinion, the most critical issues being the differing opinions with regard to wind power generation and the production of gas by fracking, the public favouring the more sustainable options. Unlike the government, public opinion does not necessarily include consideration of the need for fuel security.

It could be argued that sensitivity varied with change in government. However, in that each government inherited the progress made by the previous one and some change in attitude was caused by a change in externalities, there is insufficient evidence to support this line of thought. Certain actions have provided some evidence to suggest the Conservative government is not as sensitive to the environment as the Labour government. Firstly, the recent move to stop further subsidies for wind power, and secondly the government's insistence that fracking should be introduced if financial viability is proved. Finally, the removal of the zero-carbon regulation for start-up homes for the under-40s. All of these are argued to be retrograde steps.

9.4 Ethical standards and capabilities

Section 9.3 established that economic viability and social welfare were of higher priority for the British government than environmental need. However, subject to EU directives, the government cannot ignore the demands of sustainable development. This section examines the manner in which essential decisions are made and the support and monitoring processes used by the government.

9.4.1 The style of change

Examination of the manner in which the government influenced the development of renewable energy production reveals that technically, the government's approach appeared to facilitate rational decision making, adopting the Delphi technique and involving 10,000 experts (see appendix 36). However, the manner in which the findings were used suggests that there was a hidden agenda of cutting costs, resulting in sub-optimisation. Further adjustments had to be made to accommodate EU ruling, limiting the effectiveness of the approach so that it was rendered of little effect because only the developers who were very near to market were able to benefit sufficiently to make the approach viable (see appendix 36).

9.4.2 Governmental influence

Change is largely top-down, governed by regulation that is implemented by local authorities. It is supported by agencies and NGOs, incorporating universities and business, that aid with the diffusion of best practice and support the smaller business. For more detail refer to chapter 10 and appendices 35 and 38 for a closer examination of action at a local authority level and to appendix 39 for details of supporting agencies.

9.4.3 Monitoring performance

The government has instigated "sustainable development indicators". These have been kept since 2001 but were updated in 2013. They have been reduced in number and consist of 12 headline measures designed to demonstrate priorities within the government, supported by 23 supplementary indicators. They facilitate triple bottom line reporting although the economic indicators include poverty indicators, demonstrating the overlap between economic and social welfare (Gov.UK, 2014f). As with the definition of sustainable development, the environment is listed last and, unlike social welfare, is not

referred to within the headline economic indicators, although the sale of goods and services that support environmental performance is a supporting measure (DEFRA, 2013).

Environmental standards are wide-ranging, including emission of greenhouse gases, resource use, waste management, and land and water quality. There are, however, no standards listed that refer to air quality and the emission of pollutants, although air quality is recognised in the indicators for societal welfare (DEFRA, 2013). Each indicator has at least one measure, 25 headline measures and 41 supplementary measures (Gov.UK, 2014e).

Two data points are reported. Firstly, long-term performance indicates the change since reporting started, provided this was before the year 2000. The base year for some of these measures is as early as 1970. Secondly, short-term performance is indicated, generally over the previous five years.

The reporting of achievement indicates whether the standards have improved, deteriorated or not changed, the last including “little change”, namely any change within 3% of the base year. There is also an indication of the direction change since the previous measure was taken (DEFRA, 2013).

Care must be taken when reading this type of report because it lacks precision. The long-term performance is what is being sought, but short-term measures are indicative of the direction of change. However, short-term measures are also only dependent on the performance of the period immediately preceding the report, and performance in the base year.

The 2013 report provides an analysis of performance to 2011, meaning the base year was 2008. This is the year the recession started, and with the associated drop in trade, many of the measures showed a significant change in performance. This could distort the apparent performance demonstrated over the short term. The OECD (2011) recommends that performance figures be examined in conjunction with the GDP to avoid this potential pitfall.

The traffic light reporting system is augmented by further detail, the level of which varies depending on the extent to which it is published in a separate report (DEFRA, 2013). There is no comment on whether the performance is on target to meet any targets for the measure concerned.

9.4.4 The standards achieved

Overall performance

There are not yet enough data for a complete evaluation of long-term performance, but some valid conclusions can be drawn.

Economic performance

There are no data for one measure, and a further four measures do not exist over the long term. However, only one measure has deteriorated over the long term. This means that even if the four missing measures had demonstrated deterioration, figure 9.1 shows that performance over the long term appears to be improving. It should be noted that the degree of change is not indicated.

Long and short term assessments of economy measures



Figure 9.1: Long and short term assessments of economy measures (DEFRA, 2013)

Four measures have shown improvement over the long term but were seen to have deteriorated over the short term. These were headline measures relating to the GDP and unemployment, and it is argued that these short-term deteriorations are a result of the recession. The one measure that has deteriorated over both the long term and the short term relates to pension provision (DEFRA, 2013).

Societal welfare performance

Very few societal welfare measures exist over the long term, and those that do relate to obesity and fuel poverty. Air quality has not been measured over a long enough period to be included in the report (DEFRA, 2013).

Environmental performance

Ten environmental performance indicators demonstrated improvement over both the long and short term, and figure 9.2 shows that a further four measures record improvement over the short term. These relate principally to the headline indicators of greenhouse gas emissions and the supporting indicator of CO₂ emissions caused by transport. CO₂ emissions from the other sectors have also been reduced over the long term, and those from business have fallen the most, being less than half their 1970 figure. However, most of this reduction occurred prior to 1990 (DEFRA, 2013), suggesting the low-hanging fruit had been exploited, meaning that subsequent reduction will be harder to achieve.

Since reporting started in 1990, the emission of greenhouse gases has fallen by 26%. However, in the reporting period between 2011 and 2012, it rose by 4%. These figures only relate to the emissions created within the UK. Globalisation means that UK consumption causes emissions elsewhere that have been estimated. These rose 10% between 2009 and 2010 and were 5% above those of 1993 when reporting started (DEFRA, 2013).

Long and short term assessments of environment measures



Figure 9.2: Long and short term assessments of environmental measures (DEFRA, 2013)

Energy

The proportion of energy produced from renewable sources has increased over the short term but it was not measured over the long term. The recycling of waste has improved over the long term but over the short term it is unaltered.

Whilst natural resource use was one of the headline indicators, it did not include fuel, a critical consideration for sustainability. The measures divided resources between those associated with construction and other materials in order to isolate performance of construction and demolition waste, which is targeted by the EU to be reduced by 70%.

The UK government is supported by the Emissions Trading Scheme (ETS) which encourages the adoption of cleaner technologies using financial incentives. These policies seek to achieve the following changes by 2020:

- Reduction in emissions to 20% of 1990's levels.
- 20% provision of energy from renewable sources.
- Energy efficiency improvement of 20% of 2007's levels.

(Committee on Climate Change, no date c)

Carbon budgets phased in through the ETS aim to achieve the following reductions of carbon emissions in comparison to 1990:

- 23% reduction by 2012.
- 29% reduction by 2017.
- 35% reduction by 2020.
- 50% reduction by 2025.

(Committee on Climate Change, no date e)

Waste management

Over the period since 1993, the percentage of the respondents that regularly recycled materials more than doubled to 86% (National Centre of Social Research, 2011). All of London's waste is now processed in an energy recovery plant, although the opportunity to include heat recovery in the process was missed (Cory Environmental, 2015).

Transport

In section 9.3.1 I reported that there has been a marginal increase in the effort to reduce mileage in private cars (National Centre of Social Research, 2011).

9.4.5 The impact of geography

Britain's geography has left it in a good position where energy is concerned, but not necessarily with a sustainable attitude. On one hand it has enjoyed a history

of fuel resources (Nationmaster, 2014b) which have insulated the British from the need to economise. On the other hand, it is reported to be one of the best locations for wind power generation in the world and now outstrips Denmark's level of power produced by wind (BBC, 2014a).

Situated in the north-west of Europe and with the predominant wind direction being from the south-west (Lapworth and McGregor, 2006), Britain normally does not suffer any pollution from neighbouring countries, which has dulled its sensitivity to the need to manage emissions.

9.4.6 Summarising ethical standards and capabilities

The British are both innovative and law-abiding. These qualities mean that they have the ability to address many of the challenges posed by sustainable development through developing appropriate technologies and regulation. However, without government support, they can only become viable if they offer sufficient competitive advantage to make their development commercially viable.

Some of the activities of the British echo their cultural characteristics identified in section 9.1. The technology foresight activity carried out by the government was an example of their ability to seek to develop a long-term view. However, the activity was undermined by an approach that only supported the near-to-market activities and excluded those that needed support over the longer term. Hampden-Turner and Trompenaars (1994) identified a polarised style of thinking. Targeting a limited range of technologies for support is also understandable in the light of this polarised style of thinking.

The government has in the past been selective regarding the technologies that it has supported both through financial support and through regulation, limiting the variety of solutions that have become available and constraining the extent of their diffusion. Indeed, its latest moves such as those to stimulate the housing market and to encourage fracking encourage the adoption of less sustainable activities.

Reporting is somewhat obscure. The report is limited to only two headline reporting points indicating long-term and short-term performance and uses a broad-brush traffic light system that does not closely monitor the extent to which targets are likely to be met. There are more detailed elements to the report that

are only included if they are not published elsewhere. This means that the report itself gives a somewhat incomplete picture.

Behavioural change, as demonstrated in reduction of mileage driven in private cars and in encouraging street collection of waste for recycling, is also hard to achieve, the British being unprepared to change their lifestyle without the infrastructure to minimise inconvenience and cost.

9.5 Provision of financial support

The examination of standards and capabilities identified the need for government support to mitigate the cost of research and development to enhance the commercial viability of innovation. SMEs also need support to assist in the capital expenditure needed to install more sustainable technologies. This section examines the breadth of financial support offered to the SME.

9.5.1 Financing the reduction of CO₂ emissions

The manner in which alternative energy sources have been supported by the government has been outlined in section 9.4.1. This section examines the methods used to aid their further diffusion and address other sources of CO₂ emissions.

The Green Investment Bank is the backbone of the government's low-carbon initiative. The bank is the first of its nature in the world and has £3.8 billion of government funding to invest in carbon-free and low-carbon technologies (Green Investment Bank, 2014). Formed in 2012 (Green Investment Bank, no date), the bank is tasked with providing long-term funding where it would not normally be available, in order to accelerate the diffusion of proven technologies that are on the cusp of becoming mainstream in the area of power generation and waste management. The bank is expected to be financially sustainable in its own right, meaning that it will not fund research into as yet unknown technologies because the risk is too great (Green Investment Bank, 2013).

The Climate Change Levy is payable by businesses and organisations for the use of electricity, natural gas, liquid petroleum gas and all qualities of coal, with different rates set for each product. Reductions in the tax were available for organisations involved in metal recycling and organisations subject to the Climate Change Agreement (HM Revenue and Customs, no date b), where the

organisations have signed up to agreements for more stringent targets for carbon reduction determined by the government (Gov.UK, 2014b)

Ten low-carbon zones in London have attracted funding from the Mayor totalling £3 million. This is an initiative designed to reach businesses as well as residents within the designated zones, which are tasked with piloting and showcasing carbon reduction initiatives (Mayor of London, 2009).

Transport for London is installing LED traffic lights to reduce the impact of transport, budgeted at £2.4 million (Mayor of London, 2009). Whilst not overtly targeting businesses, this measure reduces the impact of their necessary transport.

9.5.2 SME support

The government offers four streams of financial support through the Department for Business, Innovation and Skills (Gov.UK, no date g). These take the form of tax relief, equity providing seed funding, grants and loans. The offering is dynamic but a representative sample is shown in table 9.1, relevant to June 2014. The totals do not tally because of overlap in the classifications.

The disparity between the total number of initiatives and those available to businesses in London is because the majority of the funds are through local rather than central government and therefore applicable to individual counties or regions. It does, however, provide some evidence of the number of initiatives that might be available in any one region.

Table 9.1: Finance offered to SMEs in the UK

Scheme type	Total number	London	Enterprise size (no. employees)		
			Micro (0–9)	Small (10–249)	Medium (250–500)
Finance	365	47	364	342	82
Equity	34	9	34	32	12
Grants	329	24	326	312	100
Loans	127	24	126	116	25
Total	475	56	471	445	137

The above funding is not specifically related to environmental management. Only 17 of the 475 packages encourage sustainable development (appendix 37), the scope of which includes consultancy, innovation and installation of sustainable technologies, and the fields of activity including waste reduction and

recycling, taking into account increased usage of recycled materials in products, water management, and energy and carbon reduction (Gov.UK, no date h).

The Mayor planned to investigate the viability of a rolling fund of a sum of £100 million to £200 million. The fund would be replenished as projects repaid their loans out of their savings. The GLA budgeted £4 million and was looking for other sources of funding to secure the targeted figure (Mayor of London, 2009). Whether this is embodied by the Green Investment Bank or not is unclear.

9.5.3 Incentives

The government has developed a range of incentives to encourage behavioural change that is largely focussed on the reduction of CO₂ emissions.

Energy

The government is trying to encourage the installation of small-scale sustainable power-generating facilities including combined heat and power. Incentives do not apply to energy providers and are designed to motivate the development of small-scale local production.

- Installations that qualify attract exemption from the Climate Change Levy (see 9.5.1).
- Some equipment does not raise rateable property value and consequently does not increase associated costs.
- A feed-in tariff enables the sale of power into the grid.
- Installation of specific equipment listed on a frequently reviewed list of best available technologies (BAT) enables the business to offset the entire capital cost against profits in one year, reducing its tax liability accordingly (Department of Energy and Climate Change, 2008).
- Investment in offshore wind farms in designated regions was promoted (Department for Business, Innovation and Skills, 2011) through tax relief and discounted rates for the investors.

Transport

In order to promote their research and development by assisting the diffusion of ultra-low-carbon cars, the government reduced their cost to both the private and business purchaser by 25% up to a ceiling of £5,000 (Department for Business,

Innovation and Skills, 2010) and is funding associated innovation and matching funding into charging stations (Gov.UK, 2013).

Ninety-six projects involved in developing low-carbon transport links across Britain have received a total of £600 million, motivated by stimulating business and reducing carbon emissions. A further £88 million has been provided to bus companies to aid the purchase of low-carbon-emission buses. The diffusion of low-emission HGVs has been stimulated by the investment of £8 million (Gov.UK, 2012).

9.5.4 Taxation

Fiscal measures are used to encourage environmentally sensitive behaviours. The British environmental taxes fall within three categories: those related to carbon emissions, those related to the use of aggregates and those related to waste management (HM Revenue and Customs, no date a) designed to encourage behaviour in line with the waste hierarchy (HM Revenue and Customs, 2014c).

The Aggregate Levy places a market adjustment onto the price of minerals extracted for commercial use. Exemptions applied to those that were a by-product of other activities such as coal mining, but have been suspended while the European Commission investigates whether they should be considered to be subsidies (HM Revenue and Customs, 2014a), reducing the incentive to use industrial waste in preference to the extraction of virgin aggregate.

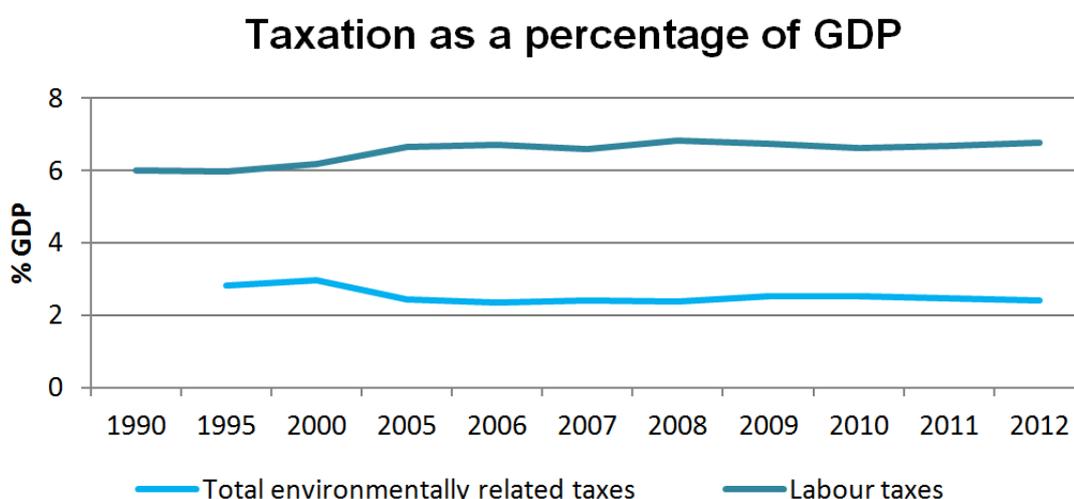


Figure 9.3: Environmental and labour taxation (Data: OECD, 2014c. Datasets: green growth indicators)

Environmental taxes were at their highest in 2000, at 2.95% of the GDP, and dropped to 2.45% in the subsequent five-year period, after which there has only been a marginal increase. Taxation on labour reflects the opposite pattern (figure 9.3). This would suggest that green taxes are used as a Pigouvian tax, and as such are not used to raise extra funding for the government, but are used to encourage desired behaviours.

9.5.5 Innovation and environmental R&D

During the period from 1997 to 2010, a Labour government was in office (Gov.UK, no date k). Figure 9.4 portrays the funding for research and development of environmentally focussed technologies both in US dollars and as a percentage of the GDP between 1990 and 2011. Public spending in environmental research and development rose throughout this period and has ranged from 1.4% to 3% of total public expenditure (figure 9.4).

The swings in expenditure as a percentage of public spending demonstrate that there is not a long-term policy dictating the figure invested. There does appear to be a change in commitment to investment between 2005 and 2006. The dramatic reduction demonstrated between 1995 and 2006, where investment of over 2.3% of the total spending dropped to 1.8% of public spending, was reversed between 2007 and 2008 and the proportion grew during the recession years after an initial drop of just over 0.1%.

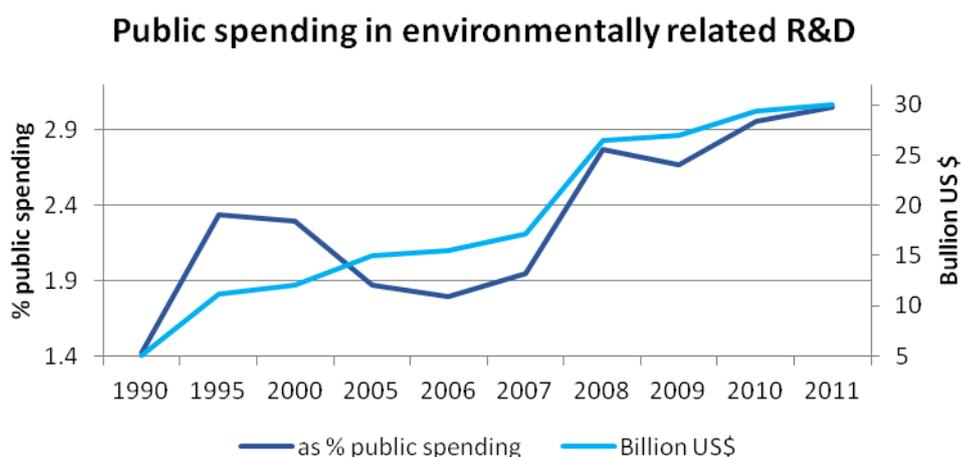


Figure 9.4: Public spending on environmentally related research and development (Data: OECD, 2014c. Dataset: green growth indicators. Quandl, no date a)

9.5.6 Summarising the provision of financial support

Most of the financial approaches to encouraging sustainable behaviours are in the form of centrally administered taxes, which tend to be viewed to be more of

an excuse to generate finance than encouragement towards the desired action. However, the rise in general taxation that matched falls in environmental taxation suggests otherwise. Taxation is focussed on factors dictated by the European Commission, namely transport, the use of aggregates and waste management.

Most incentives, in the form of grants, loans and tax relief, are administered locally, creating a postcode lottery. The majority target the micro-business, with slightly fewer offered to SMEs. Less than a third apply to the medium sized business employing between 250 and 500 workers. The government is subject to the EU ruling that subsidies should not distort the market and to some extent is constrained in this respect. In 2014, only 0.036% of the support offered through these schemes related to sustainable development.

A range of projects, such as London’s low-carbon zones, have been funded in order to kick-start and pilot technologies. The government has started to consider a green investment bank, but is looking for it to be a self-funding entity, meaning projects with a long-term payback period might still prove hard to fund.

9.6 Diffusion

The British have been shown to be good at developing new technologies, but these are only of benefit if they are diffused into practice. The British have not demonstrated their ability to gain long-term benefits from their innovation. This section explores the extent to which the government aids diffusion of technologies that support sustainable development.

9.6.1 An example of diffusion: knowledge exchange

At central government level, the Department for Business, Innovation and Skills has the principal role of supporting business. The department runs schemes that offer knowledge exchange and provide awards embedding good practice (Gov.UK, no date h) as indicated in table 9.2.

Table 9.2: Activities aiding diffusion carried out by the Department of Business, Innovation and Skills

Scheme type	Total number	London	Enterprise size (no. employees)		
			Micro (0–9)	Small (10–249)	Medium (250–500)
Knowledge exchange	380	65	62	61	34
Awards	23	9	9	9	8

There is some duplication between the types of scheme, such that the Manufacturing Advisory Service advertised on the finance pages is also in the knowledge exchange listing for expertise and advice. In addition to this, this list advertises initiatives that are relevant to individual London boroughs and therefore not available for all businesses. Further initiatives to support businesses offer knowledge exchange on subjects ranging from recycling and waste management to water conservation. For a list of those serving London, refer to appendix 39.

Awards advertise new technologies as well as acting as a reward to stimulate a desire to change. The only award within London that is relevant to sustainable development is the Queen's Award for Enterprise – Sustainable Development (Gov.UK, no date h) and it is available for all businesses with at least two employees (Gov.UK, no date i). This award is highly pertinent to the diffusion of good practice because the focus on sustainable development must have been maintained for at least five years to qualify, encouraging continuity, and it is open to a broad range of business activities, namely:

- *invention, design, production, performance, marketing, distribution, after sales support of goods or services*
- *management of resources or people, or of relationships with other organisations (or their representatives)*

(Gov.UK, no date i)

In addition to the above, much is done by local authorities to assist in knowledge exchange which is covered in chapter 10.

Incentives encouraging compliance

DEFRA commissioned research in order to identify the attitude of the public regarding their willingness to adopt environmentally acceptable behaviours. The findings were distributed onto a matrix where the axes were willingness to change and ability to change. The groups and associated action are summarised in figure 9.5.

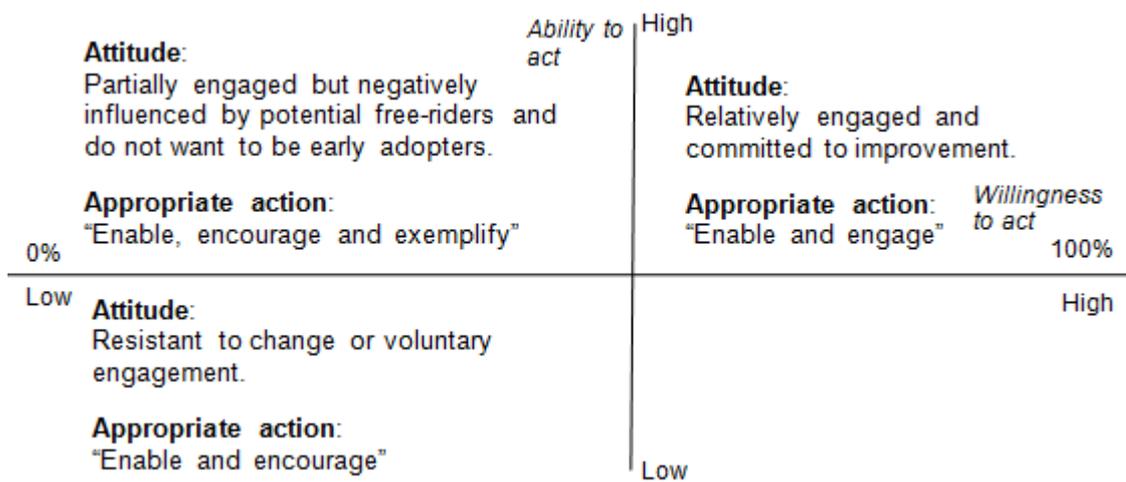


Figure 9.1: A summary of DEFRA's analysis of appropriate intervention (sourced from DEFRA, 2008)

These findings led to the conclusion that the government should adopt a top-down approach involving a combination of action that provided the necessary support to enable more sustainable lifestyles and advertise successes. The areas seen to be necessary to target were CO₂ reduction, energy and water usage and reducing waste, specifically that in the food chain. Products themselves were targeted, as was tourism (DEFRA, 2008).

An example of enabling action taken by the government was described in section 9.5.2, namely replacing all traffic lights with LED lamps to reduce the emission associated with road use. This demands no behavioural change.

9.6.2 Dissemination

As explained in 9.4.2, management of government policy is undertaken at a local level. This includes the dissemination of steps taken to support sustainable activity and the associated structures. Chapter 10 examines this at a much higher level of detail and reveals that there is significant difference in the quality of support across different regions.

Difference is most notable in dissemination of information through electronic means, ranging from websites that provide comprehensive lists of support agencies, a bank of case studies and substantial levels of advice to those that barely give any information beyond that of waste collection services and costs.

9.6.3 Encouraging behavioural change

In analysing environmental behaviours, DEFRA concluded that behavioural change would be hard to achieve. It was recognised that changes that did not fit a given lifestyle would not be readily accepted.

A range of actions were identified. As an active deterrent, minimum standards and financial measures would be used along with educational tools and “choice editing”, a mixture of measures that encourage the consumer to make more sustainable decisions.

To encourage better behaviours, along with incentives, the primary tool was that of developing a more supportive infrastructure and informing the consumer through labelling. Additionally the government committed itself to lead by example at every level of its operations (DEFRA, 2008). The outworking of this approach is described in greater detail in chapter 10.

9.6.4 Summarising diffusion

Critical to the success of diffusion of good practice in the United Kingdom was the analysis undertaken by DEFRA that determined the most effective way of encouraging behavioural change. The conclusion was that the population could be grouped according to level of engagement, ranging from the resistant through to the thoroughly engaged. The government action deemed the most effective for all of these groups was to “enable” the change. Those who were more resistant to change were seen to need encouragement and examples of best practice, whilst the more engaged were seen to require the stimulus to further augment their good practice.

To this end, the government has been seeking to develop an infrastructure that reduces the environmental impact of activities, minimising the change demanded from the individual. The level of detail for this approach extended to that of changing traffic lights to LEDs to reduce their carbon emissions.

Numerous schemes have been developed focussing on knowledge exchange, the majority targeting the micro-business. NGOs that advise SMEs of best practice have been established. Knowledge exchange is also achieved through the use of awards that advertise best practice and encourage businesses to participate. These are largely managed by local authorities which do not have a unified approach, resulting in mixed levels of provision across the country.

9.7 Performance indicators

This section refers to the OECD’s green growth indicators that have been used as a framework for this study. These indicators provide a snapshot of

performance achieved by 2011 and in some cases 2012, demonstrating the success or otherwise of the approach adopted by the government.

9.7.1 Green energy production

Britain's late start in green energy production is evident in the figures produced by OECD (figure 9.6). In 1990, the percentage of renewable energy in comparison with the total energy produced in the United Kingdom was only 11% of the OECD average. However, the gap closed over the period such that by 2011, the proportion of renewable energy had risen to 57% of the OECD average, having demonstrated a steady improvement throughout the period.

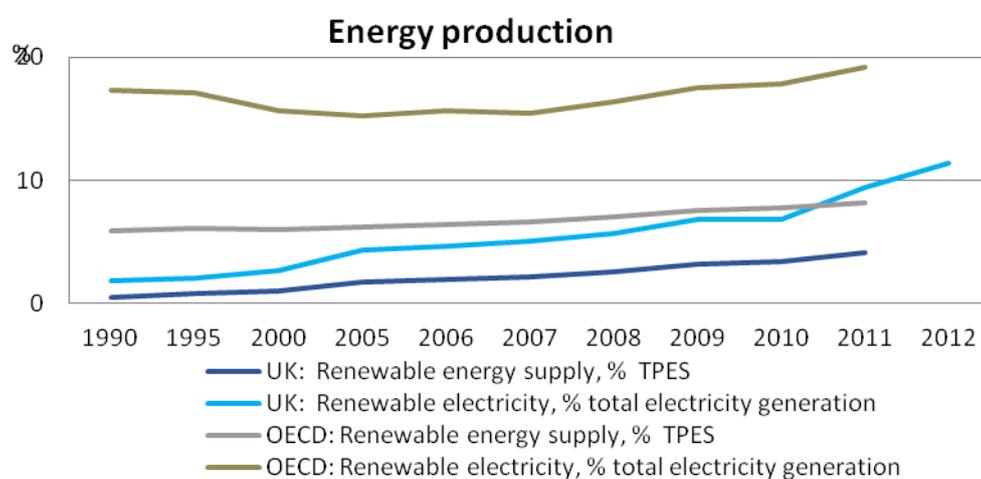


Figure 9.6: A comparison of renewable energy production with OECD (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

Similarly, the percentage of total primary energy supply (TPES) rose throughout the period from 8% of the OECD in 1990 to 50% in 2011.

The British policy of concentrating on the product in order to ensure efficient usage of fuel appears to have been productive. With a reduction of 15%, the energy intensity per capita has fallen faster than the 0.7% rise recorded for the OECD average. In the United Kingdom, the productivity per ktoe has risen by 68%, twice the average of 34% for the OECD. This rise of productivity is evidence of efficiencies in the business world, whereas the fall of energy intensity per capita is evidence of improved products (figure 9.7).

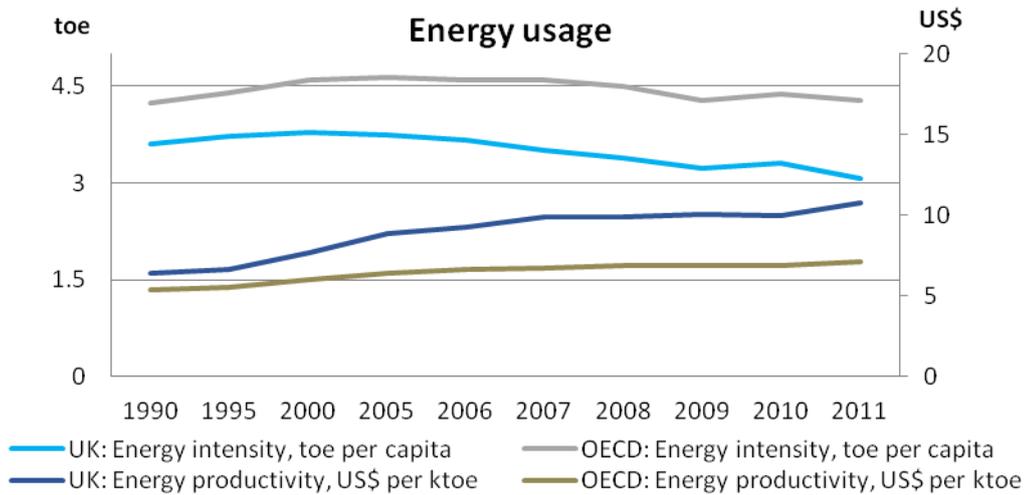


Figure 9.7: Comparison of energy usage between the UK and the OECD average (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

9.7.2 Greenhouse gas emissions

When indexed to 1990, the average performance where emissions are concerned for the OECD demonstrates a greater reduction in total emissions than that achieved for carbon alone (figure 9.8).

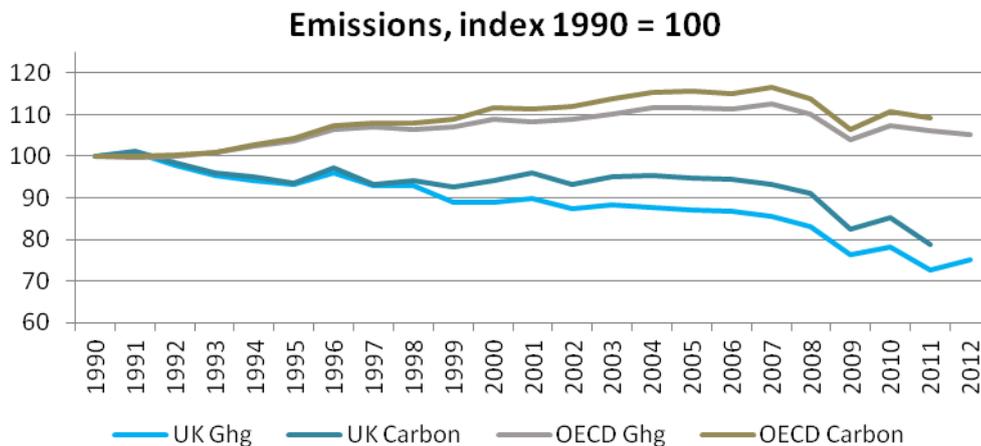


Figure 9.8: Carbon equivalence, indexed: 1990 = 100 GDP (Data: OECD, 2014c. Dataset: greenhouse gases)

The same is true for the United Kingdom, but the difference between the two has been greater for the United Kingdom, which also shows a greater level of reduction in comparison to the OECD average. The United Kingdom's emissions have shown a similar reduction during the recession years of 2008/9 but since 2010, in spite of the economy recovering, it appears that emissions have continued to be controlled.

9.7.3 Resource usage

According to the OECD, emissions underpinning production have gradually fallen since 1990 (figure 9.9), but the greatest drop related to the period of the recession. When the increase in production-based CO₂ emissions remains lower than the increase in GDP, this demonstrates a relative, but not absolute, decoupling of carbon emissions and productivity (OECD, 2014c). The United Kingdom, however, has seen a fall in productivity emissions whilst the GDP continues to rise (figure 9.9). This demonstrates that it is falling into the sector considered to demonstrate an absolute decoupling between production-based emissions and the GDP (OECD, 2014c).

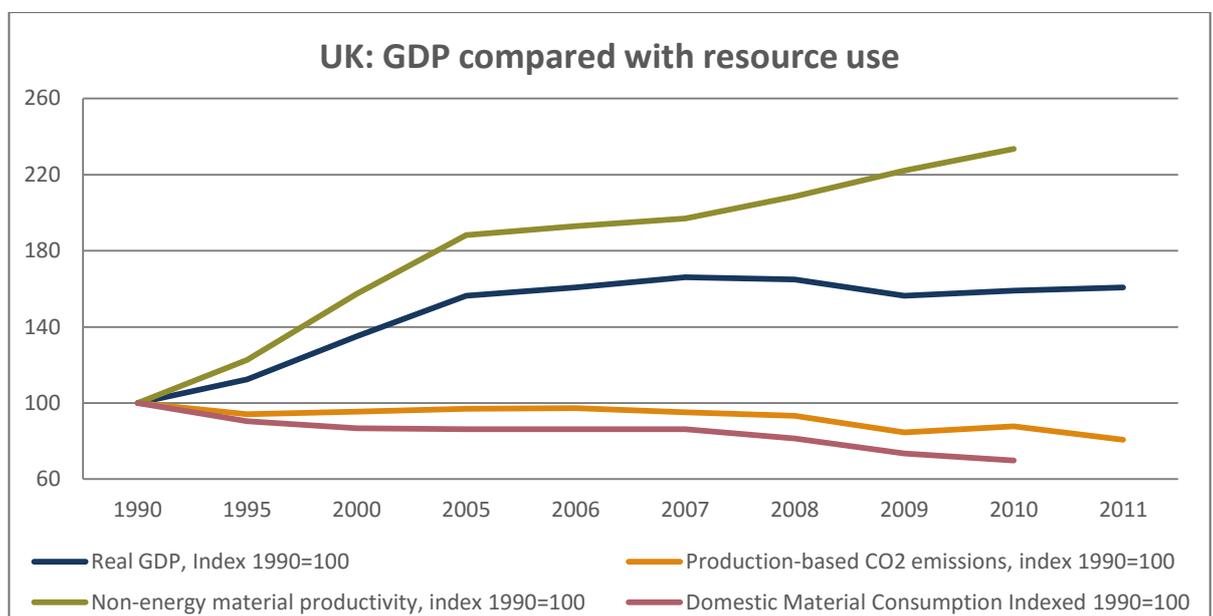


Figure 9.9: Resource utilisation compared with GDP (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

The OECD (2011) advises that the non-energy materials productivity index should be examined in conjunction with the domestic materials consumption index. When the two indices are seen to diverge, then a decoupling of materials and productivity can be confirmed. In the case of the UK, this is dramatically evident, with materials productivity outstripping the increase in the GDP.

Bearing the caution referred to in section 6.7 in mind, the statistics would suggest that domestic materials consumption has fallen consistently throughout the period, with two periods in which it dropped more markedly (figure 9.10): firstly in the first three years of the 1990s and, following a period of little change, again during the recession years. The performance within the United Kingdom reflects the changes in the average for all of the OECD countries; however, not

only was the UK's level of materials consumption lower at the outset, but the gap grew consistently through the entire period and the UK's consumption was 7 percentage points lower than the average by 2010.

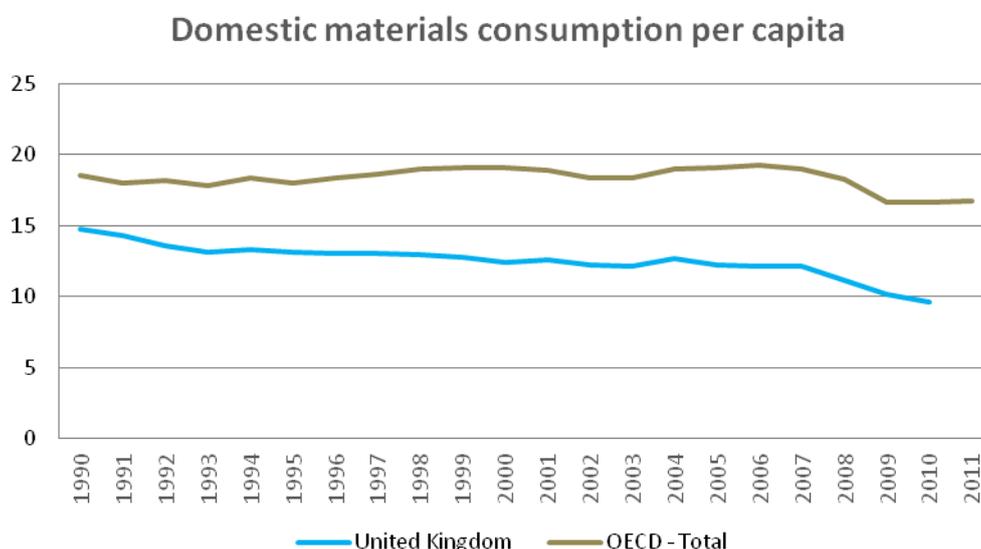


Figure 9.10: Domestic materials consumption per capita (Data: OECD, 2014c. Dataset: material resources)

Figure 9.11 illustrates the fall in materials consumption over the period. The two materials that the UK has reduced its usage of the most are fossil fuels, which started to fall in 2004, and construction minerals. The most significant drop of these started at the outset of the recession and the data are not available for the period when the recovery started.

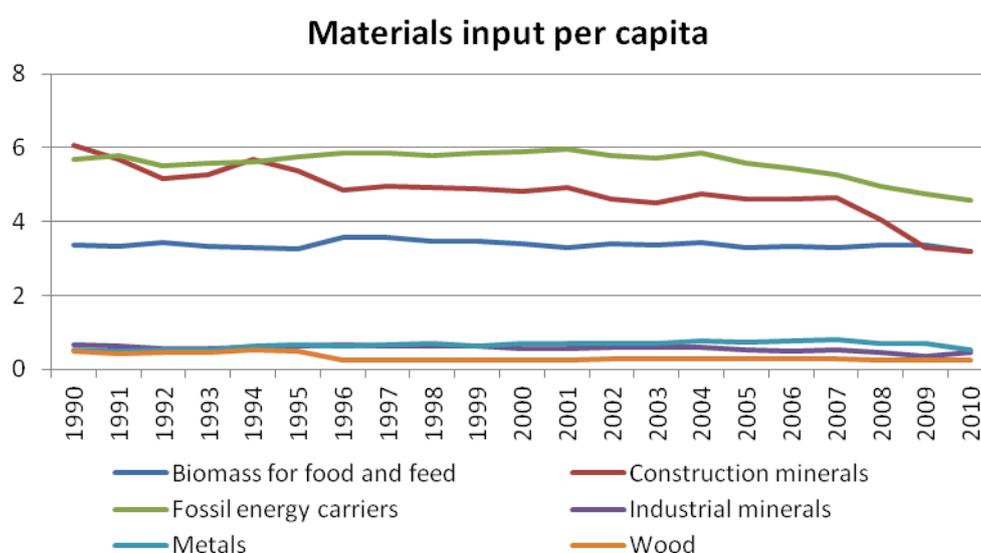


Figure 9.11: Materials input (Data: OECD, 2014c. Dataset: material resources)

Municipal waste generation started and finished the period with performance better than the average of all OECD countries (figure 9.12). However, it rose

during the first years to a peak in 2004 and only started to fall consistently after 2007, when it fell by 90 kilograms (15%) over the years between 2007 and 2011 and ended 40 kilograms per head below the average for OECD countries.

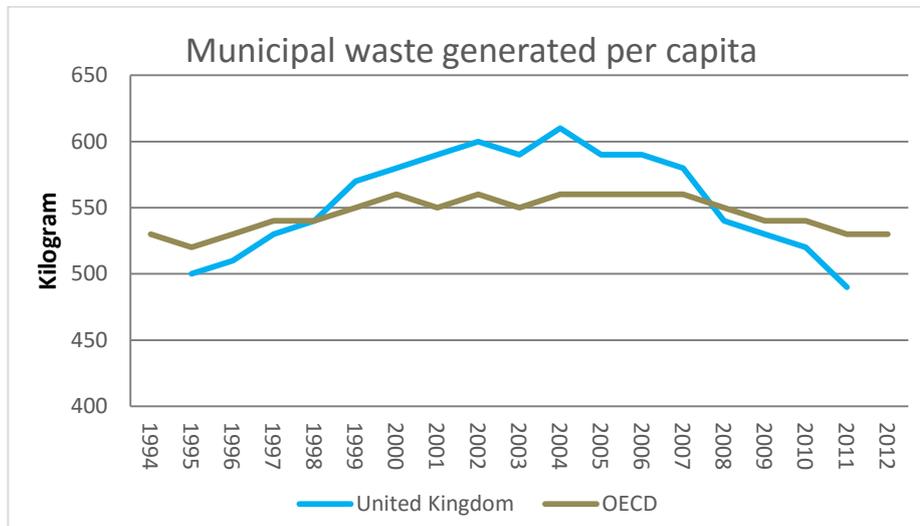


Figure 9.12: Municipal waste generation in comparison with the OECD average (Data: OECD, 2014c. Dataset: Municipal waste, generation and treatment)

Where managing waste is concerned, a similar pattern emerges. The indexed figure shows little change until 2002, where it starts to fall off steadily to the point that the quantity sent to landfill in 2011 was half that of 1995. The fact that there were no statistics for waste management in the UK prior to 1995 suggests that it was only at that date it started to be managed (figure 9.13).



Figure 9.13: Waste management, indexed: 1995 = 100 (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

9.7.4 Investment in green research and development

Section 9.5.5 referred to a steady rise in funding for research and development in eco-technologies. The production of green patents within the UK has,

however, followed the same trajectory with a peak being achieved in 2007, just before the recession (figure 9.14). By this time patents were four and a half times more numerous than those in 1990, but there were marginally fewer during the recession years, and they fell by a third to three times the number of 1990 in 2010.

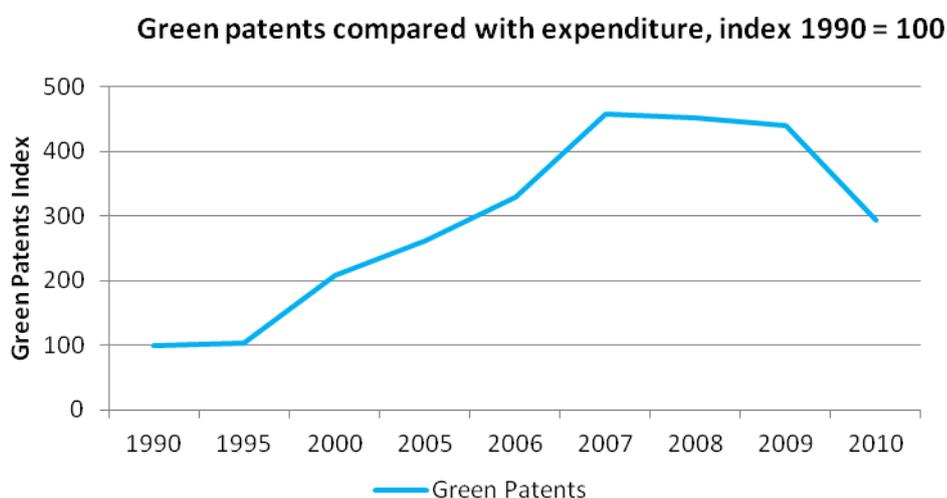


Figure 9.14: Green patents (Data: OECD, 2014c. Dataset: green growth indicators)

Global Cleantech Innovation Index

The UK ranks sixth in the index with an average score of 2.84 that includes cultural measures and environment. It is therefore demonstrating better performance than the average of 2.11–2.12. Of the measures relating to specific action, it was scored:

Table 9.3: Cleantech innovation measures (Data: Pared, 2014)

Measure	Score	Highest
Cleantech-specific innovation drivers	2.71	3.12
Development to commercialisation	1.95	4.29

The low score for innovation that has been commercialised is mitigated to some extent by the score for emerging innovations, which was 3.87 (Pared, 2014).

9.7.5 Summarising performance indicators

Britain's top-down approach appears to have been effective. When comparing the level of performance with the average for the OECD, in spite of a late start, the British have made significant steps. In spite of producing a higher percentage of power from non-renewable sources than the average OECD country, the per capita carbon emission is not only lower but falling at a faster

rate, and the productivity per toe is higher and rising at a faster rate. There is also a suggestion that the British have managed to decouple productivity from materials usage and emission of carbon.

Britain's late engagement with waste management is also evident, with the quantity produced per capita rising faster than the average OECD country until 2004, when it started to fall rapidly to 92% of the average. Similarly the percentage of waste sent to landfill halved between 2002 and 2011.

9.8 Summarising the United Kingdom

This case study has assessed the extent to which the government supports SMEs in their efforts to develop sustainable practice. It has revealed that much is done in a top-down approach that addresses the infrastructure, to a large extent enabling business as usual to be the norm.

Britain has enjoyed protection from environmental demands, being comparatively rich in resources and situated where it benefits from the clean air from the predominantly westerly winds. This, however, led to complacency which earned it the title of "the dirty old man of Europe".

Britain's government manages environmental protection both centrally and at a local level. Legislation and taxation are handled centrally but planning controls and provision of the infrastructure is local, operating within a regional framework. Support agencies are key to the successful diffusion of the requisite knowledge and operate at both national and local levels. Chapter 11 investigates the extent to which there can be variation between different local authorities.

The British culture appears to have many characteristics that would undermine the UK's ability to be in the forefront of sustainable development. However the case study reveals that some of these behaviours also work in its favour, and the British appear to have developed ways of managing these characteristics.

Whilst Hampden-Turner and Trompenaars (1994) believed that the British inner-directedness would inhibit the desire of the individual to change and that British polarised thinking prevents the development of holistic solutions, this case study demonstrates that, from a position of understanding British thinking, the government has instigated change in a manner that permits "business as

usual” as far as possible, minimising the need for the individual to change, and has provided support agencies to assist where needed.

The British are motivated by potential financial gain. The government has worked at developing structures whereby the environmental solution is also economically viable. This includes the provision of case studies that demonstrate potential savings that can be made.

Hampden-Turner and Trompenaars (1994) considered the British short view, linked to a need to maintain profitability, to constrain investment in long-term activity such as that needed for environmental protection. House et al (2004) recognised that the British were also capable of developing long-term plans. This case study would suggest that these two characteristics in conjunction have worked in favour of the British, in that once there was conviction that change was necessary, it was rapidly diffused and the benefits quickly felt.

The manner in which the government identified the strategy to aid the diffusion of sustainable practices demonstrates skilled planning that yielded effective results. The government recognised that for some more resistant individuals the only viable possibility would be to render unsustainable practices impossible by prohibiting the sale of products, forcing the choice of the better technologies.

Performance indicators demonstrate that where the British address environmental performance, they achieve good results, outstripping those of the average for the OECD. This would suggest that, whereas the individual characteristics identified in section 9.1 would forecast a low level of attention to environmental performance, in combination and in response to EU directives the results are markedly different.

Chapter 10. A Comparison of the Impact of Culture with other Drivers of Change

Chapters 6 to 9 contained case studies that examined the impact of culture on the national response to environmental demands where sustainability is concerned. However, in section 5.7.1 there was reference to other criteria that could shape governmental action, namely political affiliation, geography and whether investment had been made in some form of pilot study to trial low-carbon initiatives. The purpose of this chapter is to assess the influence of these external influences. Recognition is given to the fact that each London borough is tasked with delivering the Mayor's vision for London (see appendix 35), a duty that could potentially weaken any party political difference.

10.1 An assessment of activity at a local level

The methodology used in this chapter was explained in section 5.9. The data were gathered as described and collated as demonstrated in table 10.1 (for the complete set of data, see appendix 38). These were used as a basis for the analysis. The rest of this section explains how the analysis was conducted.

Barking and Dagenham

Controlling party	Labour (94.1% majority)
Low-carbon zone	Yes
Budget per capita	£864.47 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change by 2005 (IdeA Knowledge, 2006). Awarded the Beacon Award for work relating to climate change (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013o).
Population density	20.72151 people per acre (5th lowest in the sample)
Business type	Majority of local businesses are SMEs (London Borough of Barking and Dagenham, 2013c). 95% less than 20 employees; 78% with 4 or fewer. The largest sector is "construction" followed by "retail", "motor trade, transport and storage", "professional, scientific and technical", and "production" (Federation of Small Businesses, 2010a).
Federation of Small Businesses report	35% of businesses surveyed did not believe the council was interested in their needs. 15% had a sympathetic response and 15% had been contacted by the council for opinions (Federation of Small Businesses, 2010a).
Strategy	To work with business and showcase best available technologies (London Borough of Barking and Dagenham, 2005).
Business-facing support	Running part-EU-funded Greening Business Project: 12 hours of consultations offering money/environmental saving advice

	<p>(London Borough of Barking and Dagenham, 2013d).</p> <p>Free advice on setting up and EMS/ISO 1400 (London Borough of Barking and Dagenham, 2013d).</p> <p>Offering free water-saving devices (London Borough of Barking and Dagenham, 2013e).</p> <p>Awards include one for green business (2013g).</p> <p>Barking centre being developed into a low-carbon zone (London Borough of Barking and Dagenham, 2006; London Borough of Barking and Dagenham, no date) including office space.</p> <p>Developers provided with planning advice and must submit a “sustainability statement” (London Borough of Barking and Dagenham, 2013i).</p> <p>Starting to turn Dagenham Dock into a green business area with a vision for it to be entirely sustainable based on a closed loop concept; businesses must prove their attention to the triple bottom line. EMS will apply to the entire area. River transport (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013f; London Borough of Barking and Dagenham, 2013n).</p> <p>Attracting businesses that are key to sustainability such as recycling plastics (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013f).</p>
Activities to support business performance including educating the market	<p>Developing brown field sites into “sustainable” housing and business areas (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013q).</p> <p>Developing district heating and causing new developments to have the facility to upgrade as new technologies are adopted (e.g. heat exchange) and include solar panels.</p> <p>New developments currently 75% more fuel-efficient than average properties (TGE Group, no date; London Borough of Barking and Dagenham, 2013p).</p> <p>Encouraging residents to become engaged (London Borough of Barking and Dagenham, 2013j).</p> <p>Educating residents in low-carbon and low-water technologies and green roofs (London Borough of Barking and Dagenham, 2013i).</p> <p>Holding environment festivals – scope for knowledge exchange. Wide range of schemes.</p> <p>Funding applications for internal projects must include reference to sustainability issues.</p>
Future plans	<p>Planning more resilient infrastructures including water-saving technologies, an educational eco-centre. Encouraging walking, cycling, car club and public transport use. Promoting electric car¹ (London Borough of Barking and Dagenham, 2013h).</p> <p>Decentralised energy for “London riverside” in conjunction with neighbouring boroughs (Energy for London, no date).</p> <p>London Thames Gateway Heat Network (Energy for London, no date).</p> <p>Mayor’s Anaerobic Digestion Plant: creating power and compost (Energy for London, no date).</p>

¹ The electric car cannot be considered a sustainable technology until we have renewable electricity provision.

Website	<p>Links for both “Business” and “Environment” on the home page.</p> <p>“Green” business links from Business support page: “Greening Business Support project” “Green industry” (the Dagenham Dock development) “Town Centre Management” includes EMS for the borough's town centres.</p> <p>Business support on a separate site. No apparent links to environmental issues, although support is referred to in other pages.</p> <p>There is a link to TURaS which as yet offers no tangible support.</p> <p>Three clicks to links to the most useful page of support but not linked to the business pages. Environment>Environmental sustainability>Greening your business: information on energy. Waste, water, transport, procurement and EMS (EMAS/ISO14001).</p> <p>Business support pages good: examples of potential savings. Very useful advice across a range of activities (London Borough of Barking and Dagenham, 2013k). Link to the environmental project (2013l) but the link changed dependent upon the page being visited, causing pages to be found by accident rather than design (e.g. the Dagenham Docks project).</p>																																	
Language	<p>“Environment” referred to the green environment (London Borough of Barking and Dagenham, 2013r).</p> <p>Also used “environmental sustainability”, “green environment”.</p> <p>Referred to “greening” the business and travel (London Borough of Barking and Dagenham 2013e; 2013h).</p>																																	
External support	<p>Carbon Trust, Energy Savings Trust, Envirowise, WRAP, London Remade. No links; just mentioned in the advice</p>																																	
Targets	<p>Energy Strategy (2005):</p> <p>Carbon reduction from its buildings and operations: 20% of 2010/11’s emissions by 2016 (London Borough of Barking and Dagenham, 2012). The document stated the plan fell short of the target by 20%.</p> <p>No annual reports on attainment of targets found after 2009/10.</p> <p>Barking and Dagenham ranks 6th in the sample with respect to recycling (24/32 London boroughs) and is the worst for residual waste (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 1037, Barking and Dagenham ranks 6th in the sample (23 out of the 32 London boroughs) in the Environment Agency’s carbon rankings for reporting year 2011/12 (2013).</p>																																	
Documents	<p>174 documents included the term “sustainability”</p> <table border="0"> <tr> <td>Policy/strategy: 4</td> <td>Transport: 1</td> <td>Waste: 3</td> </tr> <tr> <td>Building control: 3</td> <td>Pollution: 1</td> <td>Energy/carbon: 5</td> </tr> <tr> <td>Rivers/floods: 2</td> <td>Air quality: 1</td> <td>Business: 2</td> </tr> <tr> <td>General: 6</td> <td></td> <td></td> </tr> </table> <p>92 documents included the term “sustainable”</p> <table border="0"> <tr> <td>Policy/strategy: 3</td> <td>Transport: 1</td> <td>Waste: 1</td> </tr> <tr> <td>Building control: 1</td> <td>Pollution: 1</td> <td>Energy/carbon: 5</td> </tr> <tr> <td>Rivers/floods: 1</td> <td>Air quality: 1</td> <td>Business: 4</td> </tr> <tr> <td>General: 1</td> <td></td> <td></td> </tr> </table> <p>1792 documents included the term “environment”</p> <table border="0"> <tr> <td>Policy/strategy: 3</td> <td>Transport: 2</td> <td>Waste: 1</td> </tr> <tr> <td>Building control: 2</td> <td>Pollution: 2</td> <td>Air quality: 1</td> </tr> <tr> <td>Business: 2</td> <td>Resilience:1</td> <td>General: 2</td> </tr> </table>	Policy/strategy: 4	Transport: 1	Waste: 3	Building control: 3	Pollution: 1	Energy/carbon: 5	Rivers/floods: 2	Air quality: 1	Business: 2	General: 6			Policy/strategy: 3	Transport: 1	Waste: 1	Building control: 1	Pollution: 1	Energy/carbon: 5	Rivers/floods: 1	Air quality: 1	Business: 4	General: 1			Policy/strategy: 3	Transport: 2	Waste: 1	Building control: 2	Pollution: 2	Air quality: 1	Business: 2	Resilience:1	General: 2
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Business: 2	Resilience:1	General: 2																																

Table 10.1: A sample set of data: Barking and Dagenham

10.1.2 Assessing support evident in the London boroughs' websites

All local boroughs within London act under the same remit, but it is clear there is difference in their actions and performance. The purposive sample facilitates understanding of the extent to which this difference is influenced by politics, top-down decisions, proximity to the centre of London and population density. A number of activities contribute to the characteristics under investigation and the manner in which they interact is by no means certain. It is therefore necessary to be aware of assumptions and test their impact before drawing conclusions.

It is important to note that the research is qualitative in nature. The intention of this research is not to draw fine distinctions between behaviours, but rather to assess performance in broad terms. In the same way that cultural characteristics were considered to tend towards one end of a continuum or another, so also is this research seeking to establish which boroughs make an effort and which do not appear to do so, identifying activities and performance in quartiles as is the current practice used by councils to determine their level of success (London Borough of Wandsworth, 2014m).

This part of the research has concentrated on establishing support available on the website in terms of information about sources of support, knowledge exchange or advice about specific tangible action. The web has become a communication tool that is embedded in the current paradigm (Huang, Lurie and Mitra, 2009) to the extent that the Irish government has developed an online search tool specifically for SMEs (Department of Finance, 2014), and enables the individual to find material with much greater ease than can be achieved offline (Huang, Lurie and Mitra, 2009).

The web has been subject to research focussed on establishing good practice with respect to its use as a communication tool. Traditionally, the theoretical approach to determining the extent to which an individual will search online has been based on the economic theory of marginal benefit, in that satisfaction from each additional unit of time spent searching should equate to the cost of that time (Huang, Lurie and Mitra, 2009). This places certain demands on the way the medium is used, which is relevant for this research because it is a factor that could determine the impact of material provided.

Good practice has been established by Microsoft and its findings will be used as a framework for assessing this aspect of the findings. According to Microsoft's research, the critical components that relate to non-business sites that should be assessed are:

- Content should be relevant and challenging, with sufficient breadth and depth.
- Information is communicated more effectively when there are additional links to good-quality and relevant materials.
- There should be information at a less technical level in order to attract those who are not yet ready for the advanced stage.
- The site should be kept up to date. Information should not be overly dated.

(Keeker, 2008)

10.1.3 The relationship between action to promote sustainability and performance: the policy makers' perspective

The intention of the investigation into the individual London boroughs was to answer some of the questions raised from the critical review of literature, London being a rich resource not only because it is the largest city in Europe (London Councils, no date) but also because of the variety offered within the 32 local boroughs. In the review of literature, a number of questions about other influences were raised that need to be answered before behaviour can be classified as a result of culture. Thus the purposive sample ensured these other influences were at work. This more detailed investigation into activities within London was designed to address the following issues identified in the review of literature:

- Behavioural science suggests that individuals will seek to minimise exposure to potential failure.
- Public choice theory links activities of politicians to their prospects of re-election.
- There is evidence of the electorate suffering from "green fatigue" and looking for the "feel-good factor".
 - Is there evidence of defensive behaviour resulting in an avoidance of taking action that might be considered unpopular?

- Is there evidence of activities promoting sustainable development being manipulated to support prospects of re-election?
- Conservative governments tend to be laissez-faire whereas socialist governments tend to intervene more.
 - Does the sample demonstrate that this is still the case?

10.2 Collating the data

From the collected data, it is clear that some of the local authorities have been a catalyst, delivering significant levels of support through external agencies including NGOs and, in doing so, assisting in meeting the needs of the businesses within their borough without investing in the activity themselves. It is necessary to assess the entire package in order to establish the extent to which the London borough supports the SME.

The styles of third-party support range from targeting specific issues, such as “Love Food Hate Waste” which is, as its title suggests, purely about avoiding food waste, to WRAP, its parent charity which addresses every type of waste (WRAP, 2014). The NGOs involved are summarised in appendix 39.

Bearing in mind the criteria for successful e-communication and the questions about the relationship between political party and sustainable development, the following was examined:

1. Strategy and priorities.
2. The range of support offered by the borough/third-party agencies.
3. The type of support provided by the borough/third-party agencies.
4. The tangible support advertised in links to external organisations.
5. Additional activities instigated by the borough/external agencies.
6. The extent to which small businesses trust their borough.
7. Performance measurement; waste and energy usage.

1 to 5 of the above focus on the quality of support that is offered to small businesses, and this is compared with their performance, the level of trust shown by SMEs, the population density and budget per capita in order to establish whether any pattern can be detected.

10.2.1 Strategy and priorities

Visiting the different websites revealed significant difference in the extent to which both business interests and environmental support were evident. Whilst all boroughs are obliged to meet certain targets, there was a clear difference in strategies and the focus of the different boroughs, but the question to be addressed is whether there is a political divide or a legacy from having been designated a low-carbon zone delineating the differences. This will be revealed through examination of:

- Strategies and targets.
- The style of language.
- The adoption of sustainability standards.
- The structure of the website, and in particular the ease with which documents supporting environmental management can be found without using the search facility.

Strategies and targets

There was a marked difference between the strategies for the individual boroughs, ranging from not developing any strategy beyond that legislated by the Mayor to careful consideration of waste reduction and recycling as well as reduction of emissions and pollution. Both these positions were evident in Conservative-controlled boroughs, and a middle position of focussing on waste management was taken by the Conservative low-carbon zone.

Targets set by the Conservative-controlled councils demonstrate the same spread whereby the least proactive seek to achieve the government targets, rather than targetting carbon neutrality for all municipal activities. The earliest date was 2012, although the council concerned, the City of Westminster, was prepared to achieve this through purchasing offsets if necessary.

The two Liberal Democrat-controlled boroughs included sustainable action in their strategies. Kingston upon Thames intended to reduce fuel consumption. Sutton, the low-carbon zone, had a broader-ranging strategy that sought to include sustainability in all of its policies and strategies, exploit renewable thermal technologies and showcase its activities.

The targets for the two boroughs differed. In Kingston upon Thames, they were only in line with national targets. Targets developed by the borough of Sutton

were more ambitious, aiming to satisfy 50% of transport demand sustainably by 2017, and continue the low-carbon initiative in Hackbridge.

As with the Conservative-controlled boroughs, Labour strategies ranged from high levels of detail to scant mention of the environment. The strategy for Barking and Dagenham, the low-carbon zone, was broadly termed, seeking to support business and showcase best available technology.

All of the Labour-controlled boroughs developed targets that were over a shorter timescale than that of the Mayor's plan, obfuscating direct comparison. The target for Greenwich was to achieve zero-carbon buildings by 2016, rather than the near-zero-carbon target of the Mayor. However, developing targets is only of use if they are met. The borough of Newham failed to attain its target for recycling, and the low-carbon borough of Barking and Dagenham failed to meet its target for building standards.

The style of language

Of particular interest was the manner in which terms that could be used in relation to the environment, including "sustainability" and "green", were used. Frequently it was found that the term "environment" related to the local or trading environment. Fewer boroughs used the term solely with respect to the green environment, and some of these only used it infrequently. This mix occurred in boroughs controlled by all three parties.

Similarly, some of the boroughs, again being controlled by all three parties, tended to use the term "green" either in isolation or in conjunction with the term "environment" when referring to the natural environment or sustainability. One Labour-controlled borough referred to "green waste" to identify garden waste.

The adoption of sustainability standards

All but one of the boroughs had signed the Nottingham Declaration on Climate Change, a public declaration of intent to manage carbon emissions. The difference lay in the year in which they did so. The earliest record of councils signing the declaration was 2005, applying to councils under the control of all three parties. The remainder had signed up by 2009, apart from one Conservative-controlled borough where no evidence can be found to suggest that it has signed it. One Labour-controlled borough, Barking and Dagenham, had also been awarded the Beacon Award for work relating to climate change.

The structure of the website

The manner in which websites were constructed indicated the manner in which the borough prioritised its responsibilities. The variety was substantial.

The site for Barnet, a Conservative-held borough, had no reference to the green environment or sustainability and the only relevant material was a link to an external agency which was hard to find, requiring a search on Google to find it.

Similarly, the site for Newham (Labour) had no links to business or the environment on its home page. Business support could only be found through the index, and it contained no environmental advice. The link labelled “green waste collection” related to requesting collection of garden waste.

In contrast to these two boroughs, some sites offered extensive support for businesses including sustainability advice and tools. These included Conservative-held Kensington and Chelsea where links to “Business and Enterprise” and “Environment and Transport” were both visible on the home page and business-facing advice extended to greener procurement, greener contracts, waste management, transport and climate control.

The site for Labour-controlled Barking and Dagenham provided a similar range of material. This site was not so easy to navigate, the environmental support pages being linked to the home pages but not to the business pages. The business support pages provided extensive advice.

Between these two extremes, councils of all three parties provided a variety of standards. All three boroughs that had been designated low-carbon zones provided substantial advice, although the City of Westminster (Conservative) focussed largely on household-facing advice and waste management.

10.2.2 Content breadth

The support provided by the London boroughs, whether it involved a third party or not, is collated in table 10.2. The sources are combined in order to ensure that duplication does not skew the findings and gaps in provision should be clearly evident. The searches revealed significant difference between the sites, but direct comparison between the boroughs on the basis of the number of documents is not appropriate. This is because there are a few characteristics of these data that preclude such an approach:

1. In some local authorities, the website is constructed using multiple webpages with superficial content whilst others would have extensive support on just one page.
2. In many instances the same documents appeared in all three searches that were conducted.
3. It is not feasible to assess coverage as a percentage of all of the documents found. For instance, in a borough that has a Minister for the Environment, every document that includes reference to the person rather than reference to the content will be included in the total. Subsequent assessment of documents with relevant content as a percentage of those revealed by the search will as a result be very small.
4. Some councils retained reports stretching back many years whilst others appeared to just provide the latest.

Table 10.2: The breadth of assistance provided on the webpages from internal and external sources combined

Borough	Transport	Transport / club	Pollution	Air quality	Carbon / energy	Waste	Waste reduction	Reuse forum	Recycling	Food waste	Wastewater	Regulation aid	Knowledge transfer	EMS	Resilience	Awards	Procurement	Green pledges
Barking and Dagenham	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓			
Barnet	✓		✓	✓		✓		✓				✓			✓			
Bromley	✓				✓										✓	✓		
Greenwich	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓		
Hackney	✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Kensington and Chelsea	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	
Kingston upon Thames	✓	✓			✓	✓									✓		✓	✓
Newham			✓	✓		✓											✓	
Sutton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	
Wandsworth	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
Westminster	✓			✓	✓	✓		✓		✓					✓		✓	

The only direct comparison that can be made is with the range of subjects covered by these documents.

Policy statements, a type of document common to all sites, were considered to be internal to the council in that they were not designed to be of direct assistance to SMEs; rather, they set out the intentions of the borough that had

not necessarily been fulfilled. For this reason they were not included in this analysis.

10.2.3 Content style: the types of support provided by the borough

Having ascertained the breadth of the support provided, this section examines the type of support given. Firstly, the type of support offered by the London boroughs is summarised, and this is followed by a summary of support provided by external agencies through the webpages of the London borough.

The findings by Microsoft relating to the usefulness of websites also include reference to the need for support at a variety of levels. Similarly, the report identified in section 5.9.3 revealed that SMEs considered some forms of support to be of more use than others.

Table 10.3 summarises the type of business-facing support found through browsing the website of the London borough. The letter denotes the type of support provided, outlined in more detail in section 5.9.2:

- A: Case studies B: Basic advice C: Calculator
D: Household-facing E: Extensive advice. F: Face-to-face support
G: Good advice ✓: Provided

Table 10.3: Summary of support that can be found through browsing the site

Borough	Advice and/or tools					No. links to external agencies	Sources of finance	Network	Date of documents. Latest strategy in brackets
	Fuel/carbon	Waste	Transport	Water	EMS				
Barking and Dagenham	GF	GF	G	B	BF	7 ¹	✓		2013 (2013)
Barnet		B				5 ²			2001–2014 (2010)
Bromley		B				3	✓		2009–2014 (2013)
Greenwich	G	G				16	✓	✓	2012–2014 (2012)
Hackney	F	AGF	AC	F	GF	7		✓	2010–2014 (2013)
Kensington and Chelsea	CF	F			F	13	✓	✓	2014 (2009)
Kingston upon Thames	D	D				7	✓	✓	2014 (2012)
Newham	D	D				1			2014 (2010)
Sutton	CF	B	D	D	G	5		✓	2011–2014 (2014) ³
Wandsworth	AEF	AEF	CE		F	15	✓		2008–2014 (2009)
Westminster	D	E	GF		G	6	✓		2013–2014 (2007)

¹ The organisations were referred to but links were not provided (rated at half the value of a link).

² Only one of these was a link (the remaining four were rated at half value).

³ The entire website was dated 2014. It was not possible to date the policy separately.

10.2.4 Content style: the types of support provided by external agencies

The review of support offered to SMEs revealed that some of the London boroughs provided extensive lists of agencies that could support businesses in becoming more sustainable. Others offered just a few. However, it is the breadth of support provided that is of greater interest. In assessing this, credit is not given for duplication of content, but it is given for identifying organisations that provide a comprehensive range of services. It should be noted that the London boroughs which provide extensive numbers of links have already been recognised in table 10.3.

Tables 10.4 and 10.5 summarise the range of topics addressed in the external links provided on the website of each London borough within the sample. Table 10.4 focusses on information and knowledge exchange, whereas table 10.5 relates to services and tools that are offered. Where appropriate, the same codes have been used across all tables.

A: Case studies B: Advice F: Face-to-face support
H: Network J: Newspapers K: Conferences/shows/workshops

Table 10.4: The style of knowledge exchange provided in external links

Borough	Waste reduction	Wastewater	Clean technology	Knowledge transfer	Local environment	Regulation aid	Carbon / energy	Sources of finance	EMS development	Transport / club	Government pages
Barking and Dagenham	B	B	K	HJ		B	F	B		B	
Barnet						B					
Bromley			K	J		B	F	B		B	
Greenwich	BK			AFHK	H	B	BFK	B		S	
Hackney	B						F				
Kensington and Chelsea	BF	F		AH		B	F	B		K	B
Kingston upon Thames			K	J		B	FK	B		B	B
Newham							K				
Sutton	B	B									B
Wandsworth	BB ¹ FK			BJ		BK	F	B	F	B	B
Westminster	B			J		B	F	B		B	

Visual inspection of the data alone reveals that some of the London boroughs are offering much more than others. Of note is the paucity of information provided by Barnet, Hackney, Newham and Sutton in comparison with those

¹ Within waste reduction there was a separate category for food waste reduction not evident in other sites.

such as Wandsworth, Barking and Dagenham or Greenwich. Difference between these is also apparent with the scope of topics in which support is offered. For instance, in Barking and Dagenham support is offered covering a wider range of topics than Greenwich, which offers more variety in the types of support provided.

In addition to knowledge exchange, the London boroughs also provide information about tangible support that can be offered to businesses including awards that not only provide competitive advantage but also can engage business in activities that would not otherwise be considered. The style of support varies depending on the aspect of environmental control that it relates to and is summarised in table 10.5.

C: Toolkits/calculators L: Installation M: Bike hire
 N: Car hire O: Certification P: Electrical waste collected
 Q: Furniture collected R: Equipment S: Borrowing exchange
 T: Design U: Waste exchange

Table 10.5: The range of tangible support advertised in external links

Borough	Waste reduction	Wastewater	Clean technology	Knowledge transfer	Carbon / energy	Recycling support	Transport / club	Emissions
Barking and Dagenham	PQ	CO	LT		O			
Barnet	QU					Q		
Bromley		O	LT		O			
Greenwich		O	LT	C	O	P	NOR	
Hackney	CPQ	C			C			C
Kensington and Chelsea	OPQ	CO	LT		CO		MN	
Kingston upon Thames		O	LT		O		N	
Newham								
Sutton					C	P		
Wandsworth	PQS	CO	LT		O			
Westminster	QSU	O	LT		O			

10.2.5 Additional support

The findings up to this point have been focussed on the provision of information and sources of support for SMEs. However, the London boroughs are undertaking activities that support a sustainable infrastructure in which business can operate. This is summarised in table 10.6. Searches were undertaken using Google in order to ensure such activities had not been missed.

Y: Yes P: Promoting
 N: No F: Not yet, but is planned for the future

Table 10.6: Tangible activities and infrastructure provided by the council

Borough	Attracting eco-business	Electric charging points	Car club	Providing meters or similar	Environmental week/day	Financial incentives	Renewable local power	Awards	Recycling	Developing their own LCZ	District heating
Barking and Dagenham	Y			Y	Y		Y		Y	Y	Y
Barnet		F									P
Bromley						Y		Y	Y		
Greenwich		F	Y			Y	P	Y	Y	F	F
Hackney		Y	Y				y	Y	Y		F
Kensington and Chelsea		Y	Y				P		Y		P
Kingston upon Thames		P	Y		Y		F		Y		F
Newham	Y	Y	P				Y		Y		Y
Sutton		Y	Y	y		Y	Y		Y	Y ¹	Y
Wandsworth		Y	Y				P	Y	Y		
Westminster		Y	Y		Y				Y		

10.2.6 Trust

The Federation of Small Businesses (2010) reported responses to a survey revealing the level of trust small businesses placed in their local boroughs. Its findings are summarised in table 10.7. The responses resulted from asking respondents to identify which of the following statements they felt best described the nature of their relationship with the council:

- I have had no contact with my local council about issues which affect my business (no contact).
- I have contacted them about local issues affecting my business but got nowhere (poor contact).
- I have contacted them about local issues and they were sympathetic (good contact).
- They have contacted me to ask for my views on local issues affecting my business (contacted).
- I do not believe they are interested in local issues which affect my business (no trust).

(The Federation of Small Businesses, 2010)

¹ Sutton was a low-carbon zone borough, but has continued the venture within Hackbridge beyond the original remit.

Table 10.7: The level of trust small businesses place in their local authority

	No trust	No contact	Poor contact	Good contact	Contacted
Barking and Dagenham	35	25	10	15	15
Barnet	30	35	20	10	5
Bromley	10	60	25	5	0
Greenwich	35	35	30		
Hackney	10	20	30	15	25
Kensington and Chelsea	20	40	10	30	
Kingston upon Thames	10	60	10	20	
Newham	30	35	20	10	5
Sutton	10	55	10	5	10
Wandsworth	10	60	15	10	5
Westminster	10	55	25	10	
Average for the sample	19	44	19	12	6
Average for all London	18	54	14	8	6

It is noted that there is a problem with this set of statements. Respondents were asked to select just one of the statements, but the choices offered could potentially mask further insights. It has been assumed that those responding to the final option could potentially have also responded to the first or second option with equal accuracy because a lack of satisfactory contact could underpin the belief that the local authority is not interested in local business. However, there can be no similar underlying link with the opposite position, namely that having been contacted by the local authority is evidence that supportive attention would have been received had the respondent made the initial contact.

10.3 Assessing content of webpages

Local authorities' aid for SMEs to adopt more sustainable practices is collated in tables 10.2 to 10.7. To complete this part of the comparison, it is necessary to place some value on the content in order to cluster the local authorities into quartiles. This demands the testing of assumptions made in assigning values and testing of the sensitivity of the results.

The different aspects of support offered to SMEs that are considered are:

- The range of information that can be found through browsing the site.
- The quality of knowledge exchange provided by both the London borough and external agencies.
- Information about tangible support available for the SME.

- Improving the infrastructure in which SMEs operate.
- The style of interaction between London boroughs and SMEs.

Whilst each of these has been shown to be of relevance, research does not provide indication of their comparative importance. For that reason, each type of support is handled separately.

10.3.1 Weighting the content of webpages

Steps were taken to ensure that the weighting of the documents was appropriate. A decision about how to handle subtopics had to be made. Two assumptions were tested:

1. Each subtopic for any given area of environmental management could add value equal to that of a more generic overview. This assumption would suggest that each element of the subject should be given an equal weight.
2. Each subtopic for any given area of environmental management could add less value than that of a more generic overview. This assumption would suggest that each element of the subject should be given a smaller weight. In testing this assumption, subtopics were weighted equally and their sum added up to 1, meaning that the total score if all elements were included would be 2 and not, as would be in the case of waste with equal weighting, 5.

In both cases, the resultant quartiles were the same, suggesting that the final clustering into quartiles resulted in no particular sensitivity to the selected weights. Throughout, the upper quartile contains the most supportive London boroughs and the lowest, the least supportive.

The resultant quartiles

Upper quartile: Hackney, Kensington and Chelsea, Sutton, Wandsworth

Second quartile: Barking and Dagenham, Greenwich

Third quartile: Barnet, Kingston upon Thames, Westminster

Lowest quartile: Bromley, Newham.

10.3.2 The style of support available on the site (tables 10.3 to 10.5)

Tables 10.3 to 10.5 summarised the material on the webpages that aided knowledge exchange, as well as the provision of more tangible support such as

tools. Each type of support was weighted to accommodate the usefulness of the provision, informed by a survey that established the extent to which SMEs found different types of support helpful in assisting in the reduction of waste (Eurobarometer, 2013). It was assumed that the weights would be equally relevant for the other environmental performance categories.

Neither the survey nor further research revealed the value of web-based support to the user. An initial assumption was made that produced the following:

- Household-facing advice, addressed to a different sector: 1
- Basic business-facing advice: 2
- Good business-facing advice: 3
- Extensive business-facing advice: 4

It was initially assumed that the extensive advice was as useful as tools and case studies, and the weights of these remaining forms of support were reduced proportionally.

A further level of support offered through the webpages was the distribution of newspapers containing information about environmentally sustainable action. This kind of activity was not included in the report used to establish the initial weighting. It was assumed that because the arrival of newspapers did not correlate with the point of the need within an SME and there was the ability to throw them away without reading and seeing relevant headlines, it was not of such relevance as having the material online. However, seeing as the newspapers could stimulate a desire for improvement, their initial weight was set at three quarters that of good advice online.

It has been shown that the number of links to external forms of support is relevant in that they can reinforce the message being given and show the extent to which support is available (Keeker, 2008). Their quality is assessed separately. In this part of the analysis, it is the quantity of links that is of interest. The highest number of links on any site was 16. It was assumed that this needed to be reduced in order to keep its influence in proportion with that of the other factors. Each link was given a weighting of 0.25 so that the site offering all 16 links was given the same score as it would receive for extensive advice in any particular topic.

Testing the assumptions identified in 10.3.2

Testing was undertaken in two stages, firstly testing the quality of support provided by the London borough, and secondly testing the support that could be found through the links to external agencies.

The original weights described in 10.3.1 above were used to provide a score for each borough. Weights were tested individually and in pairs, raising and lowering weights in increments of 0.05 to ascertain when one London borough recorded a different quartile and when two changed.

Pairs were changed when it became illogical to change one weight without changing another, for instance when the weighting for basic advice exceeded that of good advice.

Because of the final clustering into quartiles, there was no particular sensitivity with any of the selected weights. The flexibility in increments of 0.05 is provided in tables 10.9 and 10.10, the structure of which is summarised in table 10.8.

The full calculations are provided in appendix 40.

It should be noted that relative weights were retained such that, for instance, extensive information was always given a weight equal to or greater than more basic levels of advice.

Table 10.8: The structure of tables 10.9 and 10.10

Col.	Contents
A	The original weighting
B	The point at which a decrease caused the quartile for one London borough to change
C	The point at which an increase caused the quartile for one London borough to change
D	The point at which a decrease caused the quartile for two London boroughs to change
E	The point at which an increase caused the quartile for two London boroughs to change

The quality of support provided by the local authority

After testing the support provided by the local authority, the original weights were retained. It was possible to change all weights individually by at least 8% before any change in results were observed.

Table 10.9 summarises the results of using the initial weights and shows how much these could be changed before altering the final outcome. The quartiles that the boroughs fall into are summarised in the right-hand section of the table.

Table 10.9: The quality of support in the webpages provided by each London borough by quartile

Support	Trial Weightings					Borough	Quartile
	A	B	C	D	E		
						Barking and Dagenham	2
Household-facing	1	0.55	1.85	0	6.5	Barnet	4
Basic advice	2	0.55	2.4	0 ¹	3.2	Bromley	4
Good Advice	3	0.6	3.25	0	4.65	Greenwich	3
Extensive advice	4	3.65	4.65	3.05	6.1	Hackney	1
Case study	4	3.5	5	0 ²	7.15	Kensington and Chelsea	1
Calculator	4	3.05	6.75	0 ²	10.3	Kingston upon Thames	3
Face-to-face support	6.25	3.80	7.20	3.50	8.35	Newham	4
Links	0.25	0.15	0.95	0 ²	2	Sutton	3
Finance	8.5	6.4	11.35	5.75	14.1	Wandsworth	1
Network	4.75	3.3	6.15	3.15	10.2	Westminster	3

¹ Reducing this and preceding figures to 0 did not achieve any further movement.

² Reducing these to 0 only caused one borough to be moved to lower quartile.

The quality of support provided through external agencies

The quality of support provided by external agencies was assessed using the same weightings as described in section 10.3.2 above. One alteration was made because it was assumed that an agency providing information would in fact be providing good information that equated with the extensive information produced by the London boroughs. The result of testing these weights and the resultant quartile into which each London borough fell are summarised in table 10.10, where the columns are used in the same manner as those of the previous table

Table 10.10: The quality of knowledge exchange in the webpages provided by each London borough by quartile

Support	Weightings					Borough	Quartile
	A	B	C	D	E		
						Barking and Dagenham	2
Face-to-face	6.25	4.95	15.8	0.1	19.3	Barnet	4
Advice	3	0.9	4.9	0.4	6.65	Bromley	3
Newspapers	2	0 ¹	5.9	0	8.35	Greenwich	1
Conferences/shows/workshops	4.75	0.85	5.65	0.25	13.35	Hackney	4
Case studies	4	2.6	14.3	0 ²	17.8	Kensington and Chelsea	1
¹ No change was recorded at this point. ² No further change; there was still only one borough that had changed quartile.						Kingston upon Thames	2
						Newham	4
						Sutton	4
						Wandsworth	1
						Westminster	3

Once again, the weights all appeared sufficiently robust with the smallest movement that influenced change being a rise of 18.9% for conferences and workshops, or a reduction of 35% for case studies.

Throughout testing the Royal Borough of Kensington and Chelsea was the most sensitive, the average score of all the responses achieved above showing a change from the upper quartile down to the second. However, the degree of change required in the weightings to achieve this was considered too great to be relevant. The original weightings were retained.

10.3.3 The tangible support advertised in external links

In assessing the activities undertaken by local authorities, the range of activities is of greater relevance to this study than assessing their utility where sustainable development is concerned. This is because the greater variety facilitates choosing the most appropriate option for any given requirement, and the utility of the support will be evident in assessment of performance indicators.

Testing (see appendix 41) involved changing the weights both individually and in groups. It revealed that all but three of the London boroughs were sensitive to a change in weighting. Table 10.11 demonstrates the manner in which the changes were recorded, using tools and calculators as an example. The heading row shows the weight given to the parameter being tested. The subsequent rows record the quartile that resulted from using those weights. The more sensitive borough would have the change recorded on more occasions than the less sensitive.

Table 10.11: The response to a change in weight for tools or calculators

Toolkits/calculators	1	2.5	1.55	1.5	1.3	Quartile
Barking and Dagenham	1	2	2	1	1	1
Barnet	4	4	4	4	4	4
Bromley	4	4	4	4	4	4
Greenwich	1	2	2	1	1	1
Hackney	2	1	1	1	1	2
Kensington and Chelsea	1	1	1	1	1	1
Kingston upon Thames	3	3	3	3	3	3
Newham	4	4	4	4	4	4
Sutton	4	3	3	3	4	4
Wandsworth	3	3	3	3	3	3
Westminster	3	3	3	3	3	3

The average distribution resulting from the entire set of tests was compared with the distribution when all parameters were equally weighted and found to be the same. The equal weighting was retained.

10.3.4 The provision of a more sustainable infrastructure (table 10.6)

It was not possible to find weights with which to determine the value of the different activities undertaken to provide an infrastructure that lessened the environmental demand of businesses seeking to maintain the strategy of “business as usual”. The initial analysis was carried out based on the following assumptions:

1. Evidence of the council encouraging the readers of its websites to undertake an activity was considered to be of less value than providing the infrastructure itself (the value of promoting an activity opposed to undertaking it on the reader’s behalf).
2. Articulating a desire to address an issue in the future was considered to be of less value than promoting it (the value of future action opposed to promotion). This was because the former does not actively encourage a new behaviour, but it has some value because it brings the subject into the public domain.

Testing the assumptions made in 10.3.4

The sensitivity of the weighting was tested in the same manner as that of tangible support, starting with a position of marginal difference, with council activity being weighted 1.2, promotion of an activity 1.1, and planning to undertake it 1.1 (see appendix 42).

Initially, the sensitivity was tested at an extreme level, by raising the weight for undertaking the activity to 100. This changed the quartile for three London boroughs for all values of promoting the activity between 1.1 and 65.

The sensitivity was tested at the other extreme; closing the gap so that activities undertaken are 2.5 times the value of those under discussion yielded the same results for values of promoting the activity between 1.1 and 1.95. Seeing as promoting the activity demands behavioural change, these lower values are arguably the more reliable and suggest that the final distribution is robust.

Upper quartile: Barking and Dagenham, Sutton

Second quartile: Greenwich, Hackney, Newham, Wandsworth

Third quartile: Bromley, Kensington and Chelsea, Kingston upon Thames, Westminster

Lowest quartile: Barnet

10.3.5 Trust (table 10.7)

In order to ascertain the extent to which the SMEs within the boroughs trust their local authority, weights were allocated to the responses and the resultant quartiles tested. The two responses that appear to represent the most stable position are those declaring no trust in the borough, and those that had a good experience when contacting their borough. These were seen to be equal and opposite, and were given weights of -10 and +10 respectively. These two figures were arbitrary, but because they were used to determine the upper and lower limits of the range, it was of no consequence.

It is conceivable that whilst the influence of “good contact” is an opposing force to “no trust” it is not of an equal weight, suggesting that the two weights should not equal 0. This was not considered to be a relevant criticism because the aim was to produce an interval scale, a measure in which there is no true zero. It was simply used to ascertain the quartiles.

The remaining responses were weighted as follows:

- A poor experience when contacting the borough was assumed to show that trust had been undermined and was given a negative value, starting with -8.
- Having no contact with the borough could indicate either a lack of faith in the borough or a lack of perceived need. Either way, this is not a positive position where improving performance for the environment is concerned, and was given an initial weight of -5.
- There is no way of telling how the contact from the borough was received. For this reason, this parameter was given a weighting of 0.

Testing the assumptions made in 10.3.5

The weights were tested individually and in combination to assess their sensitivity (see appendix 43). The parameters of “no trust”, “good contact” and “no contact” were not altered because of the justifications when selecting their initial weights. The only two to test were “no contact” and “poor contact”.

As explained in 10.3.5, “no contact” was considered to be a negative indicator for communication of good practice, because there would be less likelihood of

the message being received. Subsequent testing was undertaken with it set at two levels, 0 and -5. Throughout testing the assumption was that “poor contact” would create a greater negative force than “no contact”.

Poor contact is also considered to be a negative. If an SME has experienced bad service in the past it is less likely to look for support in the future from the same source. It was tested from 0 to -9, not being rated as badly as “no trust” because the respondent did not state that their poor contact had resulted in a complete loss of trust.

The distribution for all but two of the boroughs changed throughout the testing. However, the average distribution achieved in the process showed no movement. It was therefore decided that the assumptions at the outset were sufficiently robust and the resultant distribution was:

Upper quartile: Kensington and Chelsea, Kingston upon Thames, Wandsworth

Second quartile: Bromley, Hackney, Sutton, Westminster

Third quartile: Barking and Dagenham, Barnet, Newham

Lowest quartile: Greenwich

10.3.6 A summary of the support offered

Section 10.3 has examined five factors that contribute to the support local authorities in London have offered to SMEs. These factors range from the variety of subjects addressed to the ease with which support can be found, trust displayed by the SMEs which would influence their perceived ability to approach the local authority, and the quality of support provided.

It was considered inappropriate to develop a single figure with which to rank performance, because of the disparate nature of the factors and a lack of research to support such a step. However, it is clear that some boroughs register a similar level of performance across all of the categories (see figure 10.1).

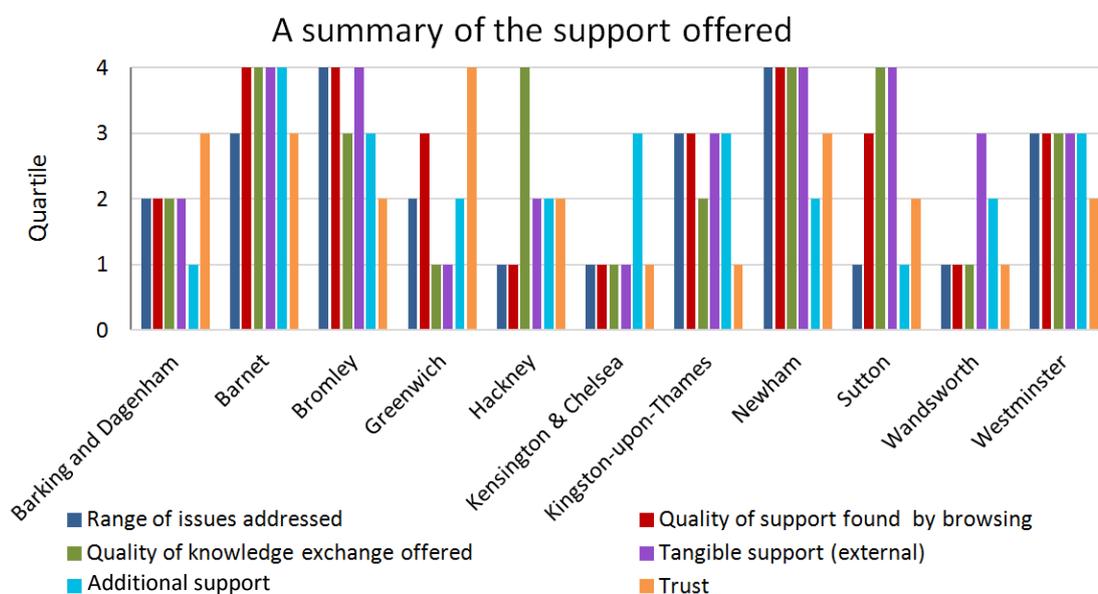


Figure 10.1: A summary of the support offered by the London boroughs

10.4 Performance indicators

The focus of the examination of London boroughs now moves from an examination of their activities to that of their achievements. The two indicators in question are the extent to which the local authority has succeeded at becoming an exemplar of good practice, measured by its weighted carbon emissions submitted under the CRC energy efficiency scheme, and the extent to which its activities have aided diffusion into action in the public arena through reference to its statistics relating to waste management.

Consideration of the data used to determine performance:

- Weighted performance provided by the Environment Agency is a score calculated to determine the performance of each reporting body. This is the figure the agency used to determine the rank performance and for this reason it is considered to be robust. The higher score indicates better performance than the low score (Environment Agency, 2013).
 - It would be inappropriate to use per capita measures because of the different demands created by business.
 - The 11 boroughs in question have been extracted from the dataset and their weighted scores used to determine the quartile into which their performance falls.
- Statistics relating to waste management are provided by DEFRA and are used to advertise council performance. The lower the figure, the better the performance. (Gov.UK, 2014d)

The data are collated in table 10.12 and in each case the resultant quartile that each borough falls into is provided. It should be noted that the performance figures are for the years preceding the assessment of activities, with energy being dated 2012 and the waste performance 2013. The action plans for most of the boroughs predated these publications. The results are summarised and compared with the performance identified figure 10.1 above in figure 10.2.

Table 10.12: Performance relating to waste management and carbon emissions

Borough	Energy		Waste			
	Carbon emissions	Quartile	% reused/ recycled/ composted	Quartile	Residual waste (kg/household)	Quartile
Barking and Dagenham	1037.13	3	26.84%	4	831.47	4
Barnet	579.33	4	33.03%	3	670.48	3
Bromley	1471.75	1	49.07%	1	452.78	1
Greenwich	963.4	3	39.94%	2	555.30	2
Hackney	1381.95	2	24.32%	4	582.55	2
Kensington and Chelsea	454.9	4	26.44%	4	446.21	1
Kingston upon Thames	1371.2	2	46.31%	1	488.21	1
Newham	1700.4	1	21.04%	4	776.12	4
Sutton	964.45	3	36.53%	2	583.06	2
Wandsworth	871.75	3	23.45%	4	542.11	1
Westminster	1456.38	1	21.70%	4	567.65	2

10.5 Correlation

Having distributed the data into quartiles, patterns within the data can become apparent. Correlation occurs when a change in one variable causes a change in another. It can be positive or negative, depending on whether both changes are in the same direction or not. It can also be linear or curvilinear (Creative Research Systems, 2012). There are a variety of methods of identifying correlation, including statistical and graphical, but the statistical approach is only suitable for the larger dataset (Cameron, 2005; Creative Research Systems, 2012). For that reason, the graphical approach is taken here.

It should be noted that correlation is a necessary component of any cause-and-effect relationship, but it is not sufficient. Correlation simply identifies what could be coincidence but without which there is no relationship between the variables to be explored further (George Mason University, 2014). The purpose of this activity is to identify whether there are any underlying relationships that would account for behaviours or performance.

10.5.1 Performance and effort

Figure 10.1 provides a graphical representation of the support offered by the London boroughs. In most boroughs, at least half of the indicators of support fall into one quartile, Greenwich and Sutton being the exceptions. Consequently it was considered acceptable to depict the performance as an average figure for an initial comparison with the performance of the boroughs.

Figure 10.2 summarises the performance achieved by each borough and compares it with the average figure for the support that is offered. It is clear that this broad-brush approach does not yield any insight. Indeed there are notable anomalies, such as Bromley, which is achieving a high level of performance for all indicators with little apparent effort.

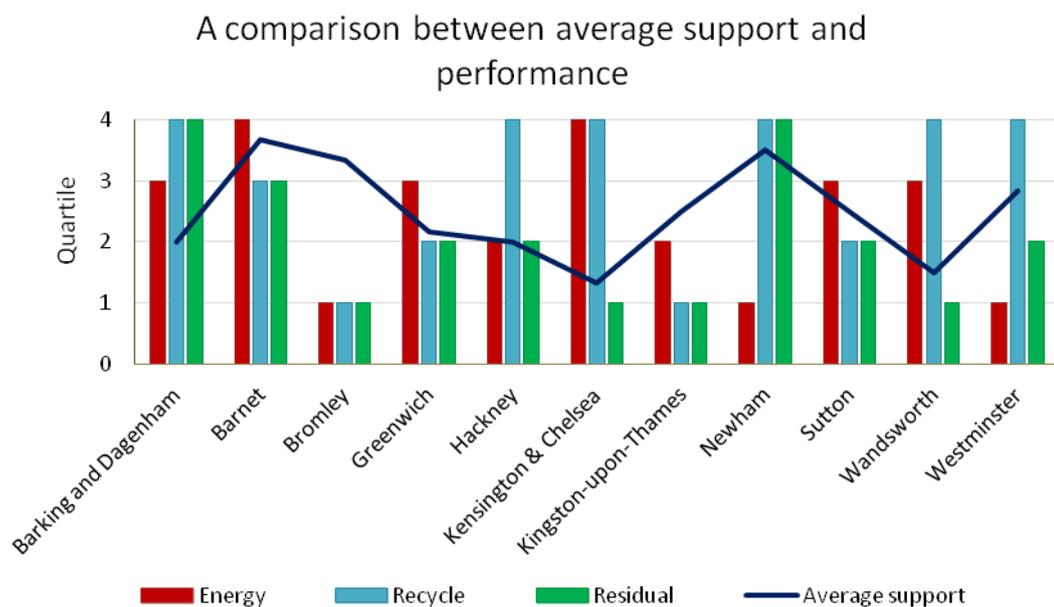


Figure 10.2: A comparison of the performance achieved by the London boroughs

Testing each of the parameters individually revealed one relationship that appeared to have a degree of correlation. Demonstrated in figure 3, there is a strong coincidence of trust in the local authority and the reduction in residual waste. However, the nature of the relationship between these variables is unclear, and if they are related, there is nothing to suggest which of the two parameters is causal and which is the effect. Establishing this link would involve research outside the remit of this thesis.

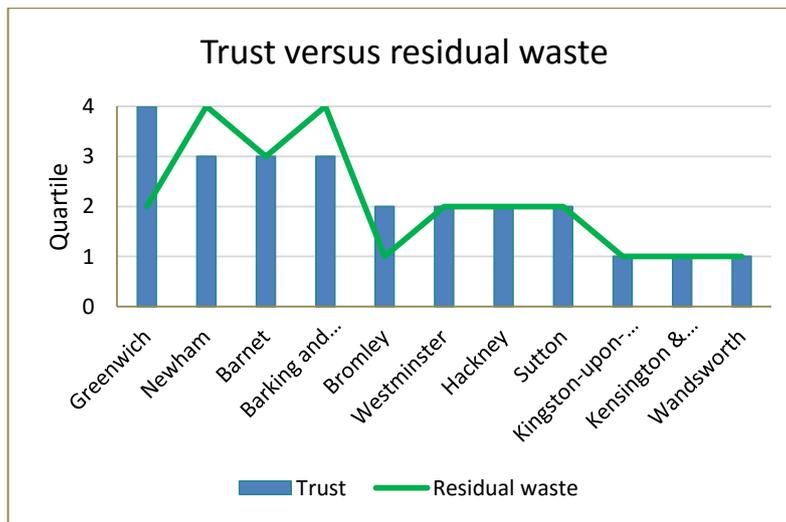


Figure 10.3: The relationship between trust and residual waste

There was also an observable correlation between the range of topics for which advice was provided and energy performance, but this was a weak negative correlation, illustrated in figure 10.4. However, it should be noted that the energy performance data were for the year of 2011/12 and action was assessed in 2014.

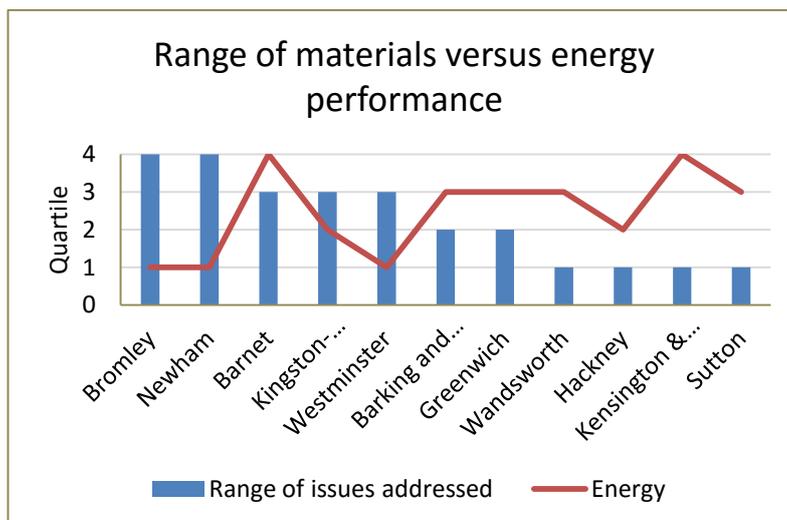


Figure 10.4: The relationship between the range of materials provided and energy performance

The only conclusions that can be drawn from this comparison between effort and performance are that the degree of trust in the borough could be influential in performance levels and there appears to be some other factor beyond the efforts of the local authority that is also of influence.

10.5.2 Consideration of other factors

The variables that were considered when selecting the sample were the controlling political party, the population density, the potential residual effect of having been a low-carbon zone and the budget per capita. These parameters

are summarised in table 10.13 and are tested against the activities within the boroughs.

Table 10.13: The factors that could account for difference

Borough	Average action	Average performance	Controlling party	Population density	Low-carbon zone	Budget per capita (£)
Barking and Dagenham	1.5	3	Labour	20.72151	Yes	864.47
Barnet	3.25	3.33	Conservative	16.45011	No	723.12
Bromley	3.25	1.67	Conservative	8.274757	No	649.75
Greenwich	2	2.67	Labour	21.36104	No	983.26
Hackney	1.5	3	Labour	51.84312	No	1248.80
Kensington and Chelsea	1.75	2	Conservative	51.93835	No	1192.80
Kingston upon Thames	3.25	2.33	Lib. Dem.	16.99105	No	804.18
Newham	3.5	4	Labour	34.18027	No	952.42
Sutton	2	2.67	Lib. Dem.	17.41011	Yes	744.08
Wandsworth	2	3	Conservative	35.62017	No	669.67
Westminster	2.75	3	Conservative	39.14728	Yes	1102.71

In figure 10.5, the population density is compared with budget and controlling party.

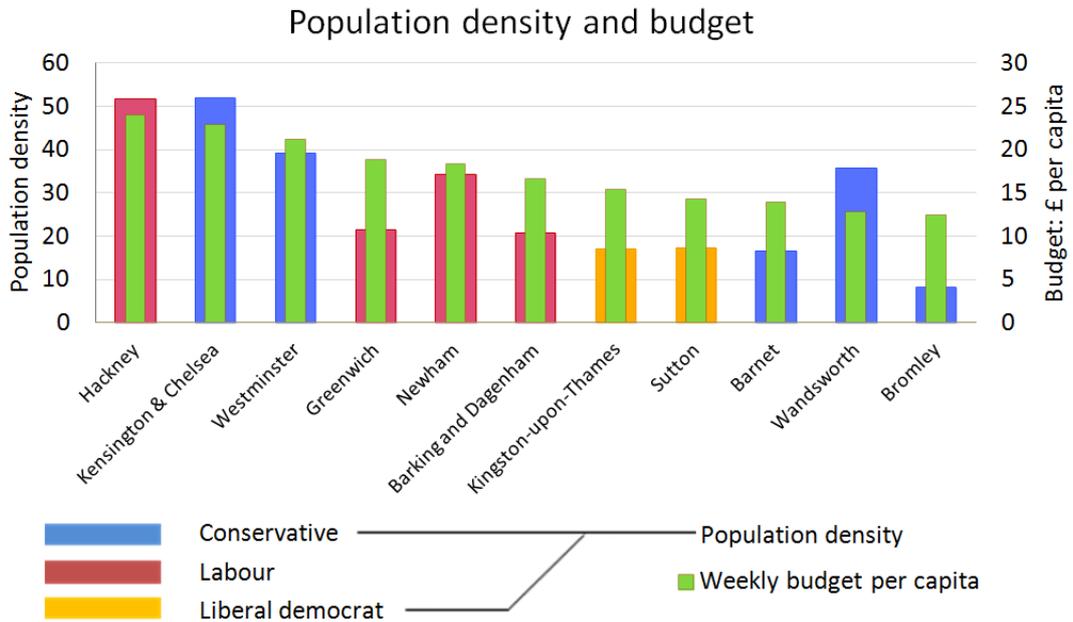


Figure 10.5: A comparison between population density and budget by political party

Figure 10.5 demonstrates that, apart from Wandsworth and Newham, the higher-density areas attract a higher per capita budget. This potentially provides a logical explanation for the variation in activities carried out by the local boroughs which is investigated in 10.2.3. The sample does not reveal difference by party.

When comparing budget with performance, however, no correlation could be found (figure 10.6).

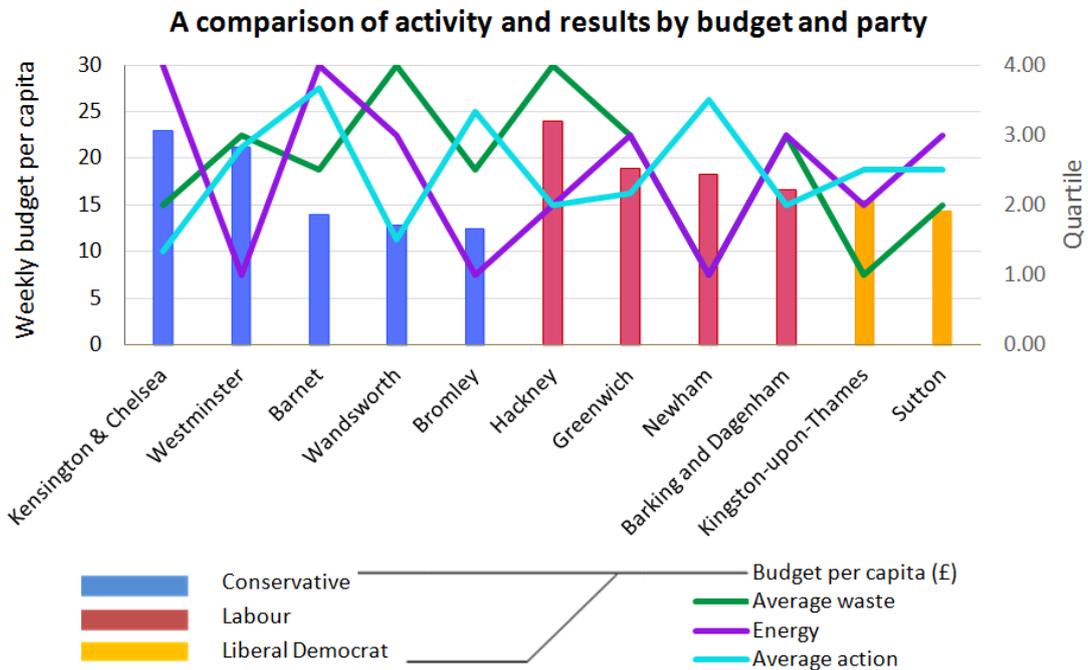


Figure 10.2: A comparison of the population density, political party action and outcome

It should be noted that both action and performance were measured on a scale of 1 to 4 where 1 denoted good performance, whereas the higher the budget, the more scope there was for performance. It would be logical therefore to look for a negative correlation, but nothing was readily apparent in the comparison between budget, performance and action. A closer analysis of the relationship between political party and the variables follows in section 10.6.3.

10.5.3 The political party

Conservative

Five Conservative-led London boroughs were examined. Two inner London boroughs, Westminster and Kensington and Chelsea, have a similar budget per capita, but both the action and the performance with respect to waste management in Kensington and Chelsea are better than those achieved in Westminster. A third inner London borough, Wandsworth, had a marginally lower population density than Westminster, but its budget per capita was 60% of Westminster's and the second lowest in the entire sample. However, in Wandsworth greater action in support of sustainable development was recorded than in Westminster, although its performance was worse.

Of the two outer London boroughs Bromley is of great interest. With the lowest per capita budget in the sample, Bromley's budget was a little lower than that of Barnet and the population density roughly half. The level of support offered to businesses was apparently the same, Bromley averaging a score of 3.33 and Barnet recording the worst in the sample at 3.67. In spite of this, the performance indicators for energy within Bromley were the best within the sample and Barnet's were nearly the worst.

Liberal Democrat

Two boroughs were controlled by the Liberal Democrats: Kingston upon Thames and Sutton. Both had a very similar population density and per capita budget, but Sutton had a history of having been designated a low-carbon zone. The activity within both boroughs was the same, but the performance indicators demonstrated a poorer performance in Sutton.

Labour

Four Labour-held boroughs were included in the sample. The activity within three of them, Barking and Dagenham, Greenwich and Hackney, was similar, falling into the mid-position between 2 and 2.17. Newham, however, demonstrated the lowest level of engagement in supporting business in sustainable development initiatives of all the boroughs in the sample. Performance was similar for Barking and Dagenham and Greenwich, but the other two boroughs showed distinct difference.

Newham was a Labour-held borough that differed from the other three in the sample in every respect. The population density of the borough fell between that of Greenwich and Hackney and its budget was 97% of that of Greenwich. However, it was the worst within the sample, performing badly both in undertaking activity to support small businesses and in performance indicators.

Comment found on the webpages for Hackney offers some insight as to why the borough is the best-performing Labour borough for energy. The councillors note that Hackney is one of the poorer regions and the residents are unable to afford cars. This potentially influential parameter falls outside the remit of this thesis.

The literature review revealed that conservative parties and, to a lesser extent, liberal democrats tend to be less interventionist than other parties, preferring to

adopt a laissez-faire approach (Block and Barnett, 2005; Henry, 2008; Giddings, 2009, p.116). This has not been upheld in the boroughs within this sample. The findings therefore suggest that the difference in activity and performance cannot be attributed to political party, and there is only a moderate correlation associating activity levels with population density and budget.

10.5.4 Low-carbon zones

Three of the London boroughs within the sample had been designated low-carbon zones, which instigated much activity as pilot projects for all of London. In the sample, I paired these with boroughs of a similar population density and managed by the same political party. Sutton was paired with Kingston upon Thames, Barking and Dagenham with Greenwich, and Westminster with Wandsworth. The performance for each pair was compared in figure 10.7, where the 1 represents the best performance and the 4 the worst.

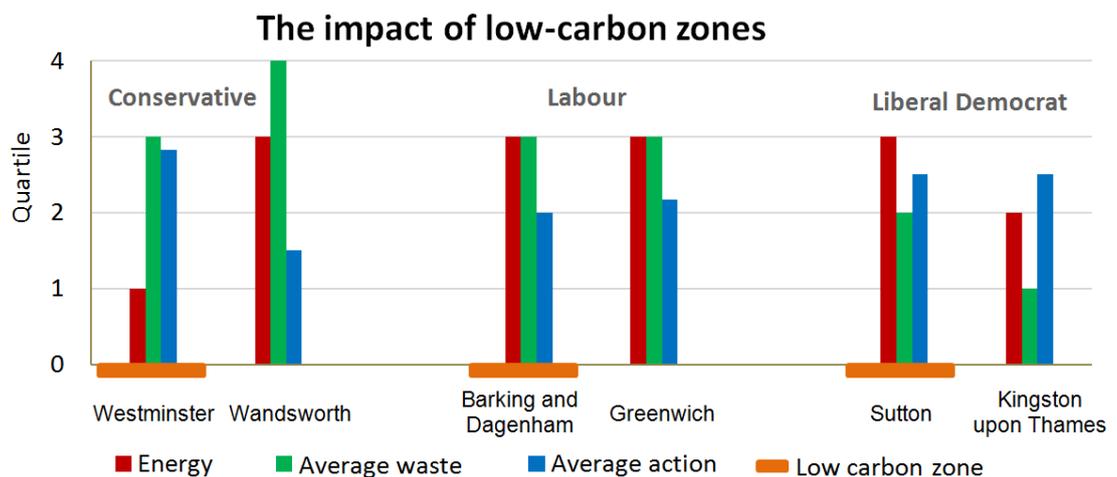


Figure 10.7: A comparison between boroughs designated low-carbon zones and equivalent boroughs

Figure 10.7 demonstrates that it was only the Conservative borough of Westminster that demonstrated a better level of performance than the associated borough that had not been designated a low-carbon zone, although in this instance its recorded level of action was lower. The performance for both the Labour boroughs was in the same quartile, although the action for the borough that had been a low-carbon zone was marginally higher. The performance of the Liberal Democrat borough that had been designated a low-carbon zone was worse than its comparator in every respect.

10.5.5 Trust

A range of external factors have been assessed in order to understand the relationship between factors that do not relate to culture with the performance of the London boroughs. This was in order to ensure that performance attributable to non-cultural issues was ruled out. Only tenuous patterns have been identified, which suggests cultural issues underpin behaviours. Some of the data gathered from the research of the Federation of Small Businesses provide insights that are more robust and would support conclusions based on logical deduction.

The statistics show that within the boroughs sampled, an average of 44% of small businesses had no contact with their local borough on business issues, underrepresenting the entire city by 10%. This would render the efforts of local authorities to assist businesses to become sustainable ineffective because this lack of engagement undermines diffusion. Whereas the systems analysis at the beginning of chapter 4 suggested the government was well-placed to promote sustainable development initiatives, the role of engagement on behalf of business needs to be incorporated.

All of the findings of the Federation of Small Businesses pointed to a concerning level of mistrust of local boroughs on behalf of SMEs. Across the entire sample, only 12% of the businesses reported a good level of support received from their local borough, and this was 4% higher than the average for all of London.

10.6 Summarising London

The purpose of this part of the study was to establish whether difference could be attributed to external factors including population density, budget, prior experience and party. London was chosen because of its numerous boroughs falling under different party control. It should be borne in mind that the Mayor sets the original targets but the local councils have the freedom to choose how to achieve them.

No correlation could be found between any of the factors of interest that lent itself to explaining the observed findings. However, this study highlighted that an element of trust is potentially a prerequisite for effective communication and control. In addition, the impact of the wealth of the average inhabitant was also identified by one council to be a consideration that should not be ignored.

Chapter 11. Synthesis and Discussion

My research into literature has been extensive because of the complex multidisciplinary approach that I have adopted. It was required in order to confirm the extent of change needed and investigate the range of factors potentially influencing decision making that would support the change of the order advocated by Ruckelshaus (section 1.2). This was deemed necessary to ensure that recognition of the factors beyond culture was considered in order to avoid bias.

In section 2.3 I reviewed the range of models developed in order to describe the concept of sustainable development and showed that all criticisms that they attracted opposed the weak elements within their structures. Those that embodied the strong interpretation of sustainable development attracted the least criticism (section 2.3.3), and I argued that this was evidence that there was an underlying acceptance that the strong interpretation was the appropriate response.

The scope of activities that need to be addressed is fundamental to business activity. Resource usage including that of energy has to be curtailed, as do the emissions of pollutants and greenhouse gases, which of themselves are not all considered to be pollutants but are the cause of climate change (section 2.2.4).

The investigation into literature examining the relationship between culture and sustainability suggested that examination of the four selected countries should reveal difference in the areas of policy making, sensitivity to ethical behaviours, ethical standards and capabilities and the diffusion of practice that can be attributed to culture. Figure 5.1 (repeated below) demonstrated that the sample included nations exhibiting significantly different attitudes to the value in seeking to control the environment and the recorded effort in doing so.

It should be noted that the source data for this selection were somewhat dated, being relevant at the turn of the century, and the case studies are relevant to a period some 15 years past that date. Whilst this difference is recognised, it is not seen to undermine the validity of the study because these cultural values are still being used as a basis for research today.

One of the criticisms levelled at Hofstede’s work was that of bias, occurring when the researcher allowed their own understanding to colour the interpretation of events (section 2.4.5). This is even greater when the research involves the identification of underlying values. In this analysis I have been careful to limit my conclusions to those that are founded on observations emanating from the country concerned.

This analysis will examine the performance of each of the countries in respect to the behaviours identified in table 5.4, provided in section 5.1.1 of chapter 5 and repeated below in table 11.1. It should be noted that the two elements of “action”, namely the provision of finance and the development of ethical policies, are handled separately because they are so different in nature. Throughout this chapter, unless indicated otherwise, the material is drawn from the case studies developed in chapters 6 to 9.

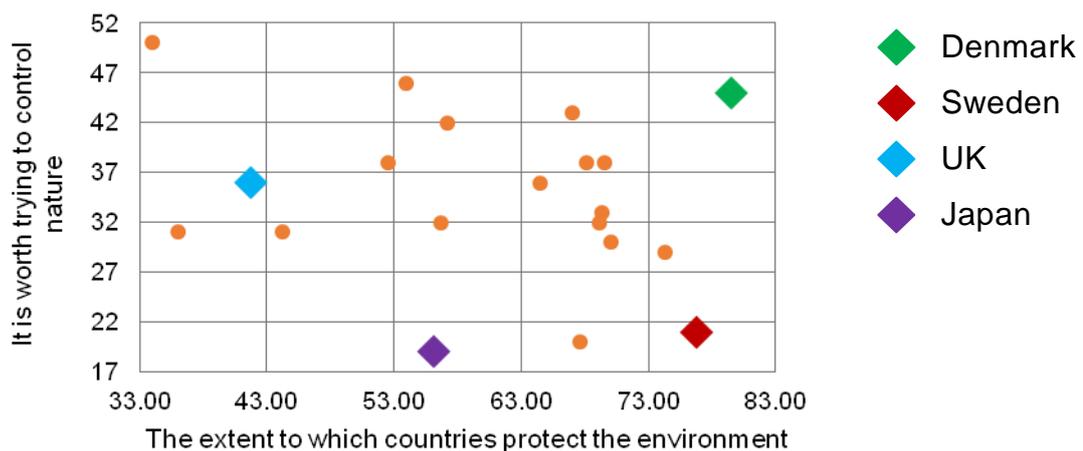


Figure 11.1: Responsiveness to the environment used as a basis of the purposive sample

It is recognised that the different areas of this research (policy development, ethical standards and capabilities, sensitivity to ethical issues and the provision of finance) to a certain extent overlap, because, for instance, policies are unlikely to be developed unless there is a prior sensitivity to the issue, and standards and capabilities as well as action in the form of diffusion and provision of finance depend upon the policies that are in place.

For that reason, the following analysis will take the following form:

- Values and sensitivity
- Policy development
- Standards, including those within policies and capabilities

- Provision of finance
- Diffusion

Table 11.1: A summary of the influence of culture on behaviours

		Values and sensitivity				Standards		Diffusion		Action	
		Judgement of ethical scenarios	Ethical attitudes	CSR values	Perception of unethical scenarios	Capacity for sustainable development	Social/environmental performance	Marketing ethical norms	Diffusion of codes of good governance	Ethical policies	Financial support for sustainability initiatives
H: Hofstede's dimensions G: The GLOBE study											
Framework used		H	H	G	H	H	H	H	H	H	G
Individualism versus communitarianism	L			✓	✓			✓	✓		✓
	H	✓	✓			✓					
Neutral versus affective	L				✓	✓	✓			✓	
Family corporate culture	H	✓	✓	✓		✓	✓			✓	
Achievement versus ascription	L				✓	✓	✓				✓
Universalism versus particularism	H									✓	
Altruistic	H										✓
Attitude to time	LT							✓			✓
Drive	L										✓

The purpose of this analysis is to assess the extent to which the relationship between the different cultures and the behaviours associated with their cultural characteristics holds true. The potential role of other characteristics that have not been included in the prior work but were revealed in the case studies will also be considered.

Prior research has suggested that there are correlations between cultural characteristics and behaviours (Caprar and Neville, 2012). This analysis is seeking to explore the nature of any such correlation. There are three classifications:

1. The characteristic could be a necessary stimulant of a behaviour but require other characteristics for it to be borne out in action. Should this

be the case, action will not necessarily reflect that suggested by the presence of the cultural characteristic.

2. The characteristic could prove to be sufficient in its own right. Should this be the case, then there need be no alternative explanation for the behaviour to have been exhibited.
3. The correlation that has been established could mask collinearity with another characteristic. This likelihood is reduced as the number of case studies is increased. With only four countries underpinning this study, this is a consideration that should be borne in mind.

It is not feasible to try to analyse the relationship between cultural characteristics and behaviours statistically because, as I indicated in section 5.2.8, the comparative strength of the influence of each element and the effects of different combinations have not been determined.

My reason for adopting a case study approach was that it was an approach suited to developing understanding about phenomena contextualised by the environment in which they exist. This consideration of the environment is important because it can reveal interactions that would otherwise be ignored and enables the identification of subtleties that have not been previously reported.

The limitations of a case study approach, however, need to be recognised. It does not support the development of theory and rigour is not as evident, relying on logical argument and reason rather than objective validation.

My intention is to provide deeper understanding of similarities and difference together with their underlying causes. The case studies in chapters 6 to 9 will be used to identify examples that either do or do not fit with correlations that have already been established and, where they do not fit, establish reasoned explanations.

11.1 Sensitivity to ethical behaviours

There is a difficulty with any research that seeks to judge ethical scenarios from a cultural perspective. This is because ethics are relative (Gill, 1999). Care must be taken not to judge observed behaviours from the mindset of the researcher because this would incorporate bias into the analysis. For this reason the scope of activities in question has been limited to that of assessing the attitude

towards the environment and the extent to which environmental needs are acknowledged. This facilitates a more objective approach that is free from moral judgement because I have not predetermined what is considered ethical behaviour.

I have used two indicators to assess the sensitivity to environmental need. Firstly, the underlying cause that stimulated government action; secondly, the priority that is afforded to the environment in the light of the other demands on government.

The breadth of action taken is also an indication of the reaction and therefore sensitivity to environmental awareness, it being possible to identify the driving motivation from the justification for the activity in question.

11.1.1 The underlying cause

Each country reviewed experienced a different stimulus that initiated its observance of environmental management. In the case of Japan, its lack of resources shaped its culture in that the Japanese traditionally viewed resources with greater respect. The Buddhist concept of mottainai is also clearly a cultural trait that underpins their attitude to waste. However, it took events that caused serious health issues to turn the attention of the Japanese to the environment.

Japan's geography is such that it faces a substantial risk from climate change and it therefore recognises the need to control carbon emissions, but building design focusses more on reducing the risk from earthquakes than it does on reducing emissions from the building's usage. Indeed Japan's principal approach to carbon control relies on technology, a route that can lead to economic benefits. Similarly its focus on transport reduction is one that preserves economic prosperity.

In the case of the Swedish, it was environmental damage to their forests that caused them to reassess their practices. The Danes were stimulated to reduce their dependency on oil by the Suez crisis and a shortage of land caused them to reconsider their handling of waste.

The United Kingdom was the only one of the four countries reviewed that did not suffer such trauma or threat. Geographically, the United Kingdom is protected from much environmental pollution by the Atlantic Ocean and

prevailing west wind, and it was only alerted to the problems within its industrial practices when they were reported by Scandinavians, to which the British responded by addressing their sulphur emissions. Similarly it was protected from the Suez crisis within the 1970s because its own production had come on line in the 1960s (Oil and Gas UK, no date) and there was no threatened shortage. In the United Kingdom's case, it took EU directives to stimulate heightened levels of environmental action, by which time it had earned the title of "the dirty old man of Europe".

11.1.2 The priority afforded the environment

Each of the governments reviewed have published strategies in which they explain their understanding of sustainable development. These reveal differences.

The British government defined it as "*encouraging economic growth while protecting the environment and improving our quality of life – all without affecting the ability of future generations to do the same*" (Gov.UK, 2013b). It is noted that economic growth was the first mentioned on the list, and the environment was second. Contrasting the duty of care between the environment and society, the environment was to be protected, but societal conditions were to be improved.

The British are looking to control waste production as well as its management. They are taking steps to manage their CO₂ emissions and pollution, are encouraging the preservation of green space within urban environments and are seeking efficiency in the use of energy and resources.

No Japanese definition could be discovered, but it is written of the Japanese that they view environmental management as a "brown" issue, evidenced in their style of addressing the individual problems of pollution, energy usage and waste rather than considering the broader green issue that addresses preservation of as much of the environment as possible (Vinger, 2012). The environment therefore is to be protected in so far as actions that result in harm to society, namely threats to health and global warming, should be avoided.

The Swedes describe a sustainable society as one in which there is "*sound management and efficient use of its natural resources. Its business sector is competitive and economic growth is healthy. Its welfare systems can readily be*

adapted to demographic changes” (Government Offices of Sweden, 2003). In this instance, there is moderation to economic growth, in that it should be healthy. This is open to interpretation but suggests that the Swedes recognise certain patterns of growth as unhealthy, although whether this only refers to minimal growth is not clear.

Similarly, the Swedes do not view improvement in the quality of life as a necessity; rather, they look to the bottom line of societal care and seek to ensure it meets need. This would appear to underpin actions such as their acceptance of nuclear fuel even when it comes at societal cost of additional risk. The care afforded the environment also differs. The Swedes adopt more of an economist’s view that the greatest utility possible is achieved whilst managing the environment in a robust fashion. This extends to their efforts to create energy from waste.

Care for society has also had the effect of supporting environmental initiatives. The Swedes excel in building design that minimises carbon emissions, but the purpose of this was more to support their people living in an inhospitable climate rather than primarily seeking to reduce their environmental burden.

Little apparent care is afforded the environment in the Danish summary of their responsibilities. In this they maintain “*Danish responsibility means striving for a sustainable future, while building competitive companies and a stronger society*” (Danish Ministry of Business and Growth, no date a). Further explanation of the term “sustainable future” was largely focussed on a corruption-free and transparent society as well as societal welfare.

The environment was thus barely visible in the Danish view of responsibility, which was reduced to honest competitive business and a strong society. Whilst the people responded to the threat of fuel shortage by developing wind power, their government was not sufficiently sensitive to the need to readily support the initiative.

Like the Japanese, the Danes are managing their energy use, pollution and emissions and waste. Their strategy for 2050 suggests that “business as usual” will be possible. Where the impact of a threat is not as clear-cut, such as the outcome of climate change, the Danes are not so proactive, preferring to “wait and see”. This suggests that the environment itself is ascribed little value.

It has been shown that each country only started to recognise the need for environmental protection when it was stimulated to do so. The stimuli have differed, with Japan's being that of pressing need, Sweden's being recognition that damage was occurring to a resource, and Denmark's being the threat of need in the future. Degrees of sensitivity are thus evident, with the Danes being the most sensitive and the Japanese the least. The fact that the British were relative latecomers, waiting until regulation forced change upon them, is not necessarily evidence of a lack of sensitivity, rather of good fortune in that the trauma was not experienced.

Similarly, the subsequent action taken by the British has not consistently been that of seeking to support the needs of the environment, there being evidence that their steps to produce nuclear power were curtailed because absolute safety could not be guaranteed for the population, and attempts to produce green housing have been modified to minimise disruption and support those who are priced out of home ownership.

Of the responses, the Swedes developed a view of sustainability that could be considered the most sensitive, assessing the balance between the three pillars of sustainability. The sensitivity of the Japanese and British was not so acute, but that of the Danish was barely demonstrated. This is in contrast to the positions identified in figure 11.1 where the Danes were shown to be the most proactive.

Indeed, action has been taken by all four nations, but there is evidence to suggest that in some of the nations, such action was not motivated primarily by the need to protect the environment.

11.1.3 Relating sensitivity to correlated cultural characteristics

The meta-analysis of the papers relating to cultural characteristics underpinning sustainable behaviours revealed four characteristics that were found to correlate with sensitivity. Depicted in figure 11.2 with the taller bar representing a greater propensity to the desired end of the continuum, these were "paternal and

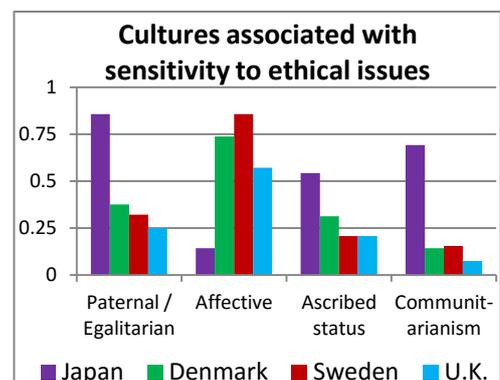


Figure 11.2: Cultures shown to influence sensitivity to ethical behaviours

egalitarian” (incorporating the dual characteristics of interaction and hierarchy discussed in section 5.1), the affective end of “neutral versus affective”, the extent to which ascribed status is conferred, and a communal culture. It should be noted that both ends of the communitarianism/individualism continuum were observed to correlate with sensitivity to ethical issues.

In figure 11.2, the cultures are shown individually where 0.5 on the vertical axis represents the midpoint between the two ends of the continuum. There is a marked difference between Japan and the western nations. In three of the cultural characteristics Japan registers above this central point, with that of the paternal nature registering in the upper quartile and its recognition of ascribed status and communitarian leanings falling in the second quartile. In contrast, Japan is in the lowest quartile where its neutral character is concerned, because of its high level of masculinity.

In comparison, the indices for all the western nations are in the upper half of the scale for their less masculine natures, with Sweden being in the upper quartile and Denmark in the second. All three western nations rank in the third quartile for their paternalism and fourth for their communitarianism. The Danes are more prepared to ascribe status than Sweden and the UK, with their score registering in the third quartile whereas those of Sweden and the UK are in the fourth.

The research underpinning the quantitative analysis

At the beginning of this section I have explained the difficulty in examining ethical behaviour at a national level. In section 5.1.3 I examined the papers that were included in the meta-analysis because they provided mixed findings with respect to the communitarianism versus individualism dimension.

The papers concerned considered a wide range of ethical issues, with sustainable development and environmental protection representing a small percentage of the questions put to the respondents. In two of the papers the cultural characteristics in question were pre-selected based on literature rather than established through the course of analysis (Christie et al, 2003; Waldman et al, 2006; Arnold et al, 2007; Beekun et al, 2008).

I am looking to see if sensitivity to ethical issues translates to sensitivity to environmental degradation. I summarise the activities that I have identified that indicate such sensitivity in table 11.2 and identify the cultural dimension that

could underpin it. This is followed by a more detailed discussion. The first row for each country provides the quartile in which the rating for the associated cultural characteristic falls, with 1 being the upper quartile and 4 the lowest.

Table 11.2: The relationship between sensitivity to ethical behaviours and cultures

	Activities identified indicating sensitivity to ethical behaviours	Paternal/egalitarian	Affective	Ascribed status	Commun.	Alternative driver/notes
Japan	Quartile ¹	1	4	2	2	
	Respecting the value of resources					Lack of resources
	Waste avoidance					Mottainai
	Response to Minamata Bay pollution				?	Economic prosperity
	Response to Fukushima disaster				✓	More calculated than emotional/paternal
	Response to design for reduced carbon emissions in buildings and from transport					Economic prosperity the primary driver
	Environment a brown issue			×		
Denmark	Quartile	3	1	3	4	
	Response to the potential threat of energy shortages		✓			Response to societal need
	Response to threat of climate change			×		Pragmatic “wait & see”
	Copenhagen’s “green” developments		✓			To mitigate effects of climate change
	District heating					Economic priorities
	Avoiding photovoltaic or wave power					Economic argument
	Description of sustainable future	✓				Barely relevant
Sweden	Quartile	3	1	4	4	
	Response to the environmental damage occurring in its forests		?	?	?	Economic benefit
	Acceptance of nuclear fuel		?	?	?	Environmental benefit worth the risk
	Drive to develop energy from waste					Economic prosperity
	Building design					Meeting social need
	Definition of sustainable development		✓	?	?	Ascribed status because of its utility
UK	Quartile	4	2	4	4	
	Responding to the damage caused to Scandinavia					External pressure
	Abandoning nuclear power				?	Societal needs take precedence
	Waste management guided by health					
	Restraint in developing “green” housing					Social disruption
	Definition of sustainable development					Economic prosperity

Key: ✓ A logical link between the culture and behaviour clearly evident
 ? Potential link between the culture and the behaviour but with a logical argument to counter it
 × A behaviour that is directly opposed to that suggested by the cultural characteristic

¹ Quartile as illustrated in figure 11.2: 1 = highest quartile and 4 = lowest.

The paternal and egalitarian dimension

In section 5.1.1 I show that paternalism is a characteristic seen in society where the corporation takes responsibility for the welfare of its workers and the egalitarian dimension is one that minimises societal difference, giving all members a voice, and takes a supportive role.

The response of the Japanese barely fits this pattern at a national level, because having identified the cause of trauma to the people, in the case of the pollution in Minamata Bay, the Japanese were slow to take steps to protect them from the cause by putting a halt to the pollution, preferring to protect the interests of business. In the case of the Fukushima disaster, response was rapid, but it was of an entirely different scale, involving issues that required no investigation into the cause.

The government had to balance conflicting aims in both these events. In the case of Minamata, there was conflict between the concern of supporting business and the associated provision of jobs and that of protecting society, and it is clear that, for some years, business interests were paramount. In the case of the Fukushima disaster, the choice was between protecting the environment by using nuclear power stations and protecting society from future disaster. This would suggest that in spite of the country's paternal culture the Japanese government still favours the welfare of the economy first and that of society and people is secondary, above that of the environment. Environmental care could just be a coincidental benefit.

This tendency to favour business is an outworking of the Japanese characteristic of blending multiple perspectives in their decisions. However, it is also structural in that central government seeks feedback at a business level and it is only local governments that refer to the populace.

Similarly, Japan's sensitivity to waste and the need to use resources economically stems from the Buddhist concept of *mottainai* and the constraints imposed by the country's geography. These have prompted significant reductions in the environmental footprint but cannot be attributed to a paternal culture.

The paternal culture of the Japanese can be seen to operate in the manner in which their local government works to protect the interest of society and, at a

different level, its central governments care for business. However, there was no direct link between a paternal nature and care for the environment.

In that a country that ranked within the upper quartile for its paternal nature demonstrated no link between that characteristic and environmental care, it would be reasonable to assume that the western nations, which all ranked in the third quartile, would not provide evidence that supported the association between a corporate culture and sensitivity to environmental issues. Associated with this dimension was an egalitarian outlook.

In the case of the Danes, the most paternal of the western nations, their egalitarian nature is reflected in the autonomy enjoyed by the people and as far as possible preserved by the government. This autonomy provided the people with the power to develop grassroots action such as the development of wind power, but it worked against them in that the government was slow to support the initiative and economies of scale were hard to develop, suggesting that at best, in the case of the Danes, autonomy can only be considered to be a contributory factor.

Similarly, the focus of the Danes on transparency and ethical relationships is somewhat limited in breadth, but it could be argued it is a quality that supports equality by preventing entities from achieving an unfair advantage.

The case studies for both Sweden and the United Kingdom failed to produce evidence of an association between a paternal or egalitarian nature and environmental sensitivity.

In summary, this research has not found any evidence that sensitivity to the environment can be attributed to paternalism, most notably in Japan which was the most paternal of the four nations. In every case, there was another interest that influenced environmental care. It has been shown, however, that Danish consideration of the environment is compatible with behaviour upholding egalitarian values.

The affective dimension

The key quality of the affective end of the neutral versus affective continuum outlined in section 5.1.1 is the valuing of people rather than money and possessions. In Hofstede's dimension it also incorporated the absence of the

masculine quality of assertiveness (section 2.4.5), resulting in a nurturing characteristic and a focus on security, comfort and company.

The affective characteristic is seen to work in Sweden's response to discovery of the damage caused by acid rain. The Swedes responded to the threat of their pristine countryside being damaged long before the full extent of the damage was known or society suffered loss of utility. Their environmental policy is wide-ranging and their description of sustainable development reflects the extent to which both the environment and society should be supported at a welfare level. However, when referring to their definition of sustainability, there is a strong case to argue that their sensitivity related more to the potential loss of resources from an economic perspective, which stimulated action (this is explained in more detail in the discussion of communitarianism below).

Not all the green initiatives undertaken by the Swedes can be attributed to their affective nature, but their sensitivity to climate change, a threat to which they are not highly exposed, is such that they are prepared to accept the risk to human health associated with nuclear energy production.

In spite of registering very different levels where an affective culture is concerned, the Japanese and Danes appear to have a similar motive underpinning their response. In both cases, once the need to take action is identified, it is adopted for social protection rather than a desire to nurture the environment. This attitude with the Danes is also evident in that they manage their waste with a lot of care, but are doing nothing about reducing the quantity produced.

Bearing in mind the potential for collinearity, my analysis produces evidence that would suggest that an affective culture contributes to a nation demonstrating sensitivity with respect to environmental care but is neither necessary nor sufficient cause. It correlates more closely with sensitivity to social welfare than to the environment, and environmental benefit is consequently an associated outcome.

Ascribed status

Nations that rank highly on the achieved status scale will only attribute value to an entity if it can be shown to deserve such value through the amenity that it

offers. In contrast, those that proffer status based on ascription do not look for such benefit before attributing value.

Japan was the only country in the sample to register above the midpoint of the continuum between ascribed and achieved status, placing it closer to the “ascribed” end. The Japanese clearly valued resources and demonstrated an abhorrence of waste. However, this was due to the economic cost of importing the resources they needed and the Buddhist culture of *mottainai*. The environment itself was afforded little status, it being classified as a brown issue.

Similarly, the outworking of a low score in this dimension, entailing an achievement-oriented culture, is evident with the Danes, who, in spite of being faced with sea level rises of 1.4 m, are not taking any action to preserve their coastline, preferring to wait and see if it proves necessary. Many of their green developments are a response to social need and, in spite of Denmark being the most wealthy of the nations in question per capita, the use of photovoltaics and wave power is moderated by economic expedience.

Sweden is the only nation where environmental action appears to have potentially emanated from valuing the environment in its own right. However, its culture is achievement-oriented, falling in the lowest quartile for ascription. A question mark has been placed in table 11.2, because I believe these actions are evidence of achieved value that can only be fully explained under the next heading alongside consideration of Sweden’s approach to individualism.

Communitarianism versus individualism

This is the dimension where there is potential confusion because there was a suggestion that both ends of the continuum correlated with sensitivity to ethical issues.

It was posited in section 5.1.3 that both ends of the continuum could act in the same way when in the presence of additional characteristics. The cultural sketches of Japan, Sweden and the UK begin to address this question. The Japanese culture is highly communal whilst the Swedish and British cultures are individual. However, the Swedes are outward-looking whereas the British and Danes are inward-looking. It is this difference that I would argue is paramount. The Swedish believe that individuals cannot flourish unless the community is

also strong, and, in order to satisfy their strong cultural tendency to rely on individual resources, they work to strengthen the society that facilitates this end.

I would consequently argue that each of the issues for which I have given a question mark in table 11.2 is in fact a response to value afforded through a response to the utility the environment provides rather than valuing it in its own right. This would suggest that Sweden's desire to support the environment includes a self-serving motive, being reflected in the definition of a sustainable society embodying "*sound management and efficient use of its natural resources*" (Government Offices of Sweden, 2003), which is clear evidence of a conservationist rather than a preservationist approach (see section 2.2.5).

The British, on the other hand, do not have this outward focus. Although the UK registers a similar level of individualism, the need to support the community that supports the individual is not so readily recognised. The difference between the two countries is evident in their definition of sustainability, in which the British specify the need for improved social standards before the need to protect the environment, whereas with the Swedish the order is reversed.

The case study of Japan, the most community-oriented of the nations in question, included two very different responses to issues that affected society. On two occasions when industry polluted the environment to the point that toxins entered the food chain with devastating effect, the government initially protected business interests, taking some years to legislate against the pollution. On the other hand, when natural disaster highlighted the risks associated with nuclear energy production, the government was quick to reassess the wisdom of its continued practice. I would argue that this response was motivated by the cost to the economy resulting from the damage incurred, but it could also be argued that other parameters relating to the relationship between government and the businesses it protected should be investigated.

The extent to which a change in one variable appears to have a significant impact on behaviour demonstrates the difficulty that would be experienced in analysing the effects of individual cultural traits in isolation of each other and explains why prior research appears to conflict in its findings. It also suggests that the difficulty in defining the individual realm referred to in section 5.1 is not the pertinent factor. In that the Swedes recognise the support that can be

afforded the individual by groups at both corporate and societal levels, the boundaries in this respect are blurred.

Attitude to the environment

This measure should be considered in addition to those found to correlate with sensitivity to environmental issues because logic would suggest it is a prerequisite. Four components have been used to classify performance for this measure, but these relate to attitudes and practices rather than the bi-polar continua developed by the theorists. This would mean that they are not directly comparable with the cultural dimensions, but help substantiate the extent to which status is afforded the environment. The four components of this measure are:

- The extent to which it is considered worth trying to control nature.
- Recognition that humans are the root cause of events.
- The adoption of a stakeholder rather than stockholder approach.
- Evidence of the extent to which countries protect the environment.

In the composite score, the Danes were the highest-performing country of the four, partly because of their recognition that it was worth trying to control nature, and partly through their track record of acting on that belief. At the time of the survey, the Swedes did not share the same level of confidence in the benefit of humans seeking to control nature, registering one of the lowest scores.

Both Denmark and Sweden were among the first nations to be environmentally sensitive, and both adopted very similar standards in seeking to ensure that the waters surrounding their land were free of pollutants and supported their activities with the input from universities. Both capital cities have won green capital awards under the European Green Capital scheme. Both countries also experienced trauma causing them to consider the environment. It is therefore evident that being unaware of the need to control nature is associated with a lack of action.

In recognising that humans are the root cause of events, the UK was in the upper quartile, whereas the remaining nations were in the second. In spite of this, the British were the last to adopt carbon control measures, only doing so when stimulated by legislation. This pattern follows the same trend referred to in

section 1.1, in that recognition of cause and effect is not necessarily a stimulus to act accordingly.

Japan and the UK were at opposite ends of the continuum in respect to the adoption of a stakeholder rather than a stockholder approach, being in the highest and lowest quartiles respectively. The Scandinavian countries were in the third quartile. It could be argued, however, that Denmark is the most sensitive of the four countries, because it was only the threat of problems in the future that stimulated action rather than the trauma itself. In addition, it is the country reported to be the most active in protecting the environment. This would suggest that the stockholder approach, one that favours the financial bottom line, does not preclude environmental sensitivity and the stakeholder approach is not sufficient to afford the environment consideration.

It could also be argued that adopting a stakeholder approach can be an obstacle to environmental support because of competing demands. The Japanese, who are the most responsive to stakeholders, found that the demand of sustaining the organisation that gave employment to the people of Minamata conflicted with their obligation to ensure the source of pollution was investigated rapidly. This is a factor that is influenced by the degree of the status given the different stakeholders.

11.1.4 Consideration of the cultural profile

If the correlations identified in the meta-analysis conducted by Caprar and Neville (2012) were to be upheld, I would expect the columns in table 11.2 headed with the lowest number to contain the most ticks and those with the highest number to contain the most crosses. This has not been the case.

However, the case studies in

chapters 6 to 9 contain accounts that clearly identify cultural traits influencing the countries' sensitivity to environmental concerns. The most convincing case is that of Japan, a nation that has a deep abhorrence of waste and values

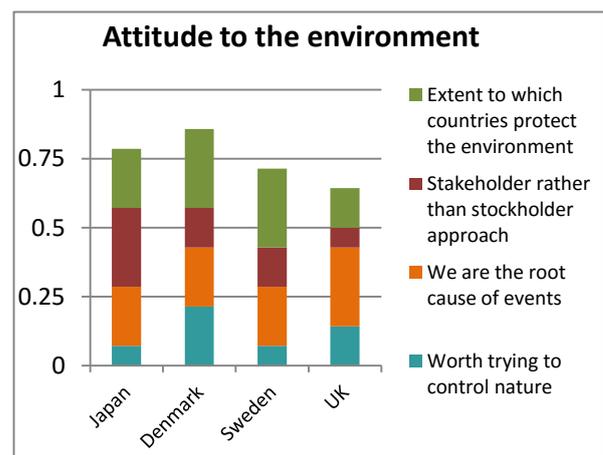


Figure 11.3: Factors contributing to national attitude to the environment

material resources. These characteristics have been driven into Japanese culture through religious tenet and through inhabiting a land that is devoid of useful materials, but neither of these specific cultural characteristics is captured within the dimensions of culture in either Hofstede's work or the GLOBE project. This is potentially an important finding that should be borne in mind when seeking to consider the influence of culture in any study.

This finding alone would suggest that it is not appropriate to state that any of the cultures were found to correlate with sensitivity to ethical considerations, or even that the entire set is both necessary and sufficient.

It stands to reason that some value must be placed on the environment if it is to be afforded protection. It does not follow, however, that this requires ascribed status. The implications of two statements describing cultural values need consideration:

- Ascribed status is only recognised when an entity is valued in its own right. If the entity has to earn status, then it is achieved status.
- The affective dimension is one that would seek to ensure that societal needs are met.

These two statements are complementary. If a nation values an entity because of the utility it provides, then its culture is classified as achievement-oriented rather than ascription-oriented. In an affective culture, the utility is valued, and in a more neutral nation, the profit generation that it facilitates is valued. Once the source of utility is considered to be threatened, if there is no replacement, then it is logical to assume that it will be protected.

This is an important observation because protection would only be given to something that is valued, but this observation recognises that both ends of the ascription versus achievement continuum can be instrumental in securing protection for the environment, depending on recognition of the utility it provides and the mix of other cultural characteristics.

11.2 Policy development

Policy development has been examined from three perspectives. Firstly, the structure underpinning policy development; secondly, the process of developing policies, and finally the range and character of the policies themselves. In each

case, greater understanding of the outworking of the policies is identified through examination of their application in the capital city. The standards set within the policies are considered in section 11.3.

11.2.1 The structures involved and the approach to policy development

Significant difference was identified between the government structures. Sweden and the UK were similar in that all departments must consider environmental impact when developing new policies. They also have a similar percentage of departments that are directly focussed on the environment, the Swedes having 1 of their 15 departments and the British 2 out of 24 departments responsible for developing environment-facing policies. In both cases as well as that of Japan, these are supported by a range of committees including research institutes.

The Danes approach environmental policy making in a completely different way. Their governmental structure is less stable than those of the other countries, consisting of numerous parties with no clear majority, and there is a strong anti-Europe voice. For this reason, issues relating to sustainable development are placed outside party politics and EU directives are adopted with little debate. The Danes depend upon committees to influence the EU whilst the directives are in their developmental stage in order to ensure that Danish interests are taken into account.

This approach resulted in complex layers of regulation as new directives superseded previous versions. The Danes have subsequently refined their approach and developed a new strategy with public consultation.

The Japanese take a highly consultative approach to environmental policy making at both a national and a local level, involving NGOs and business. At national level, business interests are upheld, with business involved in policy development. Policies developed at a local level are done so through consultation with the populace and are consequently readily accepted.

11.2.2 Policy objectives and targets at a national level

An overriding requirement of Japanese policy is that business interests are incorporated in environmental policy. Conversely Sweden and the UK have a policy to embed environmental needs assessment in all policies. The impact of this, however, is different in the two latter countries.

The climate policy is Sweden's highest declared priority, and its environmental policy considers every element of the environment. The British, however, appear to support business more overtly, with moves to reduce the impact of regulation on businesses and not enforcing detailed environmental reporting to shareholders.

The Swedish environmental policy is detailed, considering every element of the environment, including eutrophication and toxic emissions. The Japanese policy is reduced to just ten action points, some being very specific such as "to reduce the potential for toxic substance to cause harm"; however, examination of the action points reveals that, like that of the Swedes, the Japanese policy is wide-ranging and very detailed.

One weakness in Sweden's strategy is that of depending upon waste incineration for energy production. This is a strategy that potentially undermines efforts to reduce materials usage and demonstrates that their holistic thinking has overlooked the elements of environmental management that have not been given such a high profile by the EU.

The Danish strategy is quite specific. It is seeking to end dependence on the use of gas and coal by 2050 and is focussed on waste management and the generation of heat and power. In contrast, the terminology used by the British is broad, referring to sustainable development and environmental impact rather than specifying the issues involved.

11.2.3 Local authority involvement

In section 2.8.4 I argued that action relating to sustainable development was most effective when central and regional governments co-ordinated their efforts in regulating activities. In this research I found that there was little conflict between the layers of governments, but there was not so much evidence of an active effort to work together beyond that of targets set at a national level that are acted upon by local government.

Few of the local authorities examined are compelled to support business, and the range of environmental concerns within their remit varies, although they are expected to monitor performance. In Japan, local authorities develop policy that incorporates the opinions of the electorate including businesses, meaning that their interests are upheld, which could potentially cause sub-optimisation.

Local authorities within the western nations are given autonomy with respect to the manner in which they manage environmental issues, as well as the degree of support offered to business. There is variety within this, in that the Danes are allowed to undertake any action seen fit provided it does not break the law. The Swedes are allowed to raise finance through local environmental taxation and the focus of their action is on buildings and transport.

11.2.4 Building standards

Examination of building standards reveals further difference. The Japanese focus on developing buildings that are earthquake-proof, responding to the greatest threat in the region. As yet environmental performance is at an investigative stage. The Danes in contrast started to regulate the environmental performance of their buildings in 1961 and are currently seeking to achieve a 75% reduction in the carbon footprint by 2020 based on performance in 2005.

The British are seeking energy-efficient homes with the standard of zero emissions for new builds and retrofitting homes in order to achieve the standard. However, the British are prepared to use offsets to bridge the gap between actual performance and calculated carbon emissions. This potentially undermines the standards achieved.

The Swedes are looking to gain the benefits that are associated with high-density housing, enabling the use of district heating and cooling, and take a holistic approach to ensure all environmental impacts are addressed in new developments.

11.2.5 Objectives within the capital city

Reviewing the strategy for each of the capital cities identifies the extent of support for priorities that are evident at a national level. The western nations all focus on targets designed to reduce the environmental impact of activities within the capital. The Japanese, however, summarise the strategy under three headings which place human welfare at the centre.

The Scandinavian countries focus largely on carbon emissions and transport, both setting targets above those of EU directives and involving extensive district heating and cooling. Similarly both address commuting options, the Swedes looking to public transport or walking for 80% of their commuter journeys, and the Danes seeking to encourage 50% of their commuters to cycle to work.

London's Mayor has developed a strategy for London that all local authorities within the capital must accommodate. It is focussed on decentralising energy production including waste incineration, and improving the environmental performance of buildings, including retrofitting older buildings with the necessary technologies, largely in the form of insulation. Transport emissions are addressed along with the infrastructure of the city. However, the Mayor does not expect all targets to be met through technological or behavioural change, accepting the use of offsets to bridge any deficiencies in performance.

In addition to seeking to reduce the environmental impact in a wide range of issues, the Danes and the British both seek to develop resilience to climate change within the capital city. They both address water management and incorporate green roofs to mitigate flood risk, and the British also seek to address the heat island effect. It should be noted that Stockholm and Copenhagen are not vulnerable to rising sea levels in the same manner as London, and, being much smaller, Copenhagen does not suffer the heat island effect to the same extent as London.

11.2.6 Relating policy development to cultural characteristics

As with the sensitivity to ethical issues, paternalism and affective culture were both considered to correlate with policy development. In addition, it was seen to correlate with universalism, a characteristic that supported the development of regulation. The performance of the four nations is depicted in figure 11.4, with the taller bars aligning with the cultures shown in the meta-analysis conducted by Caprar and Neville (2012) to demonstrate a greater ability to create policies

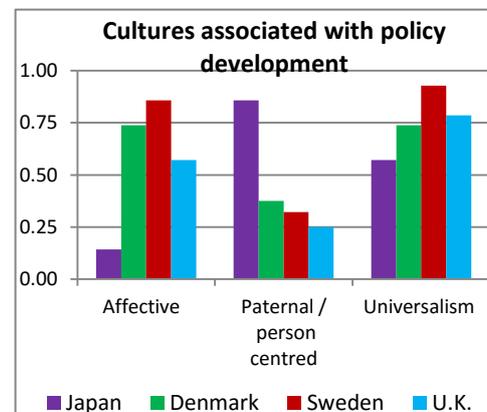


Figure 11.4: Cultures shown to influence policy development

In two of the cultural dimensions concerned, Japan showed a marked difference to the western nations, being neutral rather than affective and more paternal in its corporate culture. The only dimension that is new to the mix is universalism opposed to particularism. For this characteristic, all four nations are above the midpoint and therefore closer to universalism, with Sweden and the UK registering in the upper quartile.

The research that identified the cultural characteristics underpinning ethical policies focussed entirely on social responsibility rather than environmental responsibility (Scholtens and Dam, 2007).

Factors linking policy development to cultural characteristics within the four countries are summarised in table 11.3, which is followed by a more detailed discussion. In spite of the different focus explained above there was a marked similarity in some of the findings.

Table 11.3: The relationship between policy development and cultures

	Activities identified relating to policy development	Affective	Paternal/egalitarian	Universal	Alternative driver/notes
Japan	Quartile ¹	4	1	2	
	Public consultation for all policies		✓		
	High level of detail in policies		✓	?	
	Business interests preserved in policies		✓	?	
	Buildings not zero-carbon or similar	✗		✗	Relates to sensitivity
	Human welfare central to policy		✓		
	Scant climate change mitigation activities	✗		✗	
Denmark	Quartile	2	3	2	
	Less stable government		✓		
	Environment not "political"		✓		
	EU standards adopted with little debate		✓		
	Public consultation for new strategy		✓		
	Limited range of issues specified		✓		
	Climate change mitigation activities	?		?	Societal need
	Autonomy of local authorities		✓		
Local authorities too small for action		✓			
Sweden	Quartile	1	3	1	
	All legislation considers environment	✓		✓	Effective strategy
	Climate policy of highest priority	✓		✓	Relates to sensitivity
	Detailed level of policies			✓	
	Dependence on waste incineration				An easy option?
Holistic view with planning				Effective strategy	

¹ Quartile as illustrated in figure 11.4: 1 = highest quartile and 4 = lowest.

	Activities identified relating to policy development	Affective	Paternal/egalitarian	Universal	Alternative driver/notes
	Quartile	2	4	1	
UK	All legislation considers environment	✓		✓	Effective strategy
	Overt support for business	✗		✗	Relates to sensitivity
	Lack of specificity			✗	
	Climate change mitigation activities	?		?	Societal need
	Use of offsets				Favouring business

Key: ✓ A logical link between the culture and behaviour clearly evident
 ? Potential link between the culture and the behaviour but with a logical argument to counter it
 ✗ A behaviour that is directly opposed to that suggested by the cultural characteristic

Affective opposed to neutral

The affective nature is that of nurturing and seeking security. The most prominent activity that can be attributed to this is the climate mitigation activity that is undertaken by the Danes and British. It should be noted that the Swedes do not have the same need, but the Japanese, who are in the lowest quartile for this characteristic, are vulnerable but are not apparently undertaking anything at this level, their only protective activity being that of building earthquake-proof buildings.

Paternal and egalitarian

The person-centred culture that emanates from these corporate cultures is one that is central to the Japanese style of consultation in all decisions that is exercised in the governmental arena as well as the corporate. This influences the resultant output that seeks to preserve the welfare of business and society and can account for the high level of detail, in line with their ability to incorporate many disparate ideas into a policy established in section 6.1. None of the activities undertaken by the Swedes or the United Kingdom could be attributed to a paternal or egalitarian culture.

The case of the Danes is quite different. Throughout the development of their case study the influence of their value of autonomy was clear. This affected the government's structure and ability to legislate as well as the need to avoid debate about EU directives. The public consultation regarding Denmark's environmental strategy also allowed the individual to have a voice and avoided the need for political debate. Hampden-Turner and Trompenaars attributed Denmark's autonomy to its low level of hierarchy.

In developing this continuum, I had assumed that paternalism was the primary factor to consider and egalitarianism the secondary. The divide could, however, be less clear-cut, with the highly egalitarian Danes achieving a score closer to that of the Japanese. This being the case would suggest there are grounds for equating these two characteristics with policy development, both being influenced by the extent to which the opinion of the individual is seen to be of value. However, the stances on this differ substantially, because the Japanese incorporate the opinions into their policy whereas the Danes avoid debate and, until recently, had structures that are not compatible with addressing the issues that demand economies of scale.

This leads me to the conclusion that both paternalism and egalitarianism are influential in the manner in which policies are developed, but are neither necessary nor sufficient to dictate the style. This is because the British and Swedes also have a fairly flat hierarchy, but it is the power of the voice of the individual that is so marked in the case of the Danes.

Universalism versus particularism

The characteristic of universalism that is influential in policy development is the view that there should be one rule for all, an outworking that has been identified with an uncertainty avoidance approach. Sweden and the United Kingdom both fell into the upper quartile for universalism and Denmark and Japan were in the second quartile.

It is feasible to consider that the priority afforded the environment by the Swedes, together with their detailed level of legislation, was prompted by a desire to reduce risk by ensuring everyone was required to take the same measures.

This argument is not so robust for the other nations. I have indicated the Japanese activities that could potentially be the result of a universal attitude with a question mark in table 11.3. This is because the argument relating to their paternal culture is more persuasive, suggesting it is the dominant characteristic, and the lack of climate change mitigation together with their very recent consideration of zero-carbon properties suggests that their approach is not dominated by a desire to minimise every known risk.

The British, who registered in the upper quartile for this characteristic, also showed behaviours that would undermine the dominance of this characteristic. Their lack of specificity in their policies means that they are somewhat open to interpretation. This does not align with a behaviour that ensures an equal footing for all, or one that is seeking to avoid all risks.

11.2.7 Consideration of the cultural profile

The relationships between activities and cultural characteristics that have been summarised in table 11.3 and the subsequent discussion about the paternal and egalitarian dimensions suggest that there are grounds to support this statistical correlation. However, the broad term of “people-centred” is not enough. The paternal rather than hierarchical quality of the Japanese culture and the value the Danes place on autonomy are the precise factors that influence the style of policy that is developed along with the process.

There are also grounds to potentially consider the affective dimension to be influential because the Japanese, who register in the fourth quartile, have failed to consider environmental need in their policies, whereas the European nations, which are all in the upper two quartiles, demonstrate more behaviours that could be attributed to an affective nature.

However, the difference in this case is not clear-cut, suggesting caution is needed when claiming a statistical correlation, and any such claim should be tempered by the observation of the interaction between this dimension and that of ascribed status made in section 11.1.4.

11.3 Ethical standards and capabilities

The difference in cultural profile between sensitivity to ethical behaviours and ethical standards and capabilities rests with the removal of the correlation with the highly individual culture, simply leaving the correlation with the communal end of the dimension.

11.3.1 Standards

High standards appear to have been set by all of the countries in different fields. Table 11.4 summarises their differences. The Danes appear to be the most ambitious, aiming at having the first carbon-neutral city, and both the Danes and the Swedes have improved the waters around their land to the point that they have been declared to be pollution-free. It should be noted that their waters

include narrow shipping lanes demanding cooperation from the nations that use them. Both countries have earned green capital status.

The Japanese, on the other hand, have developed a waste management culture that leads the world, and when addressing a problem seek to find the best solution possible. The British do not lead any trends, tending to adopt the standards that are imposed by Europe and, where feasible, raise them to what they consider to be attainable.

Table 11.4: The scope of activities undertaken and supporting policies

	Japan	Denmark	Sweden	United Kingdom
CO₂ emissions reduction	Tokyo: 25% by 2025	Copenhagen carbon-neutral by 2025	40% by 2020	35% by 2020 50% by 2025 80% by 2050
Baseline	2000		1990	1990
Emissions	No toxins		No toxins Zero eutrophication	
Material reduction	Extensive	Little evidence	“Efficiency”	Packaging
Waste management	Zero landfill	Zero landfill for combustible material	Power from waste including sludge	Promoting recycling and reuse
Building standards within the capital	Earthquake-proof; investigating zero carbon	75% higher efficiency (2005 base); all new builds computer-aided design	High density and retrofitting; 5% reduction in energy use by 2015	75% fuel efficient; moving to nearly zero carbon by 2016
Climate mitigation		Buildings	“Robust” buildings	Flood
Energy policy	Technological: decarbonising fuel	To become independent of carbon-based fuel	Safe radiation environment	Decentralise production; energy from waste
Transport	Eradicate noxious emissions by 2016	GHG free by 2030; 10% energy renewable by 2020	15% reduction of emissions by 2015; green fuels	“Sustainable”
Overt recognition of the competing demands for biomass	Yes	Yes	No, but energy is extracted from many sources including sludge	No
Additional policies			Protection of landscape	

11.3.2 Standards attained

Each of the case studies has incorporated the country’s reported standards, but they are not based on common measures; for example, not all include the

carbon emissions related to their imports. In order to ensure a common platform, I will use the performance indicators provided at the end of each of the case studies. These are largely self-reported by each nation's government but were collated by the OECD, which dictated the factors that should be included. For that reason they are considered to be the most robust basis for comparison available.

The performance of each country is compared in table 11.5, which also includes, where available, the average performance for all OECD countries. The cells have been shaded according to the key below the table, using Microsoft Excel functions to accurately identify the comparative performance. I considered this to be an appropriate method to illustrate performance because some measures show better performance with the higher number and some with the lower, meaning that examination of the figures alone could be misleading. The results are revealing.

The standards attained by the Scandinavian countries are the most surprising. They clearly advertise their low carbon emissions, and both governments maintain they manage waste exceptionally well. The Danes do admit to being prepared to generate waste. However, it is the Swedes who have increased their materials consumption the most since 1990 and their consumption per capita was the highest of the four nations.

The Swedish strategy of incinerating waste does not encourage a low materials input. In spite of its efforts to extract energy from as many sources as possible and reduce its usage through the introduction of district heating and cooling, Sweden is the worst-performing country with respect to energy productivity and per capita energy usage.

The United Kingdom is one of the better-performing nations. Two of the indicators where its performance is the worst of the nations in question and below the OECD average relate to renewable energy production. The British only produced 4.11% as the total percentage of energy supply, which is substantially less than the 33.55% achieved by the Danes. However, the UK leads the four nations with respect to the GDP achieved per unit of oil equivalence and the quantity of oil consumed per capita. Its economy in this respect is translated to its performance with respect to carbon emissions, being

Table 11.5: A comparison of performance

Activity	Better performance	Base year	Japan	Denmark	Sweden	UK	OECD
2011 Real GDP indexed	↑	1990	120.15	138.54	156.62	160.74	162.53
Energy management							
2011 Energy productivity, US\$ per ktoe	↑		8.55	10.31	6.71	10.76	
2011 Energy intensity, toe per capita	↓		3.58	3.15	5.23	3.06	
2011 Renewable energy supply, % TPES	↑		3.45	23.43	33.55	4.11	8.14
2012 Renewable electricity, % total electricity generation	↑		11.79	47.68	58.34	11.42	20.16
Emissions management							
2012 Greenhouse gas emissions indexed	↓	1990	108.81	75.86	79.22	75.03	105.07
2011 Transport-related GHG emissions indexed	↓	1990	101.94	113.72	99.13	99.47	
2012 GHG emissions per capita, tonnes	↓		10.53	9.5	6.05	9.17	12.47
2011 Production-based CO ₂ emissions indexed	↓	1990	111.73	82.32	85.19	80.66	110.65
2011 Production-based CO ₂ productivity, US\$ per kg CO ₂	↑		3.32	4.36	7.39	4.66	
Materials management							
2010 Domestic materials consumption indexed	↓	1990	59.88	98.47	127.54	69.72	
2010 Domestic materials consumption per capita	↓	1990	9.46	19.76	21.12	9.59	16.6
2010 Municipal waste index	↓	1995	86.85	136.95	121.91	110.57	113.41
2010 Municipal waste per capita	↓		354	673	445	521	533
2010 Landfill indexed	↓	1995	11.6	25.8	3.5	61.2	
Research and development							
2011 Expenditure on R&D, US\$ billion	↑		13.29	2.8	3.81	14.70	
2010 Green patents indexed	↑	1990	7029.54	520.44	601.62	293.4	

All figures are rounded to 2dp.



among the better performing of the four nations in four out of the five associated measures.

Where materials management is concerned, the indexed consumption reveals that the British have reduced consumption since 1990 substantially more than the Scandinavian countries, and 10% less than Japan. Their consumption per capita, however, is less than that of Japan, a nation that has been shown to monitor its materials consumption with great care. Where the UK lags behind the other nations is in the reduction of waste being sent to landfill.

Whilst the UK has spent more than the other nations on research and development, it has yielded substantially fewer patents. This indicator should be read with care because profitable action can result from research and development even if no patents are taken out.

The performance of the Japanese is not so surprising. In the case study I exposed problems experienced by the Japanese where energy production is concerned and drew attention to their world-leading materials management practices. The impact of both of these is clearly portrayed in their performance measures. The percentage of renewable energy produced is very similar to that of Britain, but their usage per capita and productivity is mid-range. Their difficulty in producing renewable energy is also reflected in their performance with emissions management, which is the worst in three of the five measures and mid-range for transport and per capita emissions.

Japan's materials management is the best of all four nations, apart from the quantity of material that is sent to landfill, which is second to Sweden. This, however, masks Japan's excellence in returning materials such as plastics to their original state rather than, as the Swedes do, incinerating everything that is combustible.

A full comparison with each of the measures presented in graphical form is provided in appendix 44. Performance is assessed using the most recent figures available. Where comparisons have been made over a passage of time, when figures were available, the base year is 1990. This is because this was the base year for carbon reduction targets established under the Kyoto agreement.

11.3.3 Capabilities

Capabilities were observed at two levels. Firstly, the capability to change, and secondly, the capability to monitor the change in order to aid achievement of the desired targets.

The capability to change

All four countries had mechanisms that enabled change, aided by dedicated departments within their governments which had sub-divisions and NGOs providing specialist knowledge. The western countries involved universities and research institutions whereas the Japanese created numerous committees and sub-committees that were dedicated to specific issues.

Of the four countries, Sweden appeared to be able to make the most radical changes, for instance its development of energy from sludge. The Swedish anticipate further change by building the capacity to alter the source of fuel into their products including their vehicles and district heating plants. As with the British, the Swedish government has embedded the need for environmental care in all of its departments responsible for policy development. The Swedish government is also supported by the Stockholm Environment Institute, which is reported to be among the world's top ten environmental think tanks.

Historically, the British excel at radical change, having originally led the industrial revolution. Policies are top-down but informed by experts in the field. The process, however, is somewhat flawed. The British are reportedly poor at following their ideas through to maturity; their demand for profit over the short term constrains the less profitable incremental improvements. The laissez-faire position of the government means that potential technologies have not been exploited to the full, where intervention could have retained the competitive advantage sought by business.

Where the government did take a leading role, as with the Japanese, the British have based decisions on the results of consultation. However, whilst the Japanese look to the general public for their input, for the more radical change of developing renewable energy the British used the Delphi technique, involving in the region of 10,000 experts. Their approach is accused of masking a hidden agenda of cost-cutting and the resultant decisions have been constrained by the need to comply with EU directives, resulting in sub-optimisation.

This demand by British business for short-term profits, coupled with EU directives that limit funding to innovations that are close to market, further constrains the development of the more sophisticated technologies that demand time to establish.

The Japanese, on the other hand, appear constrained where radical innovation is concerned. They are highly innovative and work hard to ensure any difficulty they set their mind to is addressed. However, their focus is on improvement and development of known technologies rather than the creation of an entirely new concept. They are open to ideas and seek out the solutions identified by others before making them uniquely their own.

In section 2.6.3 of the review of literature I reveal that this style of change tends to be the more robust, creating a solid basis for change, but I question the extent to which incremental change would lead to change of the order of a paradigm change. In this instance, the Japanese appear to have demonstrated that substantial change can be achieved by incorporating an open mind to radical changes made elsewhere. I have also shown that radical change does not necessarily produce the hoped-for improvements. The approach of the Japanese allows them to identify the pitfalls of the innovation and improve performance accordingly.

The Danes and Japanese have a number of different characteristics that have affected their ability to change:

Denmark

Hofstede and House both refer to the adaptability of the Danes, and this works in conjunction with their egalitarianism that permits individuals to instigate change. This is a characteristic that appears to have dominated action, and its scope and impact need to be noted.

Denmark's administration has a long history of substantial changes rendering the government unstable, constituting numerous small parties that form minority or coalition governments. This structure influences the style of government. To this is added a long history of change where local and regional government is concerned. It is only in the last seven years that the size of regions and municipalities has been such that effective and efficient management has been

viable. Under the new format, all environmental management is undertaken at municipality level.

In spite of the inherent structural difficulties previously experienced, the Danes have a reputation of being able to satisfy their objectives. They are reported to take a pragmatic approach to government. This is not only because their government is unstable but also because there is a strong anti-Europe voice. The influence of this is threefold.

Firstly, the rigour with which the Danes view performance is not as wide-reaching as it is in other nations. They are prepared to accept that they produce a lot of waste. It is in the managing of that waste that they excel.

Secondly, they adopt European directives in their legislature with very little debate, meaning that the European standards become their minimum standards relatively rapidly. They do, however, work at committee level seeking to influence the content of directives received.

Finally, there is little control over the activities of municipal government. The only constraint on activities is that they should be within the law and should not infringe on the scope of central or regional government action. This autonomy enables municipalities to provide the most appropriate provision for any given circumstance, but also undermines the ability of central government to control the standards that are applied without resorting to the passing of legislation.

The Danes are independent and resourceful. This has promoted grassroots development of technologies that have now become the mainstay of the environmental policy. The freedom to develop such technologies has not translated into freedom to promote them competitively. For this the government has had to be coerced into action.

Japan

The Japanese, on the other hand, do not offer local government the same degree of autonomy as the Danes. Regulation is developed centrally and also at local level in a manner that permits flexible solutions at a local level. There is no compulsion to include environmental management, although the central government reserves the right to intervene.

As established in section 11.2.3, the Japanese are accused of being very slow to change. This is because they encourage public debate and process all the feedback they get about proposals before proceeding with any plan. This makes the development of new ideas closer to the model of rational decision making, but the inclusion of the Japan Business Federation in the policy-making process could potentially favour business interests. Added evidence that this might be the case can be observed from the reluctance of the populace to trust decisions emanating from central government.

At a local level, there is greater trust. Consultation to the extent to which it is undertaken by the Japanese is a slow process. However, once the process is complete, change is implemented quickly because the public are aware of the issues involved and more willing to commit to a change to which they have contributed in the planning.

There is evidence of sub-optimisation. Whilst Japan's solutions incorporate the opinion of many people, they do not appear to be moderated by caution that would have been based on an effort to identify the risk associated with action. This is evidenced by the U-turns that have been made with respect to nuclear energy production and Japan's realisation that its reliance on technological solutions means it might not meet the carbon reduction targets established under the Kyoto agreement.

Whilst the scope of policies is broader than that listed by the OECD, the Japanese are impeded in some respect, and most notably in their efforts to develop alternative energy sources, by their lack of natural resources, making them reluctant to use any resource for energy if there is a potentially more financially profitable use for it.

Monitoring progress

Reporting styles also appear to be relevant in steering change to achieve given targets. As demonstrated in their reporting of an increase in carbon emissions, the British have tended to minimise the reporting of poor performance. It is reasonable to suggest that this undermines performance because Bromley, the one London borough that did not follow this trend but appeared to focus the content of its webpages on assiduously reporting its progress, was also the best-performing. The Swedish are more open in identifying where progress is

such that it threatens their ability to achieve their targets and using this as a stimulus to adjust their action plans in order to help them avoid failure.

The Japanese do not view progress in quite the same way and this study revealed two differences. Firstly, they are prepared to take a more holistic view. Their particular circumstances have meant that reliance on anything but coal for the majority of their fuel production is highly problematic. However, on reviewing the impact of their technology, they reported that if it were adopted by western nations, the resultant saving would be more than the reduction their nation was required to make. Secondly, they are not perturbed by apparently slow progress, because they take the longer-term view. This is an attitude that allows them to accept the lengthy policy-making process.

11.3.4 Relating ethical standards and capabilities to cultural characteristics

The same cultural characteristics that have been shown to correlate with sensitivity to ethical issues have also been found to correlate with ethical standards and capabilities. The manner in which they influence the standards and capabilities differs from the

mechanisms underpinning their role in promoting sensitivity to ethical issues.

In this case, however, there was no ambiguity with individualism versus communitarianism because only low individualism was shown to correlate with standards and capabilities.

Figure 11.5 shows that Japan registers in the upper quartile for paternalism and above the midpoint for ascription and communitarianism. The western nations are the reverse, with the United Kingdom consistently registering the lowest score.

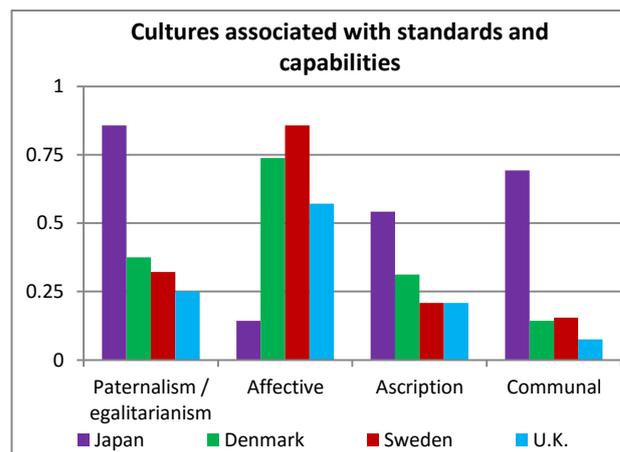


Figure 11.5: Cultures associated with standards and capabilities

This is the first subject area discussed in this chapter where the literature providing the cultural correlation focussed entirely on sustainability, drawing on the Environmental Sustainability Index for its source material. This is an index that includes a wide range of topics such as wealth, population size, governance structures and the number of organisations within a country included in the Dow Jones sustainability index (Husted, 2005).

Factors linking to standards and capabilities to cultural characteristics within the four countries are summarised in table 11.6, which is followed by a more detailed discussion.

It has proved difficult to find logical links between the cultures in question and the activities that have been identified. Similarly, the performance measures achieved by the four nations belie the extent to which they display the characteristics that have been shown to support high standards and capabilities, with the United Kingdom, the nation that registered the lowest propensity to the desired cultural characteristics, outperforming the other nations in many respects.

Little could be attributed to ascribed status apart from the negative association evident in the Japanese concentration on earthquake-proof buildings rather than addressing their environmental performance.

Table 11.6: The relationship between standards and capabilities and cultures

	Activities identified relating to standards and capabilities	Paternal/egalitarian	Affective	Ascribed status	Commun.	Alternative driver/ notes
Japan	Quartile ¹	1	4	2	2	
	Quake-proof buildings, not low carbon			x		
	Technological solutions					Economic benefit
	Poor energy and carbon performance					Geography
	Ability to innovate incrementally	✓	x			
	Public debate encouraged	✓			✓	
	Control from central government				✓	
Denmark	Quartile	3	2	3	4	
	Pollution-free shipping lanes				✓	
	Little climate mitigation activity		x			
	In a constant state of reform	✓				
	The impact of autonomy	✓			x	

¹ Quartile as illustrated in figure 11.5: 1 = highest quartile and 4 = lowest.

	Activities identified relating to standards and capabilities	Paternal/egalitarian	Affective	Ascribed status	Commun.	Alternative driver/ notes
Sweden	Quartile	3	1	4	4	
	Pollution-free shipping lanes				✓	
	Seeking “safe” environment		✓			
	Environmental care embedded		?			
	Desire to protect forests		?			Economic benefit
	Burning waste rather than reducing materials consumption			x		
	Willingness to report poor performance		?			Patriotism
UK	Quartile	4	2	4	4	
	Use of offsets/reducing criteria for some				✓	
	Environmental care embedded		?			
	Poor ability to follow innovations up					Short-termism
	Economic constraint					Short-termism
	Avoiding reporting poor performance					

Key: ✓ A logical link between the culture and behaviour clearly evident
 ? Potential link between the culture and the behaviour but with a logical argument to counter it
 x A behaviour that is directly opposed to that suggested by the cultural characteristic

Paternal/egalitarianism and individualism/communitarianism

Examination of behaviours that could emanate from the corporate culture also necessitated consideration of that culture’s individualism or communitarianism.

Once again, the Japanese and Danes have both shown behaviour that could be attributed to the corporate culture of either paternalism or egalitarianism, which again suggests that the manner in which I developed the scale could be questioned.

The Japanese “family” approach that encourages input from all levels of society gives the individual a voice that is incorporated into the final decision. This slows down the decision but speeds up its adoption. In contrast, Danish autonomy, under which the individual can take the initiative to make his/her voice heard, is potentially more disruptive. This is because of the associated individualism characteristic, which underpins the autonomy which has proved to destabilise their governmental structure.

Danes compensate for their individualism with a comparatively high number of cooperatives which have supported ventures such as the introduction of wind power. Cooperatives are a structure that could be expected in a more communitarian society (MacPherson, 2009). The Danes’ use of them, however, could be explained in part by the fragmented regional and municipal structure

that historically relied on cooperation to ensure viable economies of scale. It could therefore be argued that the cooperatives can emanate from self-interest and expedience rather than loyalty born of a paternal or person-centred organisational structure.

It could also be argued that Swedish patriotism rather than evidence of communitarianism underpins the Swedes' transparent reporting style where environmental measures are concerned. For them, failure is tantamount to national disgrace and by flagging the potential of not meeting their target early, they are ensuring the steps are taken to adjust the strategy accordingly.

Neutral versus affective

As with sensitivity to ethical issues, it is the affective dimension that has been shown to correlate with standards and capabilities (Caprar and Neville, 2012). Japan, the least affective nation in the study, creates high but realistic standards and has proved itself to be highly capable in arriving at solutions. This would suggest that the correlation derives from collinearity with another characteristic rather than from the dimension itself.

There is a little evidence to suggest that Sweden, the country that scored the highest in this dimension, is shaped by its affective nature in developing standards. The affective nature is most evident in Sweden's motivation to develop a safe environment. Embedding environmental protection in all policies, an approach adopted by both the British and the Swedes, could be attributed to the nurturing characteristic of the affective nature. It could, however, also be attributed to a logical approach to ensure that European directives are met. The Swedes' desire to protect their forests was explained by the need to preserve resources, making it an economic action rather than one driven by an affective culture.

11.3.5 Consideration of the cultural profile

Table 11.6 contained very little evidence that the correlations that have been found to be statistically significant in prior research can be upheld. The case studies do, however, include reference to other cultural characteristics that could account for standards and capabilities.

The most notable anomaly was identified in section 11.3.4, where I revealed that the standards achieved by the United Kingdom belie its potential based on

just the cultural characteristics identified to correlate with standards and capabilities.

In the cultural summary provided in section 9.1, I refer to the manner in which the British are good at low-tech solutions, and much of the reported improvement has been through adopting this approach. There are many examples in the case study that point to low-tech changes to the infrastructure that support change. Legislation has also provided a stimulus to change, causing the British to look for solutions including using technologies that have been developed elsewhere to good effect.

The manner in which these alternative causes of behaviour can be identified, including that of Swedish patriotism in section 11.3.4, augments the argument that dimensions of culture are neither discrete nor complete. This observation further undermines the validity of a purely statistical approach, and establishing correlation cannot be considered as meaningful as the more holistic approach recommended by Trompenaars and Hampden-Turner. At best the correlations between culture and policy development that have been established in literature might indicate characteristics that form part of a larger picture but of themselves cannot be considered either necessary or sufficient.

11.4 Financial support

The research undertaken by Parboteeah et al (2012) included in Caprar and Neville's meta-analysis (2012) correlated the extent of intentions to provide financial support for green initiatives with cultural characteristics. The authors identified a difficulty in locating accurate information that would provide a robust measure. This was a difficulty that I also experienced because of the transient nature of the offering of financial support, which can vary within a very short time frame, and a difficulty in identifying the extent to which the advertised provision of finance was actually delivered. This was complicated further by the different bases of comparison which could have been used, which could have been a percentage of GDP, a purchasing power equivalent or converting all into one currency.

The original work used the responses to two questions raised in the GLOBE survey (2004) which asked respondents to indicate if they would donate part of

their income if they knew the money would be used to reduce environmental pollution and if they would be prepared to pay extra tax for the same cause.

This research is seeking to ascertain whether there is evidence that those same cultural characteristics underpin a wider range of activities undertaken by governments in providing financial support for initiatives that aid sustainable development. This includes engaging business in proactive management with a particular interest in the SME. The basis of comparison, however, is constrained because there is no way of being sure all financial packages have been identified due to their transient nature, and the boundary between supporting SMEs in general and supporting the uptake of clean technologies is blurred, at times preventing the isolation of the environment-facing funding. This undermines a robust analysis.

11.4.1 The range of financial support

Financial support took a variety of forms. The western governments devolved the provision of finance to external agencies. As such, the British were the first to develop a green bank, with a fund of £3.8 billion provided by the government in 2012, to provide long-term investment in initiatives focussed on the diffusion of new technologies that are proved to be effective. Although the British also have numerous funding schemes for SMEs including the micro-organisation, only one of these includes provision for specifically environmental activities.

The British government does fund activities for which it retains control. This includes the development of the infrastructure that will enable all activities to be carried out with a lower environmental burden, as well as the allocation of funding to councils to become pilot projects for carbon reduction. Similarly it administers the Climate Change Levy, binding organisations that benefit from it to further carbon reductions.

The approach of the Danes was quite different. The sourcing of finance for projects supporting environmental development was also pushed more onto the private sector through the development of public-private partnerships, although their bottom-up top-down structure resulted in finance for wind power from central government. The Danes used financial incentives more extensively by creating a higher level of environmental taxes, potentially because their

fragmented regional and local governments did not enable the achievement of economies of scale.

In contrast, the Swedes did not use taxation as a primary tool to encourage sustainable development, their green taxes having been less than one quarter of their labour taxes. They have in contrast offered a range of financial packages supporting SMEs in moving towards sustainable development. This, however, has had limited effect because they were not of sufficient size to fund large-scale projects. The Klimp programme was the most targeted, designed to subsidise long-term carbon reduction initiatives.

Of the four nations, the Japanese were the most supportive of their SMEs where finance was concerned, with credit guarantees worth 7.3% of their GDP. This facilitated the granting of loans for SMEs, which are typically without the collateral required as security. Loans and subsidies were also granted to Japanese SMEs specifically for environmental measures by the government.

The holistic approach of the Japanese is beneficial in two respects. Firstly, by funding its financing through taxation on all entities, the government is creating an incentive for all taxpayers to adopt the technology, and secondly, the government not only support the SME but also the provider of technological solutions and buys back excess power created from private installations, its argument being that it aids diffusion that will itself drive down costs by aiding the development of economies of scale.

Typical to the Japanese holistic style of operating, they recognised that initiatives funded by the government to improve the infrastructure can also be considered to support the diffusion of the technology in two further ways. Firstly, it helps the business to achieve a lower environmental footprint with the least disruption to normal practice. At the same time, it also creates greater economies of scale, supporting the business producing the product, bringing the price down and aiding diffusion by enhancing the visibility of the technology. Fiscal measures can also support the diffusion of green activities by adjusting pricing in order to raise the competitive advantage offered by the greener choices.

11.4.2 Relating the provision of financial support to cultural characteristics

The provision of financial support has been found to correlate with five of the GLOBE's dimensions, adding "attitude to time" and "drive", a dimension tailored to align with assertiveness, to altruism, ascription and communitarianism. Illustrated in figure 11.6, all four countries score on or above the midpoint for their

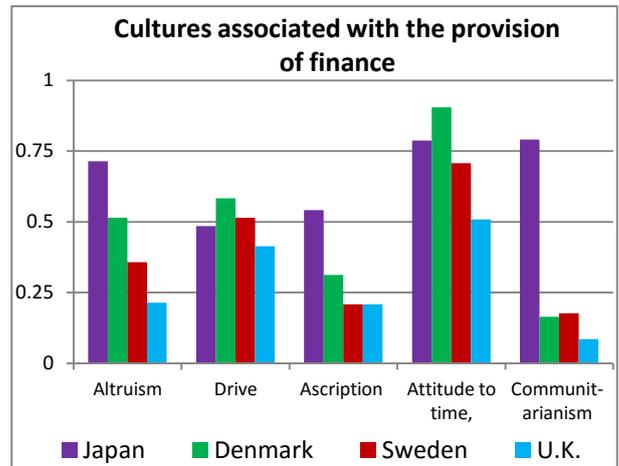


Figure 11.6: Cultures shown to influence the provision of finance

attitude to time. Little differentiates the four countries in respect to their drive, with Japan, Sweden and Denmark straddling the midpoint, and the United Kingdom registering a slightly lower score. Japan differed from the western nations the most in relation to its communitarianism and, to a lesser extent, ascription.

As explained at the beginning of section 11.4, the work underpinning this part of my research correlated two of the responses in the GLOBE project with its full range of values using hierarchical linear modelling, a process that requires the researcher to predetermine the status of the variables being tested (Parboteeah, 2012).

Factors linking the provision of finance to cultural characteristics within the four countries are summarised in table 11.7, which is followed by a more detailed discussion.

Most of the funding initiatives were linked to activities designed to reduce carbon emissions. To a certain extent all of the funding initiatives can be argued to be the result of an ambition to deliver on a nation's obligation under the Kyoto agreement and, seeing as little separates the four nations in this dimension, when attributing a culture to the behaviour, I was looking for alternative causes underpinning the activity. I have indicated in table 11.7 that the Danes' funding of wind power was attributable to the drive of the people rather than the government. It should be noted that this was a venture that was initiated long before there was any obligation on the government to reduce carbon emissions.

Table 11.7: The relationship between the provision of finance and cultures

	Provision of finance	Altruism	Drive	Ascribed status	Attitude to time	Commun.	Alternative driver/ notes
Japan	Quartile ¹	2	3	2	1	1	
	Guarantees for SMEs						Paternal element Benefits considered
	Loans and subsidies					?	Burden on taxpayer considered
	Buyback for renewable electricity					?	
	Policy based finance for SMEs				?		Paternal element
	Subsidies for wind power installations		✓				Benefits considered
	Subsidies to technology providers						Holistic thinking
Denmark	Quartile	2	2	3	1	4	
	Development of PPPs					✓	
	Funding for wind power		✓				Drive of the people, not government
	Danish Growth Fund						Nurturing/supportive
	Financial incentives						Result of autonomy
Sweden	Quartile	3	2	4	2	4	
	Klump programme		✓				
	Small-scale financial packages		✓				
	Targeted taxation		✓				
UK	Quartile	4	3	4	2	4	
	Development of the Green Bank		✓		?	?	Compensating for short-termism
	Mayor's green fund for London		✓		?	?	
	Few schemes specifically green					✗	
	Low-carbon zones		?				Could be attributed to a lack of trust in the use of grants etc.
	Development of infrastructure		?				
	Climate change levy		?				

Key: ✓ A logical link between the culture and behaviour clearly evident.
 ? Potential link between the culture and the behaviour but with a logical argument to counter it
 ✗ A behaviour that is directly opposed to that suggested by the cultural characteristic

Only two of the dimensions could be seen to potentially be relevant. The holistic communitarian style of Japanese thinking appeared to underpin the manner in which the Japanese provided finance. They provided a range of options and considered the impact of funding the packages not only on the taxpayer, but also on the supply chain. The action of the British and Swedes can be attributed to the characteristic I referred to as drive.

Tang, Hull and Rothenberg (2012) argue that a holistic approach to financing projects that ensures supporting infrastructures are considered at the same time can speed up the rate of change (section 2.6.1 of the review of literature). This

¹ Quartile as illustrated in figure 11.6: 1 = highest quartile and 4 = lowest.

approach is clearly in line with the Japanese mode of operation, which would suggest that it will reflect well in their levels of diffusion.

Future orientation

In spite of the need for all nations to reduce their carbon emissions and the associated need for finance, the nation's future orientation was seen to influence behaviours. In the case of the British, it was the projects close to launch that were funded, but the schemes themselves were in recognition of the need for funding in a pattern that did not fit with the short-termism that prevails. This, however, is a weak association and insufficient to maintain that it would correlate with the extent to which the nation's culture aligned with the dimension.

Communitarianism

There is little argument to align communitarianism with the provision of finance, although the Japanese were careful to include all sectors of society in the taxation that was designed to fund their initiatives in an attempt to encourage all sectors to engage in the projects concerned.

The United Kingdom, the most individual of the four nations, offers very few sources of finance, but prefers to invest in the infrastructure enabling all of society to reduce its impact on the environment without having to engage in changes of behaviour.

11.4.3 Consideration of the cultural profile

Yet again it has been difficult to identify any correlation between the culture and a specific behaviour. It should be noted that this was the one investigation for which the author of the original paper (Parboteeah, 2012) reported difficulty in identifying relevant performance measures. I found a similar difficulty but decided to look at the broader picture of government funding. This was undertaken to assess the extent to which these correlations in literature could be considered to be robust.

Deeper investigation into the cultural profile of the countries concerned demonstrates the manner in which the simplification of complexity can lead to false correlations.

The British were reported to be very short-term in their outlook and this is correlated to a lack of provision of finance. However, in the cultural sketch of the United Kingdom in section 9.1 I revealed that whilst the British are highly motivated by the prospect of short-term gain, they can when necessary accommodate long-term needs and plan accordingly. This was upheld in the case study because the United Kingdom was the first of the nations to develop a green bank, specifically to provide a route to funding that did not depend on a short payback period.

In section 2.4.5 I referred to the criticism that Hofstede's dimensions were oversimplified (Kirkman, Lowe and Gibson, 2006). This is an illustration of the problems such simplification can create.

11.5 Diffusion

The paper identifying the correlation between cultural characteristics and diffusion concentrated on the marketing of ethical products (Haxhi and van Ees, 2010). It did not consider the end result, namely the impact of that marketing. This study has examined the manner in which behavioural change has been encouraged by the governments concerned.

11.5.1 Dissemination of best practice

Dissemination of best practice occurred in a variety of ways. The western nations promoted "cleantech clusters" both electronically and physically with green business parks and networks. In addition to this Denmark facilitated searches for best technologies through their "State of Green". The Swedes provided free access to environmental information and promoted green labelling. They also encouraged businesses to publish their climate pact as a stimulus to encourage others to make pacts themselves. The British hold green conferences, promote green networks and awards and develop minimum standards.

Japan's approach is significantly different. Primarily, it believes that its role in the diffusion of best practice is outward-facing, showing other nations its technological input, which could be argued to be self-serving. Similarly, the Swedes are also committed to sharing good practice beyond their national boundaries, working with the other Nordic countries to help meet the aims of the OECD, and hosted the first UN conference on the environment in 1972.

The Japanese policy development process involves the participation of those affected by the policies. This aids diffusion because although it delays the development of the policy, its consultative nature educates the public, and the resultant adoption of the new policy is relatively rapid.

All four nations have considered the need for SMEs to be able to advertise their green credentials without necessarily adopting the rigour associated with ISO 14000. The Japanese have developed Eco-Action 21, which is a pared-down version of the standard more appropriate for the SME. The British have similarly developed ISO 14000 light; the Danes promote EMAS. The Swedes have led the development of ISO 26000, a broader standard based on CSR rather than environmental management.

Achieving behavioural change

Different approaches were taken to try to achieve behavioural change. The Japanese run publicity drives and campaigns to encourage behavioural change, such as sharing goods and investing in solar panels. The latter is supported further through financial incentives.

The Swedes ran campaigns to discourage the use of the car whereas the Danes promote the use of bicycles, having developed the cycle track and integrated it with the railways. The British and Swedes use more of a deterrent with congestion charging.

Developing the infrastructure

Of the four nations, Japan has undertaken the least where it comes to centrally developing the infrastructure in order to minimise the environmental impact of its people. This has in part been because of its geographic nature making it unsuitable for wind power and too vulnerable for nuclear power. It has, however, developed waste management and technologies that remove carbon from fuel, well ahead of the rest of the world. The level of detail in these initiatives extends to calculating the most efficient locations of waste plants in terms of the transport involved.

In comparison, the western nations have all attended to developing an infrastructure that will assist in the diffusion of good practice without demanding behavioural change. Most notable is the Danish development of wind power, something the British also sought to develop to a lesser degree of success.

Urban planning has included district heating and cooling and the promotion of the use of public transport.

The British and Swedes have converted some of their public transport vehicles to clean fuels. In Copenhagen the Danes have also paid attention to their water management scheme, and in the United Kingdom the British have attended to details such as replacing traffic lights with those using LEDs.

The Swedes build the ability to aid the diffusion of as yet undeveloped technologies into their systems such as by designing adaptability into their district heating so that the fuel source can be changed in the future without major change to the system.

Where they consider it necessary, western nations have imposed regulation to aid diffusion of good practice. The Swedes have built waste recycling facilities into their urban design, but regulate the public's use of them to ensure appropriate practice is maintained.

11.5.2 Relating diffusion of best practice to cultural characteristics

Figure 11.7 shows the two dimensions that were shown to correlate with diffusion in Caprar and Neville's meta-analysis for the four nations. The Japanese demonstrated the highest level of communitarianism. Denmark had the longest attitude to time, and was the only nation of the four to register in the upper quartile in the continuum.

The British culture demonstrated the lowest level for both cultural dimensions, falling in the third quartile.

The two papers underpinning this element of my work both related to ethical practice demonstrated in the process of knowledge exchange rather than diffusion of ethical practice itself (Paul, 2006; Haxhi and van Ees, 2010).

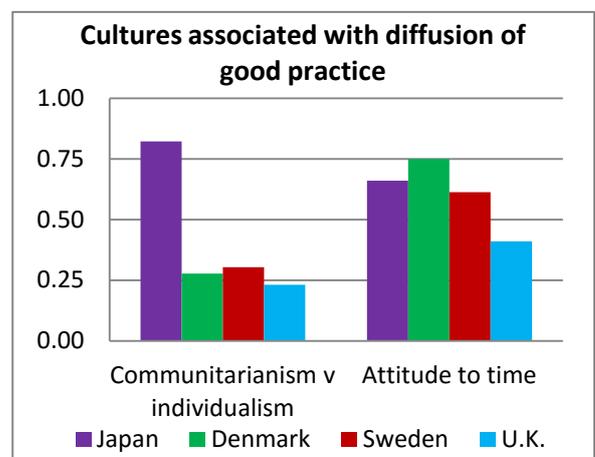


Figure 11.7: Cultural characteristics underpinning the diffusion of good practice

Factors linking activities undertaken to aid diffusion with cultural characteristics within the four countries are summarised in table 11.8, which is followed by a more detailed discussion.

Table 11.8: The relationship between diffusion and cultures

	Activity to aid diffusion	Attitude to time	Commun.	Alternative driver/notes
Japan	Quartile ¹	1	2	
	Policy development aiding diffusion		✓	
	Sharing with other nations		✓	Promotion of Japan
	Publicity campaigns	✓	✓	To achieve behavioural change
	Eco-Action 21			SME support
	Pioneer technologies to aid recycling	✓		Investment with a long-term payback
Denmark	Quartile	3	1	
	State of Green		?	National pride/economic benefit
	Cleantech clusters		?	Support to counter autonomy
	Promotion of EMAS			SME support
	Green wave/cycle track			
District heating and cooling		✓		
Sweden	Quartile	3	2	
	Cleantech clusters		?	Business support
	Free access to environmental information			Business support
	Green labelling			Business support
	Sharing with other nations		✓	
	ISO 26000			SME support
	District heating and cooling		✓	
	Flexibility to adapt to new fuel sources	?		
	Regulation of waste handling			Evidence of universalism
Traffic congestion charges			Evidence of universalism	
UK	Quartile	3	3	
	Cleantech clusters		?	Business support
	Conferences		?	Business support
	Green awards			Business support
	Minimum standards			To achieve targets
	ISO 14000 light			SME support
	Infrastructure development			To achieve targets

Key: ✓ A logical link between the culture and behaviour clearly evident
 ? Potential link between the culture and the behaviour but with a logical argument to counter it
 ✗ A behaviour that is directly opposed to that suggested by the cultural characteristic

Communitarianism

I have already discussed the potentially compromised nature of this dimension, suggesting that the two ends of the communitarianism versus individualism continuum are not mutually exclusive. However, there is evidence to suggest

¹ Quartile as illustrated in figure 11.7: 1 = highest quartile and 4 = lowest.

that, in including the public in decisions, the communal attitude of the Japanese contributes to the speed of diffusion.

The outward-facing nature of the Japanese is such that the people are aware of new initiatives by the time policies are introduced, meaning that, whilst their inclusive decision-making style delays policy development, diffusion is rapid once the process is complete. This style of thinking is not identified in any of the dimensions of culture, but I would argue it would align with communitarianism because of its all-inclusive nature.

In contrast, few actions of the British can be attributed without question to communitarianism; rather, they demonstrate the action of a government seeking to create a healthy environment for its nation's business. It could be argued that the clusters and conferences are a deliberate attempt to counter the isolation caused by individualism. Their declared intent was to help the SME identify appropriate environmental action that its small nature would normally prevent it from taking.

There are numerous instances that suggest the individualist culture of the Danes works against their efforts to reduce their environmental impact. Denmark has been shown to be a nation that can innovate and is strong with its cleantech ethos. However, business and government alike do not manage to achieve economies of scale, impeding the ease with which their technologies can diffuse.

The Swedes and Japanese both have an outward focus. They also both believe in disseminating their best practice to other countries. The more individual Danes do so in a different manner, by advertising their produce in the State of Green, which also enables their own developers to identify the latest technologies. However, it could be argued that all three of these governments have adopted practices that yield economic benefits.

Attitude relating to time

In theory, it is argued that a long-term view is needed for a population to accept the long-term payback period expected from the investment in technologies designed to reduce environmental impact, such as that of the Japanese developing recycling technologies

The Danes hold the longest-term view of the four nations but their general attitude is that “business as usual” is compatible with sustainable development and their efforts to aid diffusion are more in line with those designed to support business interests and combat the negative influence of individuality.

The Swedes, who do not hold such a long-term view as the Japanese, use a variety of methods to aid diffusion, from regulation through to building flexibility into their infrastructure to aid the adoption of as yet unforeseen fuel sources. This, however, cannot easily be attributed to their time horizon, rather being a reflection of their determination to reduce their carbon emissions.

I would argue that short-termism along with individualism have acted as a goad that caused the British government to establish structures to compensate for those characteristics and aid the diffusion of good practice.

11.5.3 Consideration of the cultural profile

In all but the case of Japan, few factors that demonstrate efforts to aid diffusion are related to an attitude to time. This would undermine any suggestion of a correlation between the attitude to time and diffusion because the Danes, who have the longest view of time, are not considering the long-term impact of their actions, considering “business as usual” an acceptable approach.

The cultural characteristics identified in each of the case studies add further insight to the ability of the nations to change. The British are reported to find change difficult, being inwardly directed. This has been addressed by local governments through the development of minimum standards, the use of awards to encourage change and accommodating change in the infrastructure.

The Japanese will accept tacit understanding, not demanding logical justification. This leaves them more open to accept the need to change practices, although this observation should be qualified by the findings in the case study which demonstrated that business interests will be upheld in preference to those of the environment.

Although the Swedes are highly individual, they are also outward-facing, which causes them to ensure their community is strong. Hampden-Turner and Trompenaars argued that this would leave them more resilient to change. In contrast, the inward-looking Danes are prepared to break rules if they consider

it expedient. This illustrates independence that underpins an ability to change. However, it could also cause resistance to change that is not desirable.

In each case study examined, there are qualifiers to the cultural dimension that alter the way in which its influence can be observed in practice. Yet again the difficulty of oversimplification within the cultural dimensions and the isolation of one activity within the complex and interrelated subject of sustainable development renders the use of statistical correlation an ineffective tool.

11.6 Overall synthesis of patterns

Through the process of comparing the performance of the four nations against their cultural dimensions, certain patterns have become clear that cast doubt on the potential of relying upon correlations between individual cultural characteristics and behaviour, and question the veracity in grouping cultures by geography. The levels of performance illustrated in table 11.5 are revealing.

Of greatest interest where the specific cultures in question are concerned is the case of Denmark, the country that purported to set the highest standards and displayed many of the characteristics that would have predicted that it should have been one of the better-performing nations. This has not worked out in practice where materials management is concerned, their performance being worse than that of the OECD average.

The authors of the GLOBE study suggested that performance of Nordic countries would be similar, and in the majority of cases the performance of the Danes and Swedes has upheld this observation, but this was not the case for a number of measures including energy productivity and intensity and materials management.

The authors of the GLOBE study also maintained that countries with shared geographies and similar latitude shared similar cultures. Both the UK and Denmark inhabit the same latitude and, according to the GLOBE study, fall within the classification of “marine west coast” (section 5.2.4). This study has shown that, when translated to environmental performance, these groupings are not entirely robust. Such generalisation masks substantial difference.

11.6.1 Sustainable development

Sustainable development is a complex activity. It requires the sensitivity to recognise the need, innovation to develop alternative technologies and the ability and willingness to finance long-term activities. There is also a need for a dual focus on reducing the input of energy and material resources whilst also reducing and managing the waste and carbon footprint for the entire process, including energy production. Critically, the behaviour of the end consumer also needs to change. This study has found that each country studied has its areas of excellence, but none of them are excellent at everything.

This is illustrated in the case of Sweden's emissions, which are the lowest per capita in the sample. The Swedes exploit every opportunity to produce the highest proportion of their energy using renewable resources (section 7.4.3). However, in table 11.5 it was demonstrated that they are more complacent with respect to its use. If they improved this as well, their carbon emissions would be reduced further.

A similar situation exists with the waste management of the Danes that enables them to minimise the use of landfill. However, they do not manage materials usage and are the worst nation in the sample in associated measures. It has been shown in section 8 that Denmark is a comparatively wealthy nation with appreciable spending power. Criticisms have been levelled at cultural frameworks in that they do not consider the impact of wealth (section 2.4.7). In addition, in sections 2.2.1 and 2.2.2 I show how affluence facilitates consumerism, which creates a high demand for materials that, in the case of the Danes, is only managed once materials enter the waste stream. Wealth, however, is not sufficient to cause materialism; there also needs to be the motivation.

The Japanese are excellent at incremental innovation, developing and refining technologies that are world-leading. In section 2.6.4 of the review of literature, I identify the shortcoming of incremental change in that the innovator can be prevented from identifying appropriate solutions by their level of understanding of the technology concerned. This does not appear to restrain the Japanese, who are expert at developing technologies addressing complex situations. However, they tend to rely on technology and overlook some aspects of environmental management as a necessary focus of attention.

The British achieve the highest level of energy productivity and the lowest energy intensity per capita, and equal the Japanese in their domestic materials consumption, performing better than the Scandinavian countries. However, the British have the worst record in the sample in the production of energy from renewable sources, and the sending of materials to landfill.

11.6.2 Culture

The complexities of sustainable development are compounded by the complexity inherent in cultural studies. Hofstede and House were both criticised for their statistical approach. In contrast, Hampden-Turner and Trompenaars advocated examination of the entire cultural profile. This study has found that this latter approach is the more robust, having found that a wide range of factors could prove to be the influential characteristic in any given situation.

This was illustrated to be the case with the British, whose performance indicators belie the fact that their profile does not embody many of the characteristics that have to date been seen to correlate with sustainable behaviours. Hampden-Turner and Trompenaars identified that the British are innovative (section 9.1) and can plan effectively for long-term demands when they are convinced it is necessary. These characteristics that do not fall into any one of the dimensions appear to have been highly influential in their management of environmental issues.

The differences that have been observed between the Danes and Swedes are also of interest. This is because they share a very similar cultural profile, but minor differences, such as the outward-facing attitude of the Swedes, have had a significant impact on their performance. The energy intensity of the Danes is 60% that of the Swedes, and is equal to the best in the sample.

In this thesis I have, however, identified cultural characteristics which appear to support appropriate behaviours. The affective nature confers a sensitivity that can underpin environmental care, but this has been qualified. It is neither a necessary prerequisite nor sufficient to stimulate sensitivity to environmental needs, being much more likely to underpin sensitivity to social need. In this aspect, benefit to the environment has been shown to occur when action is also in society's interests.

Cultures that form flat hierarchies have also been seen to underpin action to develop solutions to environmental issues. It is argued that this is partly because their management is closer to the problem, raising its visibility, and in part because they have the capacity to be more agile.

It has also been shown that highly paternal cultures influence the standards and capabilities of the nations concerned, by giving the populace a voice. The outworkings of this, however, differ, with the paternal and inclusive culture of the Japanese demonstrating an ability to develop sophisticated and complex solutions that embody the breadth of opinion, whereas the individualist culture of the Danes results in potentially destabilising action.

In section 5.4 I raised the question of whether it is apposite to use dimensions of culture developed from a study of the corporate world for a study of government action. Two examples that emerged in the development of the case studies suggest that, as found with prior research, it is an acceptable approach. In the case of the Danish government, its mode of operations accommodates the autonomy of the people (section 8.2.1); government action is underpinned by an understanding of the national culture. The mode of Japanese government that seeks to incorporate the opinion of the populace in its decisions is an example of the manner in which Japan's culture directs government operations in a similar way to those undertaken by business.

11.7 The impact of the findings on the current understanding of culture and sustainable development

One purpose of this thesis was to assess the character of correlations that have been established to date. Their character was determined in part because this is an area of research that has only been investigated over a short period of time. I have found a little that would substantiate the correlations reported by Caprar and Neville (2012):

- Aspects of corporate culture are seen to correlate with policy development. The “family” and “incubator” organisational structures tend to underpin most of the structures and activities supporting sustainable behaviours. In particular, it is the manner in which the individual is given a voice that appears to be the critical characteristic.

- There is some evidence that the universal culture and, to a lesser extent, the affective culture underpin activities that lead to policy development.
- There is some suggestion that drive, the characteristic of perseverance and aggressiveness, correlates with the provision of finance and, to a lesser extent, a long-term outlook and a communitarian culture.
- There is evidence that a communitarian culture also supports the diffusion of cultures.
- Religious tenets can lead to cultural characteristics that are not captured by cultural dimensions.

11.7.1 Using statistical analysis when analysing a subject area with little prior research

It was interesting to note that in half of the papers relating to sensitivity to ethical issues, researchers were using the findings of Christie (2003), the earliest of the papers, to guide the selection of parameters to be investigated, meaning that findings were limited to the breadth of discovery in the first paper.

There also appeared to be an acceptance that a parallel study would render similar results. This occurred in the paper I used, Caprar and Neville (2012). The paper was entitled “‘Norming’ and ‘conforming’: integrating cultural and institutional explanations for sustainability adoption in business”, but only three of the papers in the meta-analysis focussed specifically on sustainability. The remainder related to the more general topics of ethics and CSR. These had a much higher proportion of material relating to societal care rather than environmental, to the point that one did not refer to any environmental issue at all. I have established in this thesis that some of the correlations found between ethics and culture were also substantiated when relating the subset of the subject, namely sustainable development and culture

11.7.2 Alternative explanations

The purpose of this study was to assess the extent to which cultures have been found to influence sustainable development. This is a much broader basis than the more constrained activity of identifying correlations between specific dimensions and behaviours.

Hofstede and House et al both identified correlations between pairs of cultural dimensions. It was established in section 4.7.2 that the characteristic of the

individualism versus communitarianism dimension is somewhat compromised by the question of whether the “individual” includes the family group, resolved in part by House et al in the GLOBE project by developing two dimensions related to the individual.

Hampden-Turner and Trompenaars identified a different dimension that worked in conjunction with the individualism versus communitarianism dimension. Their concept of inward- and outward-facing attitudes that can be held by groups regardless of their position on the continuum has proved to be of relevance in this study.

All these issues substantiate the complexity of studying culture and compartmentalising a multifaceted concept. I would argue that culture does influence the manner in which activities promoting sustainable development are conducted. The problem that I see is in limiting the analysis to individual activities within the remit of sustainable development and to the cultural dimensions themselves. What is clearly apparent is the limited range of dimensions that have been shown to correlate with behaviours that support environmental sustainability. With two ends for each dimension there were potentially 10 of Hofstede’s cultures and 18 characteristics identified in the GLOBE project. However, only five of these correlate with the majority of the behaviours.

For reference, table 4.7 is repeated below:

		Values and sensitivity				Standards		Diffusion		Action	
		Judgement of ethical scenarios	Ethical attitudes	CSR values	Perception of unethical scenarios	Capacity for sustainable development	Social/environmental performance	Marketing ethical norms	Diffusion of codes of good governance	Ethical policies	Financial support for sustainability initiatives
H: Hofstede’s dimensions G: The GLOBE study											
Framework used		H	H	G	H	H	H	H	H	H	G
Individualism versus communitarianism	L			✓	✓			✓	✓		✓
	H	✓	✓			✓					
Neutral versus affective	L				✓	✓	✓			✓	
Family corporate culture	H	✓	✓	✓		✓	✓			✓	
Achievement versus ascription	L				✓	✓	✓				✓
Universalism versus particularism	H									✓	
Altruistic	H										✓
Attitude to time	LT							✓			✓
Drive	L										✓

The adoption of broader definitions for all of the characteristics identified in the research included in the meta-analysis carried out by Caprar and Neville reveals a further pattern. What becomes apparent is that the characteristics that support all but the provision of finance and diffusion are those that value entities and embody a supportive caring attitude.

To confirm this observation, I have re-examined the nature of the dimensions in question. Their broader definitions are provided in table 11.9. The relevant end of the continuum is in bold. For most of the terms below, the essence described by the relevant theorist has been used. When there was not a succinct term available, I found synonyms in the Oxford Dictionaries thesaurus and, apart from the word “altruistic”, used the root of the term. These are the words in bold italics.

Table 11.9: Cultural characteristics defined using broader terminology

Continuum	Broader description
Individualism versus communitarianism	These could incorporate outward-facing cultures: When including outward-facing characteristics either end of the continuum could be considered to be supportive
Neutral versus affective	Nurturing/caring/supportive
Family corporate culture	Protective/caring/supportive
Achievement versus ascription	People (and entities?) valued in their own right
Universalism versus particularism	Value equality for all general/all-embracing
Altruistic	Philanthropic/unselfish/compassionate/public-spirited
Attitude to time	Long-term view
Drive	Proactive, aggressive, confident/commanding/assured

What becomes clear is the degree of overlap between the cultural characteristics concerned. This is not the same as the identification of correlations between dimensions that has already been noted by Hofstede; rather, it is clear that the continua for a number of dimensions are underpinned at one end by similar qualities. I would argue that it is this more general shared quality of being caring and supportive that is responsible for many of the activities in question rather than the precise description that is the antithesis of the opposite end of the continuum.

A supportive and caring attitude is not all that is needed to ensure that a nation is likely to adopt sustainable behaviours. Valuing the environment (see section 11.1.4), being proactive and adopting a long-term view were also seen to be

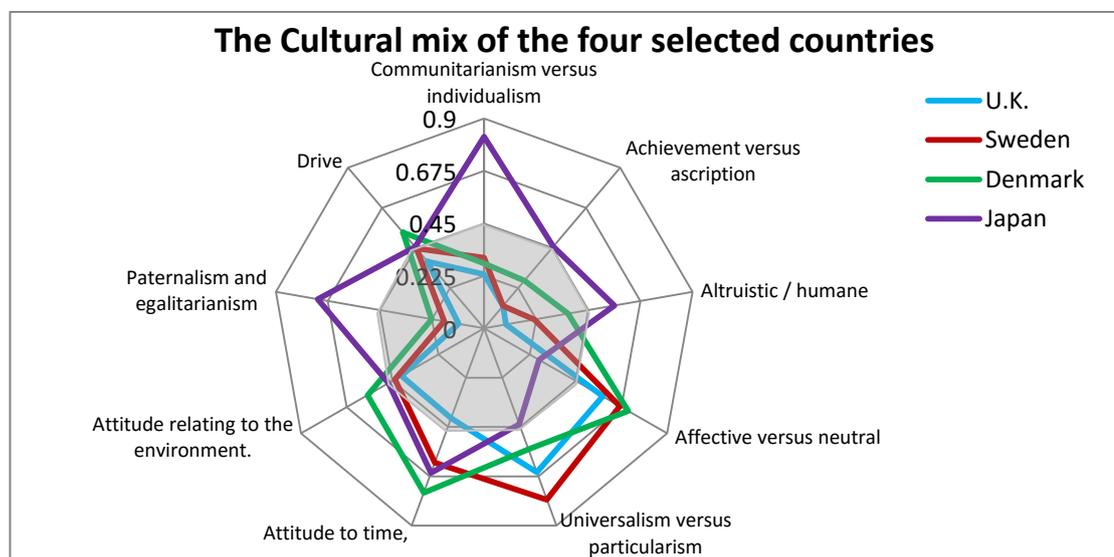
necessary. These not only were identified to be influential in the case studies but are supported by logical reason. It stands to reason that, when an entity is valued within a society that possesses the cultural characteristics that are supportive, that society will take steps to protect it from potential harm. The final two characteristics, those of taking a long-term view and being proactive, would logically be of relevance when the immediate cost in terms of effort or resources is high.

11.7.3 The characteristic of scores for cultural dimensions

In section 1.4.3, I made it a purpose of this thesis to assess the extent to which cultural characteristics work together in determining behaviours. In section 5.2, I raised questions relating to how scores could be developed that combined two or more characteristics that had been shown to contribute to a behaviour. I raised two questions: firstly, whether cultural dimensions were equally weighted or whether one was more dominant than the others, and secondly, I questioned the impact of the middle scores in a continuum.

The findings from my work would suggest that it is inappropriate to consider developing a composite score. This is because cultural characteristics interact with the external circumstances that are unique to every country and, depending upon the mix of characteristics, different ones become the dominant driver of behaviour.

In response to the second question, I have repeated figure 5.9 below, but the scale has been adjusted to show the quartiles. The lower two quartiles have been shaded, highlighting the midpoint.



It can be seen that the UK tends to the central position in four of the nine characteristics, and only scores in the upper half in one dimension. Table 11.5, however, shows that the British have performed well across the range of activities, with the best performance in 6 out of the 16 measures, and the worst in only 3. As established in the above discussion, a mix of characteristics is needed to deliver behaviours contributing to sustainable development. This would suggest that the midpoint is not necessarily a null position. This is potentially a significant finding and one that statistical correlations would not pick up.

11.8 Consideration of alternative drivers of change

Chapter 10 was a control study that considered alternative reasons that could potentially account for the changes that have been observed. My results were inconclusive. I was looking for difference in performance based on population density, income, political party and whether a specific project such as the zero-carbon initiative could influence performance, but no patterns emerged. The study did, however, raise the possibility that the degree of trust exhibited in a ruling body could influence the performance within the borough.

11.9 The impact of the findings on the system of paradigm change

Section 4.5.3 summarised the manner in which paradigms change using systems methodology and concluded that the government was best placed to drive change, although, as Steger concluded, it was constrained by its other functions.

11.9.1 Culture as a point of intervention in the sign graph

One of the strengths of systems thinking is that the maps can be used to test the impact of intervention. I have started by adding the desirable cultural characteristics to the sign graph.

The sign graph in figure 4.12 illustrated the central role of potential profit in driving long waves and the associated paradigm change. The impact of the principal cultural characteristics has been added to the sign graph in figure 11.8.

A caring and supportive culture was seen to influence the scope of benefits that could be included with “potential profit” from an action. This has been given a shared arrow head with values and sensitivity because the environment should

be valued either in its own right or for what it can deliver to society for action that reduces the environmental footprint to be recognised as profitable. This characteristic is considered necessary but not necessarily sufficient to prompt action.

Drive and a long-term view have been linked to investment. The influences of these are independent of each other, as reflected in their arrows. They are qualities that were shown to underpin financial support, but in this diagram investment also incorporates resources, effort and skills. I see little need to separate these from financial investment because they are all resources that can be accounted for and sound management would ensure that they are used profitably.

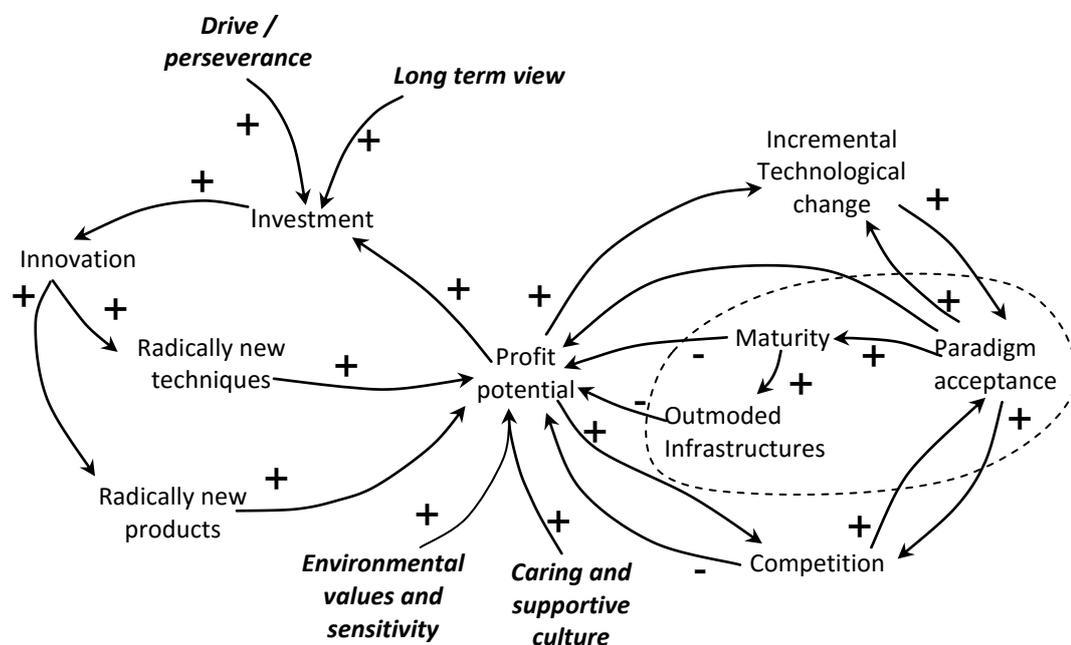


Figure 11.8: A sign graph of the manner in which paradigm change is linked to long waves with the inclusion of cultural characteristics

11.9.2 The potential reach of governments

In section 2.3.3 I introduced the manner in which Spangenberg considered the extent to which business can be an agent of change or harm where the environment is concerned and the argument of Hahn and Figge (2011) advocating that institutions including governments should be supported along with society and the environment in order to achieve sustainable development.

Consideration of this in the light of business decision making discussed in section 2.6 reveals the extent of the behavioural change that can be achieved by governments outside the realm of policy development. In section 2.6.6, I

argument that they needed support was identified in section 4.5.1 and qualified in section 4.5.2. The critical starting point is the need for governmental acceptance that the environment needs to be supported.

This is the natural focus of neither governments nor business, especially in cultures that take a short-term view and prioritise the financial bottom line. Consequently it would suggest that intervention of governments should not only help develop the necessary skills and allocate resources, but also align the advertised benefits of action with the inherent values and sensitivities of the nation. Governments should seek to enhance the perceived value that can be achieved from making the necessary changes to lower the environmental impact of activities, using arguments that resonate with their people.

This is what has been achieved to a certain extent by all four of the governments that have been examined. Most notable where diffusion is concerned is the case of the Japanese government. In garnering the opinion of society and incorporating it in the final strategy, Japan causes diffusion to occur with greater speed because the resultant policy is aligned with society's values.

The western nations, however, use other devices including certification, regulation and facilitation to achieve this. In the United Kingdom the approach is largely on identifying the economic benefit that can be achieved in advertising green credentials and in lowering resource usage, and the government's efforts have included extensive knowledge exchange efforts.

The Swedes value their natural environment, which was endangered by the action of other nations, leading to a sense of vulnerability that heightened their desire to protect it. The Swedish government is careful to keep its people informed, including by the use of labelling, which has proved to be an effective strategy because the people are already motivated to support the cleaner technologies and value being informed.

Sharing many of the characteristics of the Swedes, the Danes also value autonomy. Like the Swedes, their activities to facilitate behavioural change have included transport, waste management and energy management. Use of the bicycle has been successfully promoted because the government has made it the easiest mode of transport, delivering independence, a value that the Danes uphold.

11.9.3 Embedding culture in the system of paradigm change

Having identified the role of culture in the sign graph, it is also possible to embed it in the final systems map of chapter 4 (figure 4.10), which incorporated all of the elements that theorists have found to be of relevance to paradigm change. For the sake of legibility, I have used shortened versions of the terms.

To be technically correct, the cultural characteristics should remain in the environment, but then their addition to the diagram reveals little. I wanted to place them at the point where they were of the greatest impact.

The two cultural characteristics of a caring and supportive nature along with valuing the environment in its own right need to pervade the entire system in order to facilitate paradigm change in a manner that causes the new paradigm to be more sustainable than the last. The impact of this quality is represented with bold broken lines. The principal actions that support paradigm change remain in bold unbroken arrows. This would suggest that a culture needs to have these characteristics embedded within it for such an outcome to occur.

In contrast, drive, persistence and a long-term view are only needed by those investing time, finance or resources in new technologies, including product champions who will aid their adoption. This is removed from the government, but there remains a link demonstrating the stimulus that can be given by the government, which can include the funding. This would mean that the government itself would also need the characteristic of drive, which is contrary to the label of bystander identified by Steger (section 2.6.3).

This substantiates the nature of the “conscious operation” referred to by Ruckelshaus in section 1.3 in that it is necessary to encourage those involved in investment decisions to recognise the need for these characteristics regardless of whether it is a characteristic demonstrated by society as a whole. However, when finance is provided by governments then action will need to be taken to mitigate the need to satisfy the populace who in fact bear the expense and to keep such action detached from creating political vulnerability.

Trust has been placed in the environment near the social subsystem, to indicate the link that has been established between trust in local government and the degree to which environmental behaviours have been adopted. It is in grey to signify that it is as yet only a tentative connection.

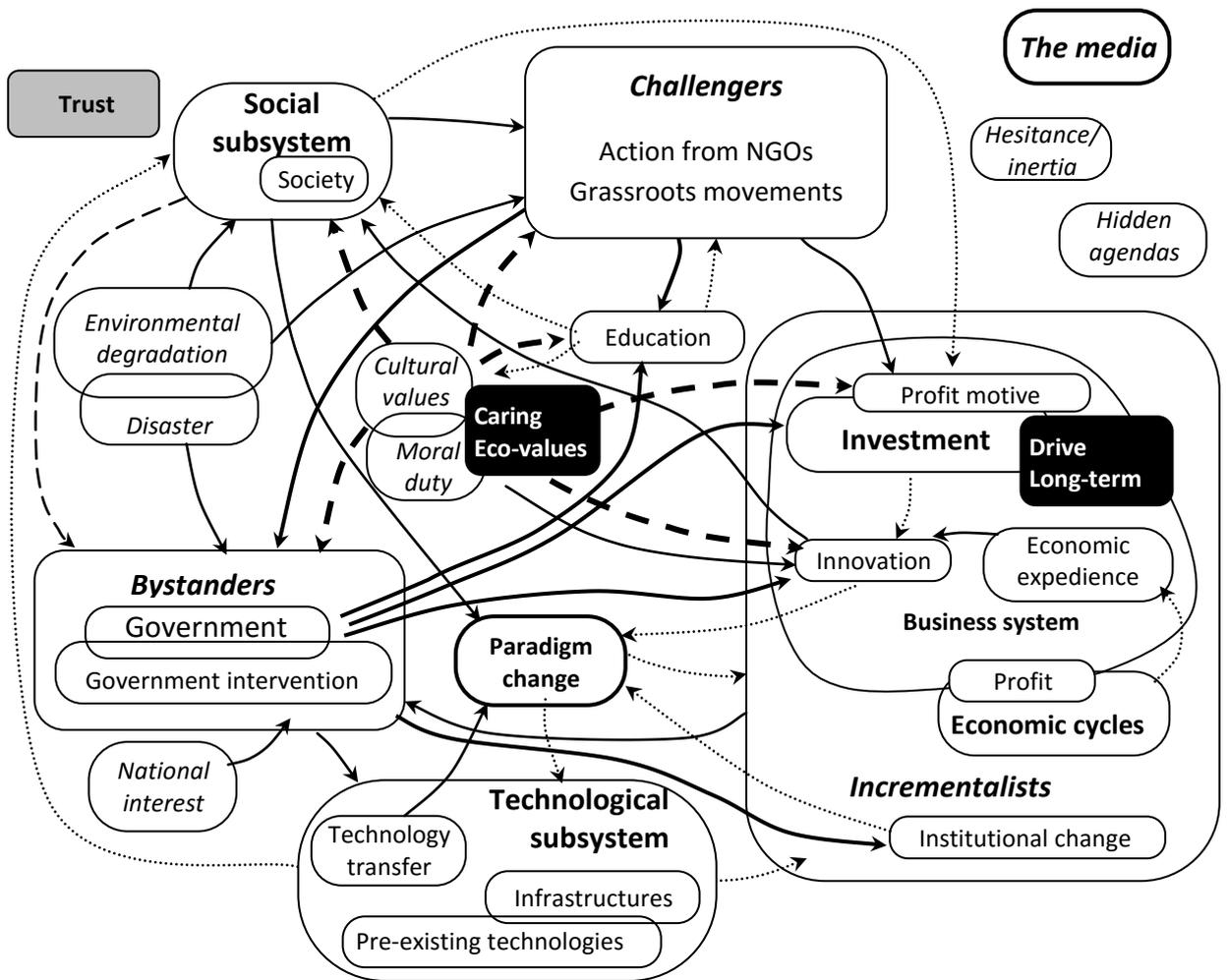


Figure 11.10: Embedding cultural characteristics in the systems map of paradigm change

Chapter 12. Conclusion

I opened this thesis with the following quotation from Lévi-Strauss: “If you don’t understand everything, you don’t explain anything” (Lévi-Strauss, 1978, p.13). Lévi-Strauss stated that this was the attitude of the “savage mind”: people who had lived close to the land in a sustainable manner for centuries (Wills-Johnson, 2010) before the enlightenment and the introduction of the scientific investigation.

Lévi-Strauss (1978) claimed that in creating disciplines that artificially segment the strands that work together to form a society and its environment, modern thinking has moved into a mode of reductionism that renders explanations of events vulnerable to the accusation of bias which could be so severe that conclusions drawn in one discipline are untenable in another. With some disciplines this is not a matter of great concern, but the implications that surround the subject of sustainability are such that we cannot afford to ignore the broader picture.

In this thesis, I have been examining the interaction between culture and sustainable development. There is a growing body of research undertaken that shows a statistical correlation between the two concepts. However, I argued that these correlations, the product of a reductionist approach to the subject, required the integration of a broader range of issues before it was possible to ascertain the value of such findings. I argued that, especially when considering concepts of such a complex nature, holism rather than reductionism is the appropriate approach (section 1.5).

For this reason, my thesis has been extensive, and it could be contended that the literature is somewhat divorced from the subsequent study. It has, however, been necessary in order to provide the foundation on which to build my investigation.

It is generally accepted that sustainable development involves ensuring the sustainability of the economy, society and the environment (section 2.3). The focus of my work has concentrated on the response to the needs of the environment. In the same way that my work has been interdisciplinary, my findings have been broad-ranging. In this chapter, I review them individually and assess their impact on current considerations found in literature.

12.1 The response to the need for sustainable development

In section 1.4, I explained the need to understand the agents of change together with the recognition of their scope and ability to make appropriate decisions.

The review of literature yielded important findings, most notably in the observation that all criticisms of sustainability models were directed at the weak elements within an interpretation, whereas models that upheld the strong interpretation attracted little criticism (section 2.3.3).

My investigation into decision making including consideration of the role of the decision maker identified that the tendency was to select the more incremental change. Even though incremental changes can over time deliver considerable change, they are bounded by the paradigm in which they are rooted (section 2.5.11).

I have established that the potential reach of governments is extensive (section 11.10) but they are constrained by party politics, the need to balance all three pillars of sustainability and the forces of political choice (section 2.7). This would tend to limit the degree of change that is promoted (section 2.7.1).

In that I have found tacit agreement that the strong interpretation of sustainability that demands paradigmatic change is the appropriate approach and also found that natural tendencies avoid the radical change that would facilitate it, my findings support the consideration of Ruckelshaus that attaining a sustainable position requires a “conscious operation” and explain why appropriate action is deferred until the impact of inaction makes it an unavoidable demand.

12.1.1 Consideration of the implications

This finding undermines work supporting the concept that business as usual is compatible with a sustainable paradigm. The “conscious operation” referred to by Ruckelshaus needs to be broad-ranging and the entities involved should be identified in the light of figure 4.11 in section 4.7. The multiple cause diagram illustrates the process of paradigm change and identifies the potential role of governments, business and society. Delivery of the “conscious operation” can be aided by the media, researchers and educators.

The concept that sustainable development can be achieved with business as usual is a belief that is held by many, including the Danish government. It validates the notion that behavioural change is not necessary and is one of the key causes of procrastination where taking necessary action is concerned.

The “conscious operation” has been shown to be viable for business by authors such as Porter and van der Linde (1995), McDonough and Braungart (2002) and Leavoy and Phyper (2010) providing many examples of business models that are both sustainable and profitable (section 2.1.4) The limiting factor remains resource use, which, as shown in section 2.4.1, renders the consumer culture that is supported by mass production untenable. Research into the profitable use of more disparate resources is needed if a sustainable future is to be secured.

12.2 The relationship between sustainable development, culture and research methods

In section 1.4.3, I explain that I am seeking to investigate the nature of the correlations that have been identified in literature. In sections 11.8.1 and 11.8.2 I explain that the research method itself needs careful consideration in order to ensure that findings can be considered robust. In this section I consider the characteristics of culture and sustainability as well as those of statistical correlations themselves.

12.2.1 Cultural dimensions

Hofstede and House both used a positivist multivariate analysis to produce their scales of cultural dimensions. In contrast, Hampden-Turner and Trompenaars used a phenomenologist approach, providing qualitative descriptions of cultures considering the interaction between the different dimensions (section 2.4.8).

In chapter 11, I have compared the two approaches, concentrating on activities that have been found to correlate with specific cultural characteristics, and found that it is not possible to find concrete evidence to support many of the statistical correlations. The causes of the difficulty that could be attributed to the cultural dimensions are varied, namely:

1. They are not discrete. They are influenced by other dimensions (sections 11.1.3, 11.1.4, 11.3.4, 11.3.5).

2. They are oversimplified (section 2.4.5).
 - A specific characteristic within a cultural dimension could be the pertinent factor influencing a behaviour, but the entire cultural characteristic is too broad to be an effective predictor of behaviour (section 11.2.6).
 - Nations could be aware of the shortcomings in their culture and take active steps to remedy them (section 11.5.3).
 - The manner in which the GLOBE project identified responses for values and action that differed to the point that they were for some characteristics negatively correlated demonstrates the sensitivity of the correlation to the precise wording of any question.
3. They can be shaped through external factors, creating unique characteristics that are not captured in either Hofstede's dimensions of culture or the GLOBE project (section 11.1.4).
4. Assumptions about behaviours should not be based on classifications such as "Nordic" or "marine west coast".
5. The central point is not a null value. This suggests that the midpoints demonstrate characteristics that are evident at both ends of the continuum, which could potentially make the nation with such properties more flexible.

The first two points had been identified in my critical review of literature, but had not deterred analysts from using the framework as a basis for analysis. The criticism of simplicity was made of Hofstede's work (section 2.4.5), but, seeing as some of the dimensions in the GLOBE project correlated with those of Hofstede, I would argue that the same can be said of the GLOBE project.

Hofstede recognised that his dimensions were generalisations that could potentially be used inappropriately, stipulating that they should only be used to assess behaviours at a national level (section 2.4.5). He did not express concern about their use in complex situations.

12.2.2 Analysis of individual activities that are associated with sustainable development

My analysis revealed difficulties emanating from seeking to analyse individual activities that lead to sustainable development. These relate to the complexity of

the subject, depending upon many interconnected demands. In particular, I found the following:

- Recognition that the environment needs to be protected is an essential precursor to sustainable development (section 2.2). Nations with cultures that do not support this realisation are unlikely to take action to protect it.
- Policy development is inextricably linked to standards and capabilities, in part because the policy incorporates the standards that are set as targets.
- Diffusion depends upon the sum of all other activities: the policy, the standards set, the capabilities to achieve objectives and the finance provided to support appropriate action.
- Financial support cannot always be measured in comparable ways.
 - A government may invest in an infrastructure that lowers business expenses rather than provide funding to the business itself.
 - Financial support, especially at governmental levels, is dependent upon the economic conditions at the time. A government having to impose austerity measures cannot be as open-handed as it would be in times of prosperity.
 - Funding in the form of tax relief is dependent upon the profits generated that would determine the tax burden in the first place.

To analyse the motivational drivers or performance for any one of the disparate facets of sustainable development oversimplifies the situation because it isolates the factor under consideration from associated issues that potentially influence the outcome. This does not negate research undertaken to establish the merit or otherwise of specific activities, but it does indicate that this needs to be balanced by work that situates those findings in the wider environment.

12.2.3 Using statistical analysis when investigating complexity

Statistical analysis has a lot of strengths when used appropriately, but there are two reasons why it is not necessarily the most suitable approach for subject matter of this complexity. Firstly, statistical analysis simplifies data, but in section 3.3 I referred to Rogers, Dessein and Verhoeve (2013) who maintained that complexity should not be simplified; it should be explained.

Secondly, further difficulty is introduced because the relationship between sustainable development and national culture is a new area of study. For many procedures, the statistician can select the parameters such as a hierarchy or choosing the variables to be tested. This can only be undertaken with any reliability when the factors involved are fully understood. This is not the case with a new area of study, which suffers from a paucity of necessary guidance. In section 11.8.1 I show how, in consequence, analysts refer to a limited body of research to guide their work. This lack of knowledge places a constraint on the parameters of the analysis which can potentially prevent further insights.

In conducting the research for the papers summarised in Caprar and Neville's meta-analysis, some of the researchers have been careful to test the individual demographic characteristics to assess whether they have coloured the outcome of the analysis. This is good practice, but it does not consider the extent to which these factors work in combination with each other.

Statistical analysis can be purely descriptive, or it can be inferential, leading to conclusions that are generally applicable. The critical stage when using inferential statistics is that of selecting the sample to ensure that it represents the entire population (Gliner, Morgan and Leech, 2000). This is a fundamental problem underlying the use of this method for studies involving complexity, such as that evident with sustainable development and culture. I have shown that selecting a representative sample for the entire population is not feasible because there are too many variables to consider.

12.2.4 Assessing activities that contribute to sustainable development from a cultural perspective using statistical measures

In my thesis I have shown that culture does influence the manner in which activities that lead to sustainable development are undertaken. I have, however, shown that the relationship is not always observable when using classic cultural dimensions as a framework, nor when using a quantitative approach.

I have revealed that where sustainable development is concerned, analysing individual activities that contribute to sustainable development tends to oversimplify reality. Similarly it has been shown both by others and within this thesis that cultural dimensions developed by Hofstede and the GLOBE project are simplistic. Using statistical correlation between these dimensions and

individual activities in order to determine the cultural impact on sustainable development oversimplifies the highly complex relationship. There are specific examples that highlight the problem, for instance:

- In chapter 5, I explain in detail how I used purposive sampling to ensure that my case studies provided sufficient difference to form a basis for comparison. In spite of the effort I took, three of the case studies were similar, with only Japan having a completely different profile. With the qualitative and dissensus approach that I have taken in my thesis, I have been able to identify difference between nations with a similar cultural profile and justify my conclusions. This is not an avenue open in the quantitative approach that is looking for generalisations and similarities. Christie et al (2003) maintained that the results they achieved were potentially flawed because of the result of such a cluster.
- The observation of Christie et al (2003) referred to above is of interest. They took pains to select three very different cultures but found to their surprise that they had very similar scores for some of the cultural dimensions. They concluded they needed a larger sample size, but I maintain that this demonstrates that it is not so much the different dimensions that are of relevance, rather the precise mix and interaction with external factors.
- The cultural characteristics that underpin sensitivity to environmental need cannot be isolated. This is because the environment offers the resources that support both societal comfort and the ability to generate profit. This means that both ends of the ascription versus achievement and neutral versus affective dimensions would lead to awareness of the need for environmental protection, making correlation difficult to achieve.

Rogers, Dessein and Verhoeve (2013) argue that the initial stages of research into complex subjects should concentrate on exploring the dynamics of the subject and that only after full exploration has clarified relationships is it appropriate to begin to develop generalisations. I would argue that the statistical work that has been referred to in this work has been conducted somewhat early, before sufficient understanding has been developed.

The majority of the papers included in the meta-analysis used as a starting point to my research were structured along the same lines. The review of literature covered the phenomenon in question and cultural theory. In most, sample selection involved matching the demographic qualities of the respondents rather than the qualities of the nations in question. Whilst some of these papers resorted to databanks for their source materials, ensuring the sample came from a wide range of nations (Husted, 2005; Waldman, 2006; Scholtens and Dam, 2007; Haxhi and van Ees, 2010; Parboteeah, Bronsen and Cullen, 2011), others selected respondents from fewer nations (Arnold et al, 2007), two of which studied just two nations (Paul, Roy and Mukhopadhyay, 2006; Beekun, 2008).

Less than half of the papers (Christie, 2002; Paul, Roy and Mukhopadhyay, 2006; Scholtens and Dam, 2007; Parboteeah et al, 2011) were careful to limit their findings to the nations involved in their studies, or to place a boundary around the area of applicability, and only Christie et al (2002) made a concerted effort to assess the extent to which the wider environment could have influenced the results of their analysis.

Christie et al (2003) provided a broad range of issues that could colour a national response that could not be classified as cultural. Their sample of three nations was systematically selected, ensuring that the characteristics in question were distributed in such a way that both ends of each of Hofstede's cultural dimensions were represented in the sample and a wide range of external factors were also included. I would argue that in spite of the care taken in sample selection, the three countries could not represent the entire population because I have shown that the precise mix of factors involved is unique to each nation and determines the resultant behaviour.

12.2.5 The implications for future research into culture and sustainable development

I have established that national culture and sustainable development are both subjects that have to date been analysed in a manner that simplifies complexity, and have claimed that statistical analysis has to date not proved to be an appropriate approach.

I have shown how a reductionist approach divorces issues from their environment, which, in the case of the interdependent network of factors that constitutes sustainable development, poses the risk of developing conclusions that are fundamentally flawed. This does not negate the benefit that can be gained from the judicious use of quantitative methods.

Firstly, there is potential for their use at a holistic level, assessing the impact of culture against performance indicators such as those collated by the OECD, because these are the sum of all the disparate facets required to deliver sustainable development. Databases exist that enable such work to be carried out, incorporating large samples that would lend more credence to the work.

Caution should also be exercised when assessing the understanding gained from such activities because the impact of the entire environment should be considered, including such disparate factors as geography, religion and wealth. This would suggest the need to incorporate inferential statistical analysis into a mixed methodology.

In section 11.7.3, I argued that the central point in a continuum was not a null point, but could, as claimed by Kluckhohn, create a third characteristic in the continuum. This concept needs further research.

12.3 The extent to which cultural characteristics are robust

In section 1.4.3 I expressed a need to establish the extent to which cultural characteristics and their interaction with activities leading to sustainable development can be considered to be robust.

I have to a large extent answered this question. In addition to the above conclusions, my discussion of cultural characteristics in chapter 5 together with the discussion and synthesis in chapter 11 both illustrate the extent to which statistical portrayal of cultural characteristics is vulnerable. Firstly, as demonstrated by Hamden-Turner and Trompenaars (1994) and House et al (2004), the framing of a research question can elicit different responses depending upon the terminology involved, and secondly I found that an ethical culture does not necessarily predispose a nation to care for the environment, because there is also a need to understand the underlying need.

I found that a limited range of cultural characteristics were reported to support ethical activities (section 11.7), pointing to a more general theme of being caring and supportive (section 11.7.2) and ensuring that the individual has a voice (section 11.7). These more generalised characteristics are sufficiently robust to enable me to return to the subject of paradigm change and include this learning in the system.

12.4 Incorporating cultural characteristics into systems analysis

Systems analysis proved to be a useful tool that assisted in developing understanding of the subject around paradigm change. The inclusion of culture in the sign graph in figure 11.8 was revealing because the only point for the caring, supportive culture was in the centrally positioned element of potential profit. This revealed the potential change that can be achieved if the advertised profit from taking an action aligns with the values of the people. When that occurs, the values influence both halves of the diagram, facilitating the acceptance of paradigm change.

Incorporating drive into the relationship diagram (figure 11.10) stretched the functionality of the diagram, but it revealed a challenge of the conscious operation identified by Ruckelshaus (section 1.3) in that drive and perseverance will be needed to resist the preference for short-term financial gain rather than environmental benefit and longer-term survival.

12.5 The limitations and implications of this study

My thesis has involved investigating an emerging arena of research and as such has only scratched the surface of the subject. Although I have developed case studies, they were a means to an end rather than an end in their own right.

I have already identified implications of my findings including the difficulties relating to the subject matter and inferential statistics. In this section I will only add those that emanate from the limitations of my research.

12.5.1 The scope of subject matter

My four case studies were selected from nations that are among the top 20 in the developed world in terms of world trade and all have democratically elected governments. I consider my findings to be largely compatible with a different governmental system because I claim that a holistic understanding of the

culture in its entirety must be established before any identification of whether the necessary traits are sufficiently evident to effect change. However, my findings should be limited to nations that have industrialised and consequently share the same challenges. The findings could have been significantly different had I studied emerging nations that have not as yet adopted a consumer culture.

I have concentrated on the behaviours that support sustainable development, but, as explained in the introduction to chapter 5, I have not investigated unethical action. Where sustainable development is concerned, this includes behaviours such as bribery and falsification of records. My reason for ignoring these behaviours is because case studies of the style that I have developed are not an appropriate research approach. By its very nature, evidence of unethical action would tend to be obscured from the desk researcher. In chapter 11, I have referred to trust potentially being a prerequisite for engagement between governments and the people (sections 11.3.4, 11.8). This is a necessary quality that has emerged through my research that is an antithesis of unethical action.

The implication of this is that a further cultural quality of trust or trustworthiness might be shown to be a necessary characteristic if nations are to be able to move to a sustainable position, but I would not predict it to be sufficient. The absence of this aspect of research does not negate my findings.

I have not considered the level of social acceptance of actions that have been imposed by governments. Hence it is recognised that the cultural aspect of this research has been limited to activities that are considered expedient by government, which might not reflect the opinion of the populace.

In section 2.6.1 I consider the findings from behavioural science relating to the behaviour of the decision maker when addressing complex situations where the optimal solution is not apparent. I have not, however, established whether the responses identified by the theorist concerned are culturally sensitive, or whether they are universally applicable.

12.5.2 The source of data

Apart from using OECD performance measures, my research was undertaken depending on material that was published by the governments concerned. It is

recognised that this could be influenced by political constraints, meaning that the full extent of motivation underpinning action could have been masked by what was considered to be politically correct. The extent to which this occurred could itself be grounded in cultural characteristics.

The documents used to develop the case studies were all in English. This gives the governments for nations in which English is not the primary language the opportunity to present a version of their deliberations that they consider to show their ministers in the best light. This could, for example, account in part for the disparity between the advertised prowess of the Danes and their relatively lacklustre performance indicators.

12.5.3 The influence of the passage of time

The OECD performance measures are now up to five years old, and reflect performance as the nations were struggling to cope with the effects of the recession. It would be of interest to equate these with measures that will become available reflecting more prosperous times.

12.6 Further research

As explained in section 12.5, this area of research needs considerably more work. I have identified relationships at a theoretical level based upon the activities of governments. This study needs to be enlarged to examine the attitudes of the other groups within the system, namely those governing business decisions, societal attitudes and the freedom to speak, including the role of pressure groups and educators.

More particularly, in sections 6.2.1 and 10.2.6 my findings suggest that further research is needed into the area of trust between the populace and its government, and in sections 5.1 and 12.5.1 I raise the need to consider unethical behaviour before the scope of government effectiveness can be ascertained.

In section 11.9.2, I consider the impact of governments and education. This, however, touches on a subject that has not been researched within the case studies and further research would be needed to establish if cultural characteristics would influence this in any way.

Finally, although the performance indicators are provided for some 20 years, it would be interesting to note how the nations maintain improvements over time. In section 2.7.3 I refer to “green fatigue” and in section 9 I note that, although the British are expert innovators, they are not known for their ability to capitalise on their innovations over an extended period of time. The United Kingdom was also the last of the four nations to embed sustainable development into its strategies. In this research I have not been able to identify whether the progress made to date is evidence of the innovative prowess of the British rather than evidencing the staying power needed to see it become a way of life in the future.

12.7 Concluding observations

The purpose of this thesis was to deepen understanding of the demands of sustainable development and in particular to identify the interaction between culture and appropriate action. I have shown that mechanisms of change would naturally support neither the environmental element of sustainability nor change of the magnitude seen to be required.

I have also shown that culture does indeed correlate with the ability of the nation to engage with the demands of supporting the environment but have argued that correlating specific cultural dimensions with specific behaviours is not a robust approach. It is necessary to understand the entire cultural profile of a nation before any meaningful conclusions can be drawn. I have argued that to adopt a protective stance where the environment is concerned it is necessary to value the services the environment offers and also have a supportive and caring culture. This is a greater generalisation than the more specific dimensions developed by Hofstede and in the GLOBE project.

Whilst the limitations identified above should be noted, I would argue that my findings relating to the difficulty of correlating individual dimensions with specific behaviours stand because the complexity and interconnectivity that exist within the two subject areas would apply in any situation. Similarly, I would argue that the culture that values the environment and includes a caring element is more likely to facilitate change, but, as stated at the beginning of this conclusion, it is necessary to understand the entire situation in order to accommodate externalities that could lead to unexpected consequences.

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Appendix 1. The Sustainability Debate: a Critique of the Terminology and Underlying Opinion

Described as “a moving shadow” (Bell and Morse, 2008, p.195), the subject of sustainable development has come under significant criticism. In part this occurs because there is a tendency to use the term synonymously with “sustainability” (Aras and Crowther, 2009; No name, 2009), using both terms interchangeably as in Faber (2009) and Dempsey et al (2011), or referring to “development” as an end result (Hopwood et al, 2005).

Those who differentiate between the end state of sustainability and the means of achieving it, namely sustainable development, also retain the concept of development. Indeed, Ceigis (2009) reviewed the definitions of sustainable development that he considered both to be mainstream and to embody as many dimensions as possible. Over half of the definitions Ceigis et al (2009) refer to, including that of the Brundtland Commission, retain the term “development” without seeking to define it further.

Truman was the first to coin the term “underdeveloped world” and in doing so he both promoted the assumption that development involved activities that advance the western lifestyle and changed the world perspective on the third world, setting it on a trajectory that is proving to be unsustainable (Howard, 1994; Sachs, 2000, p.28). This is because communities that had previously made little demand on their environment beyond those necessary to support life were drawn into the consumerist mindset of the western world, which according to Truman was the epitome of the developed world. This attitude encouraged undeveloped nations to adopt a consumer lifestyle regardless of the level of development that the community had achieved along a different trajectory (Howard, 1994; Sachs, 2000).

In the period following Truman’s speech, American policy both sanctioned and promoted development that encouraged growth in resource use that was potentially unsustainable (Kumar, 1994; Trainer, 2005) and served the interests of the western business more than those of the third world (Howard, 1994; Trainer, 2005). Indeed it is claimed that a common error made by nations is to

interpret “sustainable development” as “sustainable growth” (Lempert and Nguyen, 2011).

The term “sustainable development” is problematic because, firstly, the term “development” is the antithesis of preservation and as such is not seen to address the needs of the environment (Pezzoli, 1997; Castro, 2004; Benessia, 2012). Secondly, Truman’s original position in identifying an underdeveloped world suggested that development was to westernise, causing communities to become divorced from their cultural roots (Howard, 1994; Sachs, 2000, pp.16–17). Thirdly, there is a recognition that the western paradigm embodies growth that is itself believed to be unsustainable because of the finite nature of the resource base. Consequently the term “developed” in conjunction with “sustainable” is considered an oxymoron (Daley, 1996; Meadows, 2005; Redclift, 2005).

Similarly, there are three principal criticisms of the term “sustainable”. Firstly, evidenced by the lack of agreement relating to its definition, it is considered to be too vague (Pezzoli, 1997; Castro, 2004; No name, 2009; Jones et al, 2011; Smith and Sharicz, 2011). Secondly, it appears to be used to legitimise activities that are not necessarily sustainable (Gladwin, 2006; Cashmore et al, 2007; Jones et al, 2011), including the continuation of the business or maintaining the status quo (Aras and Crowther, 2009), and thirdly, it is criticised for leading to a false sense of security, lending credence to the idea that sustainability is compatible with economic growth without the need for radical change to business practice (Redclift, 2005; Jackson, 2009; Jones et al, 2011). The latter two criticisms could be levelled more at the usage of the term rather than the term itself. Hence it is evident that the phrase “sustainable development” is open to criticism at the most fundamental level: the terminology used to describe the concept.

There have been attempts to use alternative terminology, and these further assist in understanding the underlying argument. Sanford (2011, pp.28–29) uses the term “responsible business” and in doing so both avoids the difficulties associated with the term “sustainable development” and makes the concept more accessible to those businesses that strategically choose to observe the financial bottom line by suggesting that the standards imposed by responsibility

should be the norm rather than a position a company can choose to adopt or reject (Laszlo, 2011).

Whilst it could be argued that the term “responsible” makes it harder for businesses to deny appropriate action, this term places the locus of action in the business sector. However, Kastenhofer and Rammel (2005) argue that it requires action of businesses and governments to achieve a sustainable future, which will also require changed attitudes on the part of the consumer.

Adele (2006) proposed an alternative definition for “development” in the context used in the Brundtland definition, namely being “a way to overcome poverty, and to maintain social equity both within the community and amongst different communities, as well as different generations”. This is a significant departure from the norm, strengthening the role of policy makers and clearly demonstrating that business behaviour cannot be viewed in isolation from the community and government structure in which it is situated. These alternatives therefore demonstrate the need for sustainable development to be considered the norm and that it should be the focus of all players within society.

Whilst the debates over terminology could be dismissed as mere semantics, they are evidence of different values that should be revealed. The most apparent is the criticism of the usage of the term “sustainable” that has revealed the manner in which businesses will exploit the term for competitive advantage rather than offering transparent reporting. However, to identify the full breadth of the values surrounding sustainability and sustainable development, it is necessary to examine the justifications underlying the arguments.

The arguments against the use of both halves of the term “sustainable development” question the westernised way of life, including business structures and the concept that growth is equivalent to progress and should be maintained and that there is a technological solution to make it sustainable. Indeed, western business depends on growth to satisfy those financing the enterprise (Friedman, 1970; Daley, 1996; Meadows et al, 2005; Lawn, 2011; Peet, 2011), and in this, the West is locked into a paradigm that makes it vulnerable to change. However, where sustainable development and a sustainable environment are concerned, it is recognised to be a flawed structure (Meadows et al, 2005; Dresner, 2005, p.175; Lawn, 2011; van den Bergh and

Kallis, 2012). Hence the arguments tend to criticise the weak definition that preserves business interests by placing faith in as yet undiscovered technologies and accommodates the facility to continue to exploit natural resources provided an alternative capital is created. Rather than levelling criticism at the strong definition, there appears to be a reluctance to embrace it.

Appendix 2. Models of Sustainability

An activity that has been carried out in parallel to that of identifying the factors that influence sustainability is that of developing a model that portrays their characteristics and relationships. These models can convey more meaning than the verbal description (Lozano, 2008) and as such should be examined.

The metaphor of the original model, the three pillars, suggests that they are isolated from each other as independent functioning entities but, provided they are of appropriate proportions, should be able to support sustainable activity. (Dresner, 2002, p.146; Luoma-aho, 2004; Agyekum-Mensah et al, 2012, p.432; Murphy, K., 2012). The insight conveyed by this model is that it is necessary to ensure that the pillars are maintained if sustainability is to be achieved.

Spangenberg (2004) identifies a weakness with the model, recognising that the economic pillar which should support sustainable development could equally work against it. His third pillar would have been institutions, and all three pillars would be on a platform representing the business economy.

Concentric circles

Sustainability is also represented as concentric circles (figure A2.1). These have the effect of depicting a hierarchy, with society being a part of the environment, and the economy an intrinsic part of society. Any gain in one circle is at the expense of its neighbour (Lozano, 2008; Borland, 2009; Smith, 2011). This model clearly embodies the constraint that exists to growth (Miller et al, no date). It does not, however, portray a direct link between the economy and the environment.

A version of this model (figure A2.2) used by the Maori of New Zealand (Matthieu, no date), incorporates culture between environment and society (Matthieu, no date; Lozano, 2008). This, however, simplifies the relationship between society and culture, which as argued above are multidimensional and intrinsically linked. The one dimension of culture that could arguably be

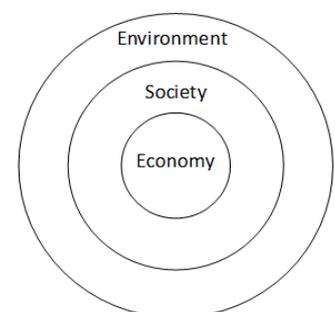


Figure A2.1: The concentric circle model of sustainability (Lozano, 2008; Agyekum-Mensah et al, 2012)

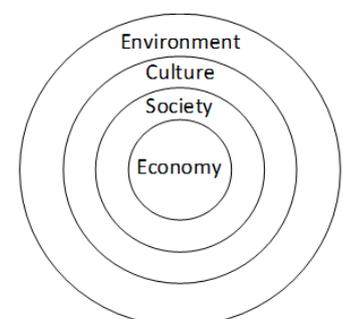


Figure A2.2: The augmented concentric circle model of sustainability (Lozano, 2008; Miller, no date)

represented in this model of sustainability is the genetic one, in that it determines the product of a society and therefore is linked to the environmental burden created by consumption. Another variation on this theme recognises that the three entities represented by Lozano's concentric circles do not have a common goal. In this version, the circles are not concentric (figure A2.3).

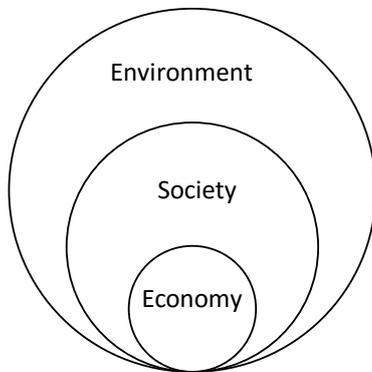


Figure A2.3: The non-concentric circle model of sustainability (Lozano, 2008; Agyekum-Mensah, 2012)

There is a divided opinion regarding the style of sustainability that the concentric circle model depicts. On the one hand, the environment is represented as all-encompassing and constraining; it is seen by some to demonstrate the strong interpretation of sustainability (Morrissey et al, 2012; Miller, no date). On the other hand it is also argued that, with the economy at the heart of the model, it is anthropocentric (Lozano, 2008), and therefore a weak interpretation. Further criticism is levelled at the manner in which these models simplify the relationships between the entities depicted (Lozano, 2008).

The Venn diagram

“Faculty Pioneer” of the World Resources Institute, Hart, identified the same three underlying factors as those used for the three pillars and concentric circle models, namely the “market economy”, the “survival economy” (society) and “nature’s economy” (Hart, 1997, p.19; Todorov and Marinova, 2009). Hart’s model, however, was that of a Venn diagram (figure A2.4) representing the three economies as overlapping circles. Hart not only recognised the different requirements of each of the positions, but also considered the impact that they made on each other (Hart, 1997; Todorov and Marinova, 2009), giving credence to the need to sustain each of the elements.

In Hart’s model, the different economies not only protect independent interests but, if kept in balance, protect the interest of the other sectors. Therefore it is

apparent that the key difference between Hart's model and the three pillars is that Hart sees the three worlds as requiring support in their own right, whereas the three pillars model depicts them as entities to be used, and only supported to ensure that the facility society needs from them is maintained.

Hart also recognised that the economies could compete for the same resources and that this could result in poverty, pollution and resource depletion, and where all three intersect, the overarching ill of the megacity is identified (Hart, 1997, p.19; Murphy, 2012). These problems are seen to affect the lower income groups, which are more sensitive to price rises and live in more vulnerable locations than the more affluent members of society (Khan, 2008; Murphy, 2012).

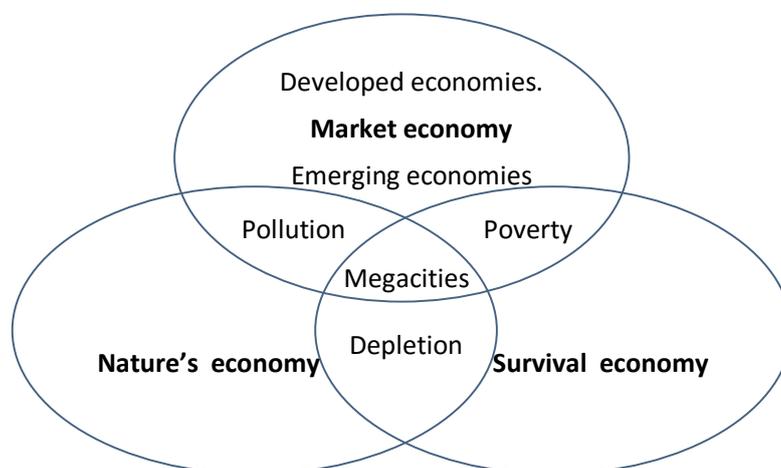


Figure A2.4: Hart's competing economies (adapted from Hart, 1997, p.19)

The relative positions of the three entities in Hart's model of competing economies are criticised because they represent a hierarchy with the market economy being dominant, situated above and supported by the other two economies (Borland, 2009). Indeed, he states that the power to guide the world to a sustainable position rests with the business sector (Hart, 1997, p.18).

Cultural issues have been incorporated into the Venn model by the inclusion of an all-encompassing circle around it, together with the factors that influence society (figure A2.5). This version is an improvement on the efforts to include culture as a fourth circle because it retains connectivity between the four elements depicted, but represents a business perspective rather than being a holistic overview. Thus it is not the society and the environment, but societal and environmental objectives that are embodied within culture.

There are two criticisms of models of sustainability based on the Venn diagram. The first is that it suggests that elements of business occur outside the arena of society and the environment, when those supporting a strong view of sustainability argue that the three elements are inextricably linked (Miller et al, no date; Lozano, 2008). It suggests that sustainable development can only take place in the overlapping sectors, and other activity is of no relevance to the other economies. In this respect, Hart's diagram is oversimplified.

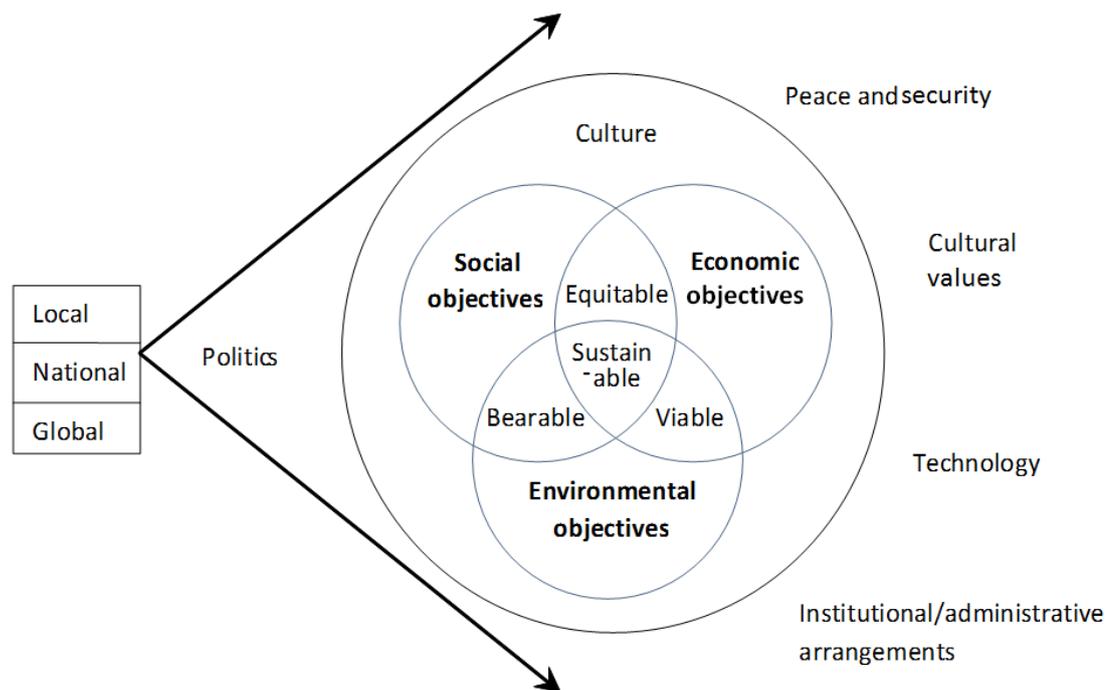


Figure A2.5: an all-encompassing version of the Venn diagram including culture and its drivers (adapted from Lozano, 2008)

Hart identified the actions that businesses should adopt, ranging from reducing pollution and demand on resources to social considerations. These were to be seen as integral to the business practice (Hart, 1997, p.19), meaning that it could be argued that the criticism is more appropriate for the diagram than for the model itself. The Venn diagram is also criticised for being a “snap-shot in time” (Lozano, 2008); however, this might be misinterpreting the purpose of developing the model, which was intended to be a guiding principle (Hart, 1997, p.18).

The fractal triangle

Taking a simplified model of sustainability to represent a triangle, McDonough and Braungert (2002, p.150) propose that this triangle should be fractal. The quality of a fractal image is that it consists of smaller images of itself ad infinitum

(Mock and Wernke, 2011), and this model encourages a more systematic questioning to underpin sustainable choices (see figure A2.6).

McDonough and Braungert (2002, pp.150–153) maintain that the boundaries between elements are fertile areas of discovery and potential business opportunity, and by giving the triangle its fractal nature they are encouraging deeper enquiry into the sustainable nature of actions. Using slightly different terminology, the three corners of the triangle are labelled with economy, ecology and equity, the last relating to fairness to people. However, Mock and Wernke (2011) revert to the more commonly accepted “three P’s”: people, planet and profit.

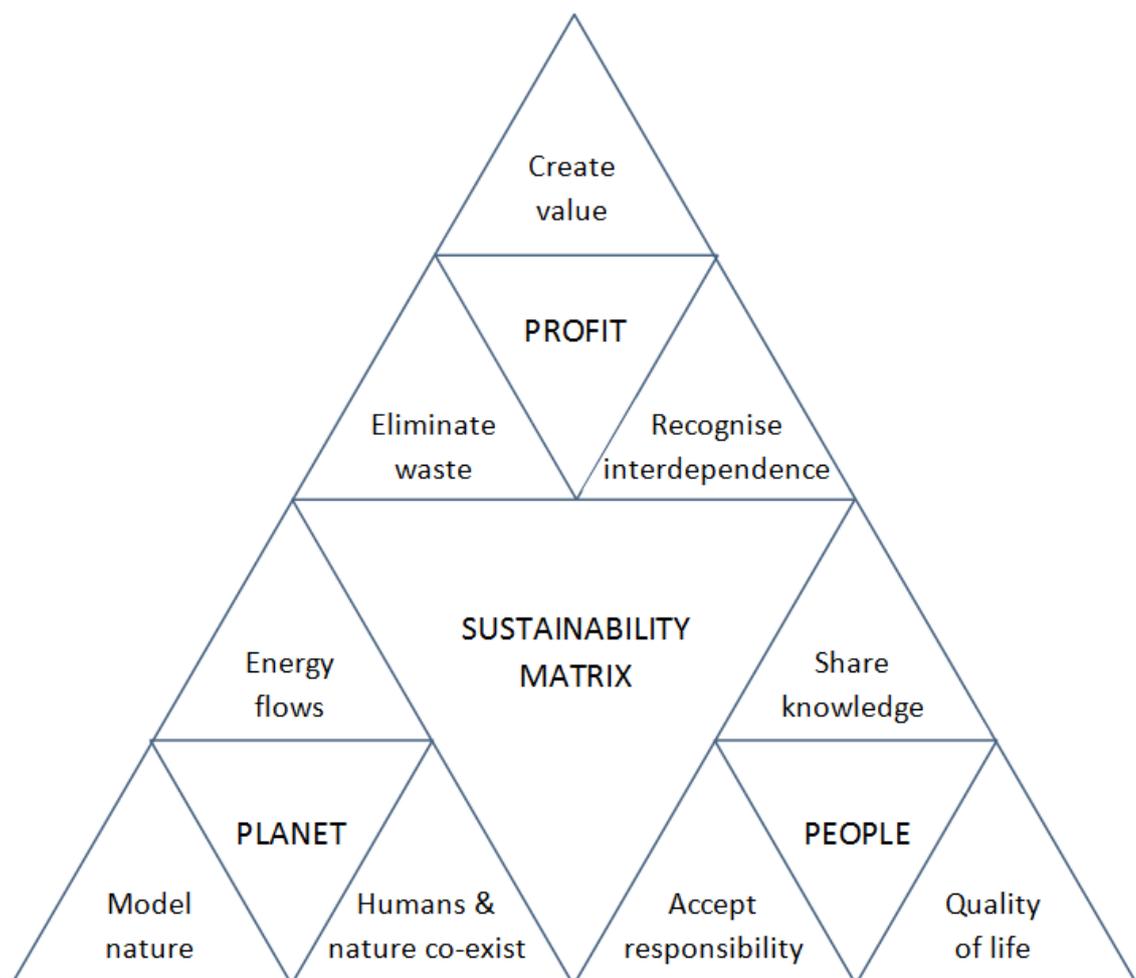


Figure A2.6: The fractal sustainability triangle (Mock and Wernke, 2011)

The terms used by McDonough and Braungert suggest a different emphasis on the three factors being considered. “Economy” is a broader term than that of “profit”, embracing a more general need for consideration of national needs rather than only what could be for personal gain. “Ecology” is also a term that embraces the needs of the natural environment, but “fairness” suggests a

characteristic rather than an entity and could allow the focus to be broader than that of just people and societies.

The complexity of this model enables sustainability issues to be addressed at numerous levels, which is more in keeping with the multifaceted nature of sustainability itself. In addition to this, it facilitates accommodation of the wider range of issues that should be considered, as proposed by Laszlo and Laszlo. It is dynamic because its fractal nature accommodates the creation of new tensions as new boundaries emerge. This suggests that an entirely sustainable balance requires equilibrium at many levels, some of which are not yet apparent.

Spangenberg (2004) reflects a similar understanding of the interlinkages between the elements of sustainability. Whilst not developing these into a diagram, he advocates performance measures for social, environmental and socio-environmental issues and shows how performance indicators should be developed for each of the dimensions as well as indicators at their points of interaction.

The quadruple top line

Borland (2009) proposes a model that also represents a hierarchy and retains the concept of the top line. Borland, however, seeks to resolve a problem she identifies with the triple top line. She maintains that the triple top line reduces the dominance of the business world identified in a criticism levelled at the triple bottom line, but does not support the environment sufficiently. She proposes a changed approach to the model in that she concentrates on the support systems rather than the interactions. In this respect, her model is more in line with the three pillars of sustainability. It is represented in a stepped triangular format (figure A2.7) with “social/cultural” needs at the top, resting and thus depending on “financial” prosperity, which in turn is underpinned by the environment. A fourth element that is added is that of the planet because she maintains that the environment is dependent on the resources provided by the planet and requires different capital to support it (Borland, 2009).

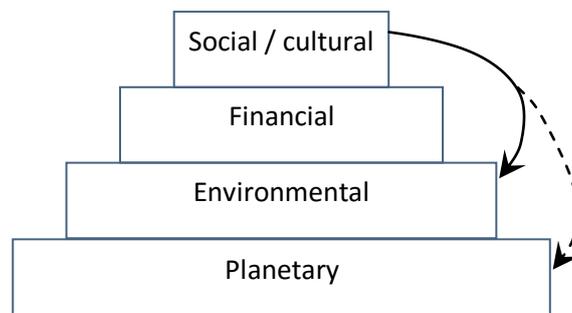


Figure A2.7: The quadruple top line (Borland, 2009)

Whilst this model does not represent the relationships with the detail that is evident in the preceding ones, it does emphasise dependency on the environment and the planet and moves the model to one which is more in line with ecocentric thought (Borland, 2009). It also recognises the dependence societies and cultures have on financial wellbeing and consequently augments the concept that the welfare of the economy and business world should be maintained. However, as represented by the feedback loops, this model recognises that ultimate power in influencing the state of the environment and planet rests with societies and their cultural values (Borland, 2009), and accommodates the argument that organisations do not make decisions; it is the people within them.

Borland maintains that societies need educating in order for them to achieve sustainability. This accommodates the current ethos of business, namely that businesses satisfy consumer demand and respond to market pull (Evans and Castek, 1998, p.60; Beech, 1998, p.102), appreciating the education required to enable societies to withstand efforts of business to create the demand itself (Beech, 1998, p.102; Esperet al, 2010).

The pentad

Sanford (2011) represented five stakeholders as a pentad because, unlike the three (or four) pillars model, she wanted to demonstrate their interdependence. Having identified the five stakeholders contributing capital, Sanford argues that each requires some form of return on its capital investment if its ability or desire to continue providing the capital concerned is to be sustained.

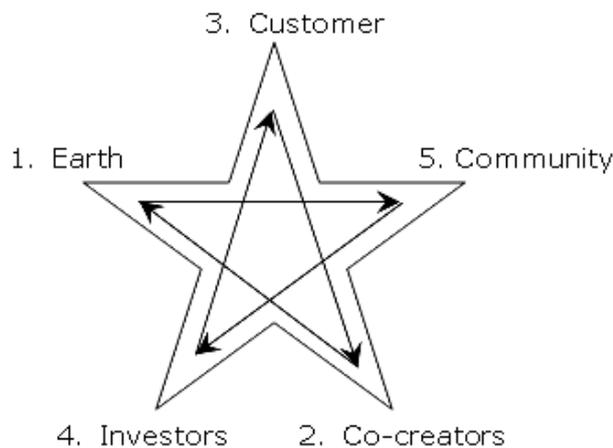


Figure A2.8: The pentad (adapted from Sanford, 2011, p.40)

Sanford (2011) argues that the model identifies five characteristics that should be noted by any business seeking long-term prosperity. Firstly, unlike many models, the pentad (figure A2.8) demonstrates that all of the stakeholders contribute to the benefit experienced by the end user, and secondly, it illustrates a broader range of capitals that contribute to the end product. Thirdly, the model confers on business the need to review the product or service to ensure the utility desired by the end user is delivered in a manner that is most satisfying for the other stakeholders. The model invokes an obligation to consider different modes of delivery of utility, such as moving from a product to a service system. Fourthly, it raises the profile of the stakeholders that are critical to sustainability, causing the business to move to a stakeholder approach, and finally, Sanford envisaged organisations being able to view stakeholder needs from a holistic level and recognise them as all part of the same “living system” (Sanford, 2011, pp.41–48). There appears to be little criticism of Sanford’s model (Research and Markets, 2011).

Insights from the models

It is evident that models of sustainability and the debates around them highlight different qualities that have added valuable insight to further the understanding of sustainability. Whilst the “pillars” suggest there is no relationship between the composite elements, the model does represent the need for all three pillars to be in balance with each other. The concentric circles demonstrate the manner in which business and societies are embedded within the environment and growth of one is at the expense of another. The non-concentric version accommodates a lack of common goal.

The Venn diagram, as originally envisaged by Hart, clearly communicates damage that can occur when one economy invades the territory of another, but criticisms draw attention to the fallacy of believing that areas of activity in one economy do not interact with other economies, augmenting the need to consider environmental and social issues in every aspect of business. The stepped pyramid of the quadruple top line draws more attention to the role of the environment and proposes a hierarchy, although it needs to be understood that the model is based on the dependency of the actors involved, rather than the dominance. Whilst it is acknowledged that action originates with society, society is subject to activities within the business world and this relationship is highly complex. This is a difficulty with all of these models because the process of creating a boundary around elements suggests there is a clear line of delineation between them and thus oversimplifies the relationships.

Two diagrams seek to avoid the trap of oversimplifying relationships. The fractal triangle identifies the dynamic complexity of the subject. It does not bring in any new stakeholders, but illustrates the multidimensional interdependent relationship between the entities involved. The pentad avoids all boundaries and seeks to demonstrate the interconnectedness by incorporating a flow of different capitals, with each element not only contributing to a product or process, but receiving from it as well. Thus these two models consider the manner in which the entities involved are mutually dependent.

The principal criticisms levelled at the models of sustainability apply to those representing the weak interpretation. The pentad and fractal triangle along with the strong element of the concentric circle model (that of the finite nature of the total system with its associated implication that growth in one sector is at the expense of another) attracted little criticism, although criticism was drawn by the weaker element of the concentric circle model that placed business at the centre, along with the concept suggested by the Venn diagram that some aspects of business do not have any impact on the environment or society.

Appendix 3. Characteristics of Environmental Management that Undermine the Ability of Governments to Act

The environment is shared by all nations and damage can cross boundaries, causing one nation to pay for the benefit enjoyed by another (Foster and Wise, 1999; Vogt, 2002, p.178; Suleymanov, 2010). Indeed, the global nature of the problem is such that practices and the associated benefit in one country can lead to an adverse effect and associated cost in another (Foster and Wise, 1999; de Serres et al, 2010). Globalisation compounds the problem in that industry outsources hazardous activities to countries where the legislation creates the fewest barriers to the activity (McDonough and Braungart, 2002; Bárecena-Ruiz and Garzón, 2003; Fauchald and Stigen, 2009).

Environmental damage frequently occurs from the combination of events, making it difficult to regulate without developing a mixture of measures (O’Riordan, 1995; Finus, 2002, p.52; de Serres et al, 2010). Conversely, one process could result in a variety of different environmental effects (de Serres et al, 2010), necessitating a broad assessment of impacts in order to determine the true cost of an activity.

The complex interconnected web of variables involved in environmental issues can result in unintended consequences that undermine the anticipated benefits of an action (Dresner, 2002, p.21; Zebda, 2002; McDonough and Braungart, 2002, pp.45–67). Indeed the complexity is such that it cannot be easily comprehended, encouraging a lack of engagement that leads to a false belief that minor modification to lifestyles is all that is needed (Wagner and Zeckhauser, 2012).

Appendix 4. A Comparison of Measures Available to Governments to Encourage Sustainable Development

Form of intervention	Scope				Effectiveness			Limitations
	Products	Activities	All ¹	Sectors ¹	CAC	Market sensitive ²		
Taxation	✓		✓	+		✓	Can be applied sensitively. Proved to be a strong stimulus. Creates a double dividend.	Politically sensitive. Should not undermine social welfare. Can drive the activity and its environmental impact elsewhere. Can change the balance of international trade.
Subsidy	✓	✓		✓		✓	Politically acceptable. Can support innovation.	Requires funding and monitoring. Not considered to be very effective. Can stimulate adverse behaviour. Limited by the WTO and the polluter pays principle.
Recycling tax-subsidy	✓	✓		✓		✓	Politically acceptable. Business friendly.	Can encourage price rises. Can be criticised for wasting money. Tends to promote “end-of-pipe” measures. Can stimulate adverse behaviour.
Loan	✓	✓	✗	✓		✓	Reduces government expense. Politically acceptable. Can support innovation.	Needs funding. “Free money” leads to a lack of participant commitment that undermines the quality of outcomes.
Revolving investment fund	✓	✓	✗	✓		✓	Minimises government expense. Politically acceptable. Can support innovation.	“Free money” leads to a lack of participant commitment that undermines the quality of outcomes. Limited by the size of the fund.
Voluntary standards	✓	✓	✗		(✓)		Widespread acceptance. Appear to change practice with increasing effectiveness.	Could be used as “green wash”. Hard for the SME to obtain the knowledge, time and funding.
Regulation	✓	✓	✗	✓	✓		Can control the outcome. Threat of regulation stimulates innovation.	Demands significant monitoring and enforcement. Viable alternatives need to be available. Can be unwieldy and inflexible. Should not unduly hinder international trade. Nations tend to adopt similar standards.

Appendix 4

Mandatory labelling	✓		✓			✓	Enables buyers to make informed decisions. Provides competitive advantage.	Consumer confusion regarding precise benefits. Undermined by both the media and green wash. Can conflict with voluntary labelling systems.
Green and white certificates	✓			✓		✓	A targeted approach influencing supply and demand of electricity.	Confused with other schemes.
Tradable permits and EU ETS	✓			✓	✓	✓	Cap and trade, merging the advantages of market and non-market tools.	Do not capture all sectors. Difficulty in assessing the initial allowances. Open to abuse. Degree of change limited to 20% reduction of CO ₂ .
Non-tradable permits		✓		✓	✓		Good for environmentally sensitive areas.	Promote end-of-pipe measures. Require monitoring and enforcement.
Knowledge exchange	✓	✓					Can stimulate innovation.	Requires “buy in”.
Infrastructure development		✓		✓	✓		Does not require “buy in”.	Only affects the area developed. Long-term nature means technology is “locked in” even if it proves to be flawed.

Notes for Appendix 4

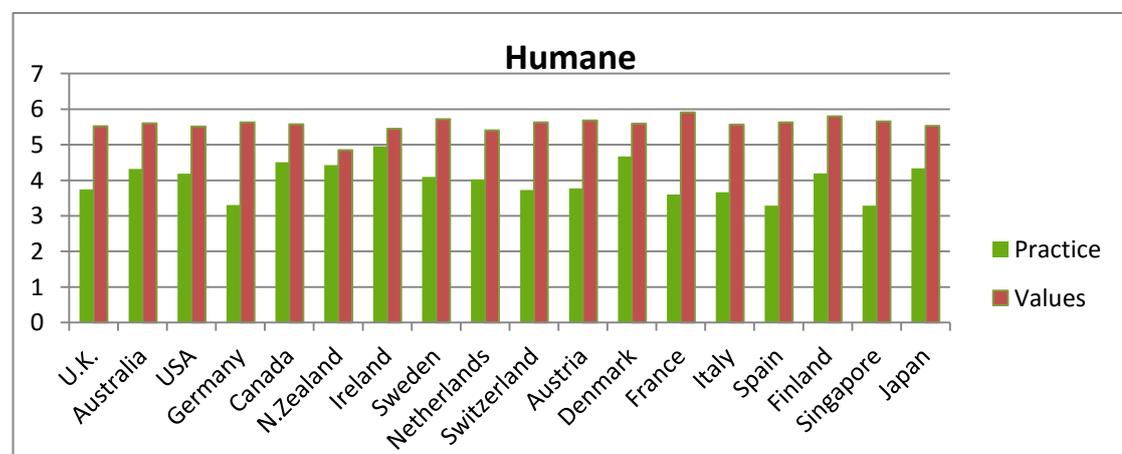
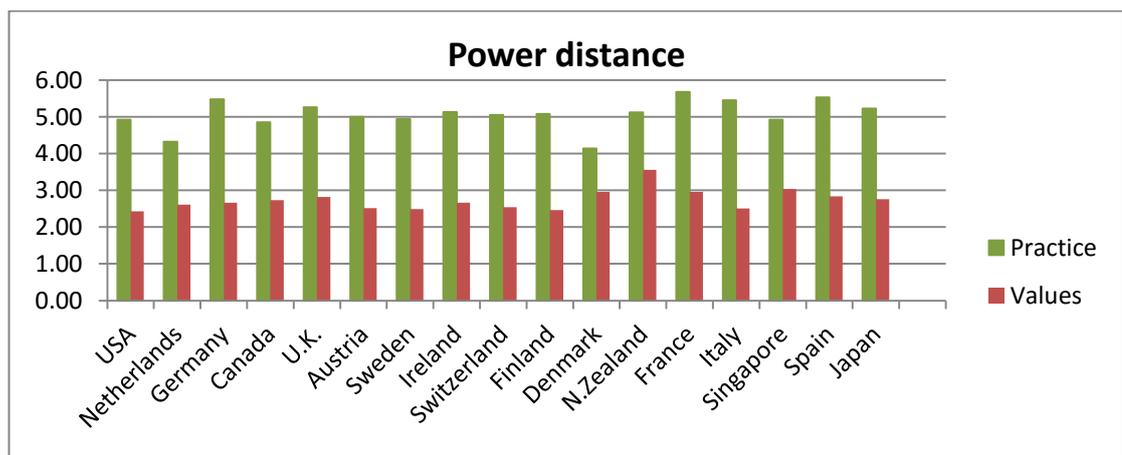
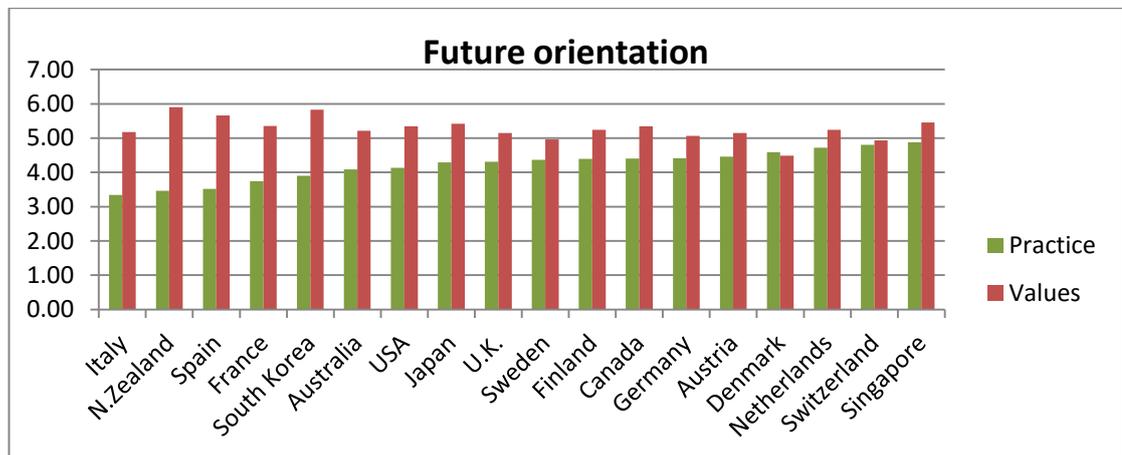
- ✓ indicates that the instrument captures all instances being regulated with no further action needed, and any + in the “sectors” column shows that exemptions can also be granted.
- * indicates that action is needed to apply the instrument in each individual instance.
- (✓) indicates that Command and Control may be involved depending on the standard involved.

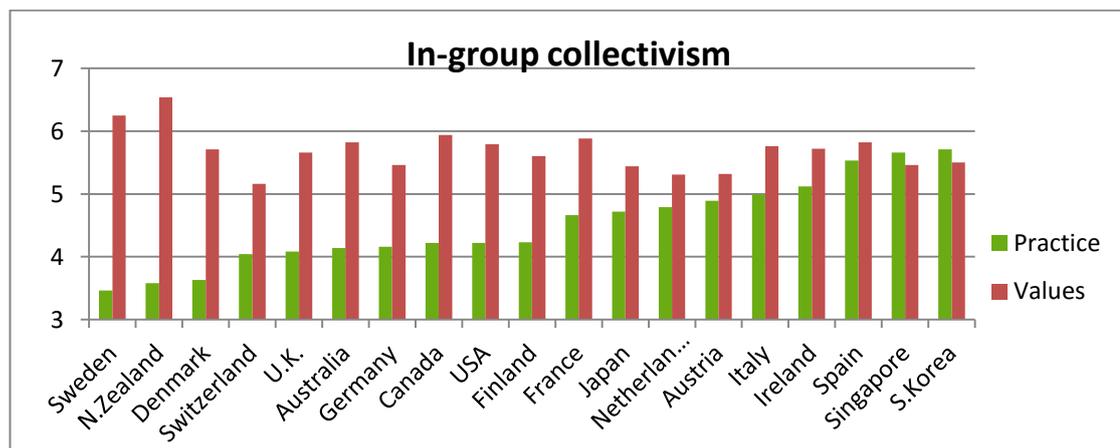
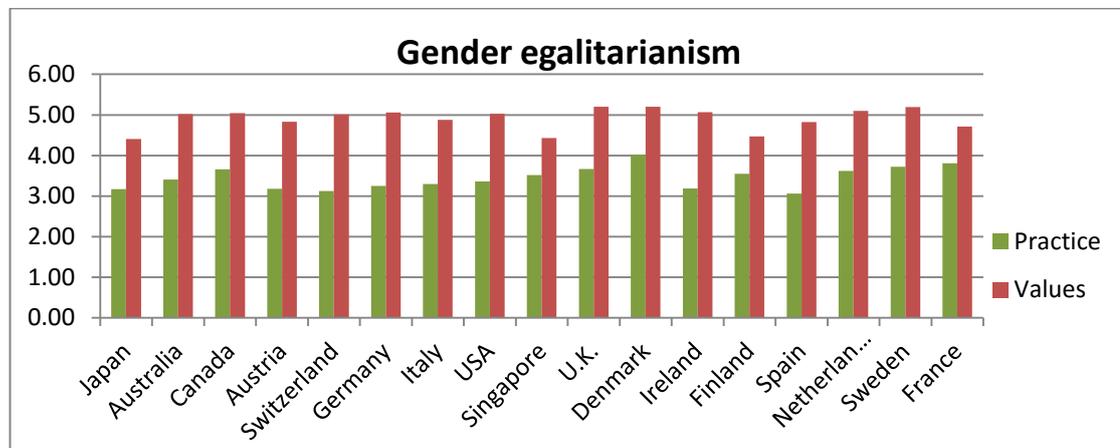
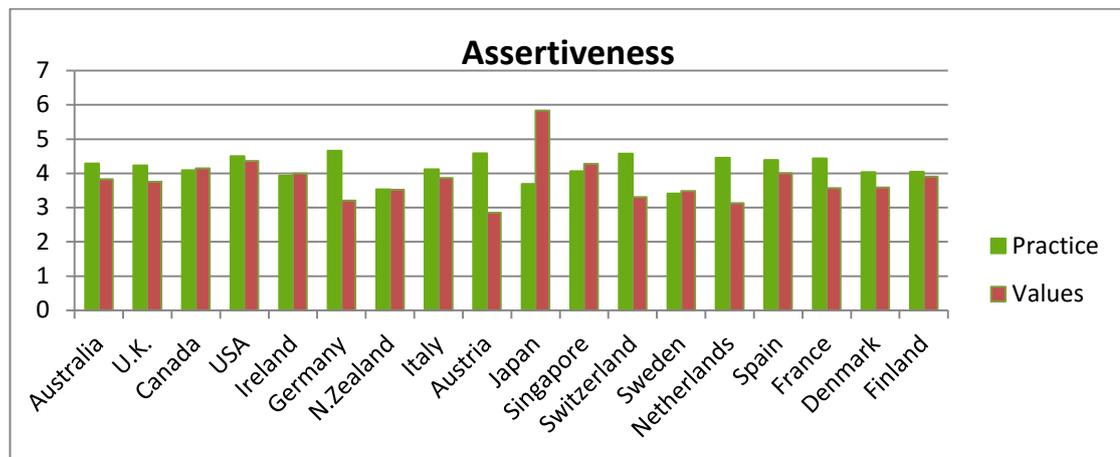
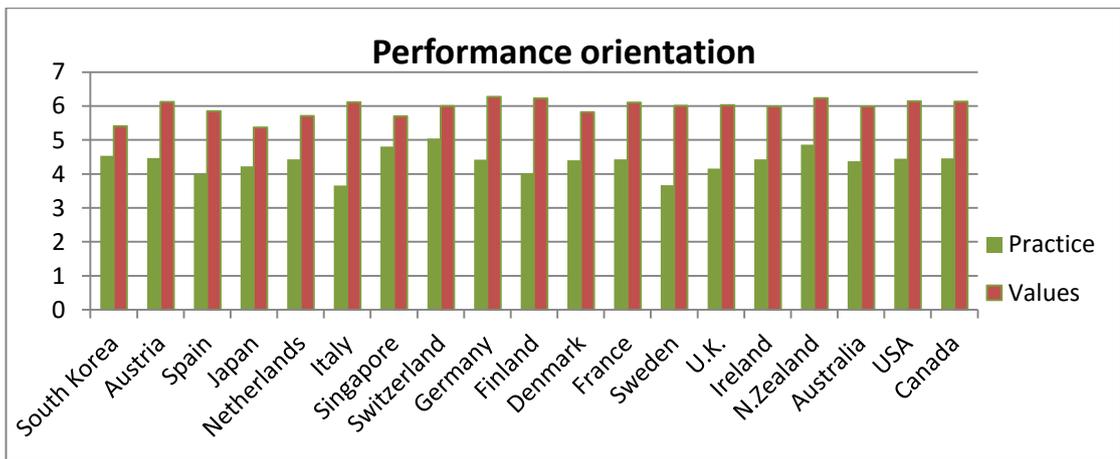
¹ indicates that the individual instrument applies to a limited sector and multi-instruments are needed targeting different sectors if the practice being controlled is to be managed in its entirety.

² influenced by market forces (favoured by economists) and suffers the associated difficulty of putting a value on environmental resources.

Appendix 5. Comparing the Scores for Practice and Values in the GLOBE Project

The following charts all show the difference between the practice and value measures established in the GLOBE project.





Appendix 6. The Findings of Hampden-Turner and Trompenaars in “The Seven Cultures of Capitalism: Value Systems for Creating Wealth in the United States, Britain, Japan, Germany, France, Sweden, and the Netherlands” (1992) in Tabular Form

Dimension	Upper/longest quartile*	Second quartile*	Third quartile	Shortest/lowest quartile*	Notes	
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.						
<i>Universalism versus particularism (rules versus relationships)</i>						
Universalist rather than particular	Switzerland USA Canada	Ireland <i>Sweden</i> Australia	<i>UK</i> Netherlands Germany	Spain France	Singapore <i>Japan</i>	South Korea Range 29% Mid-range 82.5 Base 32–97
Would not be less critical of a friend in a review	Finland Switzerland Canada	Australia Italy USA	<i>Sweden</i> France	<i>Denmark</i> Belgium Germany	Netherlands <i>UK</i> Ireland <i>Japan</i> Spain Singapore	South Korea Range 23% Mid-range 63.5 Base 24–75
Would not keep quiet for a friend	Ireland Finland Switzerland <i>Sweden</i>	Canada <i>Japan</i> Spain	<i>Denmark</i> <i>UK</i> Italy	USA France Singapore		South Korea Belgium Range 28% Mid-range 56 Base 20–70
<i>Communitarianism versus individualism (the group versus the individual)</i>						
Freedom to act as an individual	<i>Japan</i> France	Singapore Ireland Italy Germany	Norway Belgium	<i>Sweden</i> <i>UK</i> Australia Spain	Finland Netherlands Switzerland <i>Denmark</i> USA Canada	Range 59% Mid-range 59.5 Base 30–89
Individual credit	<i>Japan</i> France	Singapore <i>Denmark</i> Germany	Canada Australia Switzerland	<i>Sweden</i> S. Korea <i>UK</i>	Netherlands Ireland Norway USA Belgium Spain	Finland Range 76% Mid-range 64 Base 40–88
Prefer individual responsibility for actions	Singapore Italy	<i>Japan</i> Germany	Finland <i>Sweden</i> South Korea	Belgium Netherlands Ireland	Spain <i>UK</i> Canada <i>Denmark</i> USA	Australia Range 43% Mid-range 47.5 Base 26–69

Appendix 6

Neutral versus affective								
Hide emotional responses (Masculine aggressiveness then controlled) Can be read two ways	<i>Japan</i> New Zealand	Hong Kong Austria Canada	Singapore Australia	<i>Sweden</i> Netherlands <i>UK</i> USA	Finland Belgium Norway Germany	<i>Denmark</i> Italy Switzerland	France Ireland Spain	Range 66% Mid-range 48 Base 15–81
Attitude to time								
Relationship between past, present and future	<i>The future is more important than the present</i>		<i>The future and the present are of the same importance</i>		<i>The future is less important than the present</i>			Ranked within classifications
	Korea <i>UK</i>	USA Norway	Belgium <i>Japan</i>	Canada	<i>Sweden</i> France	Hong Kong Germany		
Synchronicity versus sequential	<i>Japan</i>	Canada Norway	France <i>UK</i>	USA Germany	Korea Belgium	<i>Sweden</i> Hong Kong		Grouped and ranked
Time horizon	<i>Weeks–Months</i>		<i>Weeks</i>		<i>Days–Weeks</i>		<i>Days</i>	Range 2.3 Mid-range 4.55 (1 = seconds 7 = years)
	Hong Kong Austria South Korea	<i>Sweden</i> <i>Denmark</i>	Finland France Switzerland <i>Japan</i>	Singapore Germany Netherlands Norway	<i>UK</i> Italy Spain N. Zealand	Canada Belgium USA Australia	Ireland	
Future time horizon		Hong Kong South Korea	France	<i>Sweden</i> <i>Japan</i> Switzerland	Germany Canada	<i>UK</i> USA Italy	Netherlands Singapore	Range 1.02 Mid-range 5.29
Performance measures (1993)								
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland Germany	Austria Netherlands Finland New Zealand	Singapore Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>	Italy Spain	Range 45.54% Mid-range 57.75
Anticipated increase in SMEs	<i>Japan</i> Spain Germany	Ireland Singapore Italy	Netherlands France Belgium	Switzerland <i>Denmark</i> USA		New Zealand Finland Canada Norway	<i>UK</i> Australia <i>Sweden</i>	Range 30.24% Mid-range 55.12

Appendix 6

Anticipation of new employment opportunities	<i>Japan</i> Singapore Ireland	Austria Germany	USA Italy <i>Denmark</i> Belgium	Netherlands Australia Canada N. Zealand	<i>UK</i> Spain Switzerland France	Finland Norway	<i>Sweden</i>	Range 28.06% Mid-range 60.97
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Paternalism evident in corporate culture

Steep hierarchy	Hong Kong Singapore Austria	Spain Belgium France	<i>Japan</i> Italy Finland	Ireland <i>UK</i> South Korea	Germany Switzerland Netherlands	Australia <i>Sweden</i>	Norway <i>Denmark</i> Canada USA	Hierarchy visually represented
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Preference for "hands-off" management (reversed)	Singapore		Ireland <i>Japan</i> Spain	<i>Sweden</i> Austria Belgium	Italy <i>UK</i> Netherlands USA	Finland <i>Denmark</i> Norway Germany	France Switzerland Canada Australia	Range 60% Mid-range 62 Base 32-92
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Structure (p)	<i>Family:</i>		<i>Elements of family: Incubator</i>		<i>Weak elements of family: Guided missile</i>		<i>Minimal elements of family: Eiffel tower</i>		
	S. Korea Spain <i>Japan</i>	Belgium Singapore	Italy N. Zealand	Canada <i>UK</i> Germany	France <i>Denmark</i>	Switzerland Sweden	Netherlands Ireland	USA Norway	Australia Finland Austria

Structure denotes locus of authority rather than function		Singapore	<i>Japan</i>	Spain Italy Hong Kong <i>Sweden</i> USA	Switzerland Netherlands Germany Ireland <i>UK</i>	Austria France Belgium Canada	Norway Australia Finland <i>Denmark</i>	Range 56% Mid-range 72 Base 44-100
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Specific versus diffused (the range of involvement)

Differentiate between public and private roles	<i>Sweden</i> Netherlands Switzerland Finland	<i>Denmark</i> <i>UK</i> France Canada	Ireland Germany Belgium	USA Norway Australia	Hong Kong Spain <i>Japan</i>	New Zealand Austria	South Korea Singapore	Range 59% Mid-range 61.5 Base 32-91
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Appendix 6

Company should not provide housing	<i>Sweden</i> USA <i>Denmark</i> Switzerland	Netherlands <i>UK</i> Australia Hong Kong	France Austria Canada Norway	Germany Italy Singapore Finland		<i>Japan</i> South Korea		Range 78% Mid-range 50 Base 11–89	
<i>Achievement versus ascription</i>									
Achievement more important than “being yourself”	Norway USA Australia	Canada Ireland New Zealand	<i>UK</i> <i>Sweden</i>	<i>Denmark</i> Finland	Germany Singapore Switzerland	France Italy Hong Kong	Netherlands <i>Japan</i> Austria	Poland South Korea Spain	Range 73% Mid-range 40.5 Base 4–77
You have to earn respect	Norway Ireland <i>Denmark</i> Finland	New Zealand <i>UK</i> USA Canada	<i>Sweden</i> Australia France	Spain Italy Singapore <i>Japan</i>	Germany South Korea	Switzerland Belgium	Austria		Range 44% Mid-range 72 Base 50–94

Appendix 7. The Findings of Trompenaars and Hampden-Turner in “Riding the Waves of Culture: Understanding Cultural Diversity in Business”

Dimension	Upper/longest quartile*	Second quartile*	Third quartile*	Shortest/lowest quartile*	Notes	
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.						
<i>Universalism versus particularism (rules versus relationships)</i>						
Should make allowances for individuals with specific difficulties	USA Germany Sweden	UK Netherlands Australia	Canada	Singapore Belgium	Japan Italy France	Range 52% Mid-range 69 Base 43–95
<i>Communitarianism versus individualism (the group versus the individual)</i>						
Should a family help to rebuild a damaged store versus the individual? (p.167)	Singapore	Japan	Belgium Germany	France Italy	UK Australia USA Canada Sweden	Range 46% Mid-range 61 Base 38–84 responses reversed ¹
Salary should consider family size (responses reversed ¹)	Japan		Italy	Singapore	France Sweden Belgium Germany Netherlands Australia Canada USA UK	Range 63.1% Mid-range 36.05 Base 32.4–95.5
A job is a job for life	Singapore	Japan	Belgium Italy	France Sweden	Germany Netherlands UK Australia Canada USA	Range 67% Mid-range 65.5 Base 32–99

¹ The responses have been reversed so that two ends of the continuum for all elements are in the same direction.

Appendix 7

New employees should fit in (responses reversed)	Singapore	<i>Japan</i>	<i>Sweden</i> France	Italy	Belgium	<i>UK</i>	Germany Netherlands Australia	Canada USA	Range 53% Mid-range 65.5 Base 39–92
<i>Neutral versus affective</i>									
Feminine characteristics of nurturing and permissiveness	<i>Sweden</i>	Netherlands	Spain France	Singapore	Canada Australia USA	<i>UK</i> Germany Italy	<i>Japan</i>		Range 90% Mid-range 46.5 Base 5–95
<i>Attitude to the environment</i>									
Stakeholder rather than stockholder	<i>Japan</i>	Singapore	France		Germany Belgium Netherlands	<i>Sweden</i> Italy	<i>UK</i> Canada	Australia USA	Range 32% Mid-range 24 Base 8–40
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland Germany	Netherlands Finland New Zealand Singapore	Norway Australia Canada	<i>Japan</i> USA	France Ireland	S. Korea	<i>UK</i> Italy Spain		Range 50% Mid-range 54.5 Base 8–40
<i>Attitude to time</i>									
Long term versus short term	<i>Japan</i> <i>Sweden</i> West Germany	N. Zealand Finland Switzerland Singapore	Norway <i>Denmark</i> Netherlands	France Taiwan Canada Belgium Luxembourg	Australia USA Italy Ireland		<i>UK</i> Austria	Hong Kong Spain	Ranked: <i>Japan</i> (longest) to shortest
Relationship between the present and future	<i>The future is more important than the present</i>				<i>The future and the present are of the same importance</i>		<i>The future is less important than the present</i>		Grouped
	Australia S. Korea Sweden	Netherlands USA <i>UK</i>	Italy <i>Japan</i> Singapore	Belgium Germany			France		
Synchronicity versus sequential	<i>No connectivity between present and future</i>			<i>Some connection between present and future</i>		<i>Clear overlap between present and future</i>			Grouped
	Australia	Netherlands Singapore	<i>UK</i> USA	Belgium Italy		South Korea Sweden	Germany France	<i>Japan</i>	

Appendix 7

Performance measures (1993)										
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland Germany	Austria Netherlands Finland New Zealand	Singapore Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium South Korea	<i>UK</i>	Italy Spain		Range 45.54% Mid-range 57.75 Base 29.47–79.52
Anticipated increase in SMEs	<i>Japan</i> Spain Germany	Ireland Singapore	Italy South Korea Netherlands	France Belgium	Switzerland <i>Denmark</i> USA	New Zealand Finland Canada	Norway <i>UK</i>	Australia <i>Sweden</i>		Range 30.24% Mid-range 55.12 Base 40–70.24
Anticipation of new employment opportunities	<i>Japan</i>	Singapore	Ireland Austria Germany USA	Italy <i>Denmark</i> Belgium Netherlands	Australia Canada New Zealand <i>UK</i>	Spain Switzerland France	Finland South Korea Norway	<i>Sweden</i>		Range 28.06% Mid-range 60.97 Base 46.94–75
Specific versus diffused (the range of involvement)										
Party for marriage the responsibility of the individual versus corporation	Netherlands <i>Sweden</i>	Germany	Spain Italy <i>Japan</i>	France USA			Singapore	<i>UK</i>		Range 33.5% Mid-range 74.45 Base 57.7–91.2
Achievement versus ascription										
Achievement earns more respect than age	USA Australia	Canada <i>Sweden</i>	<i>UK</i> Belgium	Germany France	Italy	Netherlands	Singapore	<i>Japan</i> S. Korea		Range 26% Mid-range 50 Base 37–63
Skills more valued than power	Germany USA	Singapore France	Belgium <i>Sweden</i>	Canada Italy	<i>UK</i> Australia	Netherlands		<i>Japan</i>		Range 53% Mid-range 53.2 Base 26.7–79.7
Drive										
Manager's sense of drive/responsibility	Sweden USA <i>Japan</i>	Finland Korea Netherlands	Singapore Switzerland Belgium	Ireland France Austria	Denmark Italy Australia	Canada Spain	N. Zealand <i>UK</i>	Norway		Range 24% Mid-range 50 Base 50–74

Appendix 8. A Merger of the Cultures Identified in Both Books

(p) denotes recognition of paternal characteristic (“pr” indicates reversal of measures)

(a) denotes altruistic behaviour (“ar” indicates reversal of measures)

(d) denotes drive/assertiveness (“dr” indicates reversal of measures)

Dimension	Upper/longest quartile *	Second quartile*	Third quartile	Shortest/ lowest quartile*	Notes	
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.						
<i>Universalism versus particularism (rules versus relationships)</i>						
Universalist rather than particular	Switzerland USA Canada	Ireland <i>Sweden</i> Australia	<i>UK</i> Netherlands Germany	Spain France <i>Singapore</i> <i>Japan</i>	South Korea	Range 65% Mid-range 64.5 Base 32–97
Would not be less critical of a friend in a review	Finland Switzerland Canada	Australia Italy USA	<i>Sweden</i> France	<i>Denmark</i> Belgium Germany Netherlands <i>UK</i> Ireland <i>Japan</i> Spain Singapore	South Korea	Range 30% Mid-range 60 Base 45–75
Would not keep quiet for a friend	Ireland Finland Switzerland <i>Sweden</i>	Canada <i>Japan</i> Spain	<i>Denmark</i> <i>UK</i> Italy	USA France Singapore	South Korea Belgium	Range 34% Mid-range 53 Base 36–70

This first grouping has been adjusted as described in section 4.8.2.

<i>Universalism versus particularism (rules versus relationships), ignoring the Central Europe/eastern bloc countries</i>							
Universalist rather than particular (pr)	Switzerland USA Canada	Ireland <i>Sweden</i> Australia	<i>UK</i> Netherlands Germany	Spain France <i>Singapore</i> <i>Japan</i>	South Korea	Range 29% Mid-range 82.5 Base 36–97	
Would not be less critical of a friend in a review	Finland Switzerland	Canada Australia	Italy USA <i>Sweden</i>	France <i>Denmark</i> Netherlands	Belgium Germany <i>UK</i> Ireland <i>Japan</i> Spain	Singapore South Korea	Range 23% Mid-range 63.5 Base 45–75

Appendix 8

Would not keep quiet for a friend	Ireland Finland	Switzerland <i>Sweden</i>	Canada <i>Japan</i>	Spain <i>Denmark</i>	<i>UK</i> Italy	USA France	Singapore	South Korea Belgium	Range 28% Mid-range 56 Base 36–70
Should not make allowances for those with specific difficulties (pr)(ar)	USA Germany <i>Sweden</i>	<i>UK</i> Netherlands Australia	Canada		Singapore Belgium			<i>Japan</i> Italy France	Range 52 Mid-range 69 Base 43–95 No adjustment
<i>Communitarianism versus individualism (the group versus the individual)</i>									
Look after the group if you are to improve one's quality of life	<i>Japan</i> France	Singapore	Ireland Italy Germany	Norway Belgium	<i>Sweden</i> <i>UK</i> Australia Spain	Finland Netherlands Switzerland	<i>Denmark</i> USA Canada		Range 59% Mid-range 59.5 Base 30–89
Group rather than individual credit (dr)	<i>Japan</i>	France	Singapore <i>Denmark</i> Germany	Canada Australia Switzerland	<i>Sweden</i> South Korea <i>UK</i>	Netherlands Ireland Norway	USA Belgium Spain	Finland	Range 76% Mid-range 64 Base 40–88
Responsibility for actions lies with the group, not the individual (dr)	Singapore Italy	<i>Japan</i> Germany	Finland <i>Sweden</i> South Korea Belgium Netherlands	Ireland Spain <i>UK</i> Canada	<i>Denmark</i> USA	Australia			Range 43% Mid-range 47.5 Base 26–69
Should a family help to rebuild a damaged store versus the individual? (a)	Singapore		<i>Japan</i>		Belgium Germany	France Italy	<i>UK</i> Australia USA	Canada <i>Sweden</i>	Range 46% Mid-range 61 Base 38–84 Reversed
Salary should consider family size (p)(a)	<i>Japan</i>				Italy Singapore	France <i>Sweden</i> Belgium	Germany Netherlands Australia	Canada USA <i>UK</i>	Range 63.1% Mid-range 36.0 Base 32.4–95.5 Reversed
A job is a job for life (p)(dr)	Singapore	<i>Japan</i>		Belgium Italy	France <i>Sweden</i>	Germany Netherlands	<i>UK</i> Australia	Canada USA	Range 67% Mid-range 65.5 Base 32–99 Unchanged

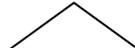
Appendix 8

New employees should fit in (p)(dr)	Singapore <i>Japan</i>	<i>Sweden</i> France	Italy	Belgium	<i>UK</i>	Germany Netherlands	Australia Canada	USA	Range 53% Mid-range 65.5 Base 39–92 Reversed
Neutral versus affective									
Hide emotional responses (reversed)	<i>Japan</i> New Zealand	Austria Canada	Singapore Australia	<i>Sweden</i> Netherlands <i>UK</i> USA	Finland Belgium Norway Germany	<i>Denmark</i> Italy Switzerland	France Ireland	Spain	Range 66% Mid-range 48 Base 15–81
Feminine: nurturing and permissiveness (reversed) (ar)	<i>Japan</i>	Italy Germany <i>UK</i>	USA Canada Australia		Singapore France	Spain	Netherlands	<i>Sweden</i>	Range 90% Mid-range 46.5 Base 5–95 No adjustment
Attitude relating to the environment									
Worth trying to control nature		Spain France <i>Denmark</i>	Norway Canada South Korea	Austria Ireland New Zealand	Australia <i>UK</i> Netherlands	Belgium Italy	Germany Switzerland	<i>Sweden</i> Singapore <i>Japan</i>	Range 59% Mid-range 38.5 Base 9–68
We are the root cause of events	Norway USA Australia New Zealand	Canada <i>UK</i> Switzerland Ireland	France Spain Austria Netherlands	<i>Denmark</i> South Korea Italy	Belgium <i>Sweden</i> Finland	Germany <i>Japan</i>	Singapore		Range 55% Mid-range 60.5 Base 33–88
Stakeholder rather than stockholder approach	<i>Japan</i>	Singapore		France	Germany Belgium Netherlands	<i>Sweden</i> Italy	<i>UK</i> Canada	Australia USA	Range 32% Mid-range 24 Base 8–40
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland	Germany Netherlands Finland	New Zealand Singapore	Norway Australia Canada		<i>Japan</i> USA	France Ireland South Korea	<i>UK</i> Italy Spain	Range 50% Mid-range 54.5 Base 8–40
Extent to which countries protect the environment (copied to attitude)	<i>Denmark</i> <i>Sweden</i> Switzerland Germany	Austria Netherlands Finland New Zealand	Singapore Norway Australia	Canada <i>Japan</i> USA		France Ireland	Belgium <i>UK</i>	Italy Spain	Range 45.54% Mid-range 57.75

Attitude to time							
Relationship between the present and future (<i>Riding the Waves</i>)	<i>The future is more important than the present</i>		<i>The future and the present are of the same importance</i>		<i>The future is less important than the present</i>	Ranked within classifications	
	Korea UK	USA Norway	Belgium Japan	Canada	Sweden France Germany		
Relationship between the present and future (<i>The Seven Cultures</i>)	<i>The future is more important than the present</i>			<i>The future and the present are of the same importance</i>	<i>The future is less important than the present</i>	Grouped	
	Australia S. Korea Sweden	Netherlands USA UK	Italy Japan Singapore	Belgium Germany	France		
Both sources combined. Where there is only one, it is included	<i>The future is more important than the present</i>			<i>The future and the present are of the same importance</i>	<i>The future is less important than the present</i>	Merged	
	S. Korea Australia Norway	Netherlands UK	Italy USA	Singapore Belgium	Sweden Germany Canada Japan France		
Synchronicity versus sequential (<i>Riding the Waves</i>)	<i>Significant overlap</i>				<i>No connection</i>		Grouped and ranked
	Japan	Canada Norway	France UK USA	Germany	Korea Belgium Sweden		
Synchronicity versus sequential (<i>The Seven Cultures</i>)	<i>Clear overlap between present and future</i>			<i>Some connection between present and future</i>	<i>No connection between present and future</i>		Grouped The illustrations did not have the same level of detail as the above
	France Japan	South Korea Sweden	Germany	UK USA	Belgium Italy	Australia Netherlands Singapore	

Appendix 8

Both sources combined	<i>Overlap between present and future in both</i>			<i>Very close proximity in both</i>		<i>Clear divide in both</i>		Merged the two, modifying classifications to accommodate similarity
	<i>Japan</i> Canada Norway	France Germany	Belgium South Korea	<i>UK</i> USA	Sweden		Italy Australia	Netherlands Singapore
Time horizon	<i>Weeks–Months</i>			<i>Weeks</i>		<i>Days–Weeks</i>		
	Austria South Korea Sweden Denmark	Finland France Switzerland	<i>Japan</i> Singapore Germany	Netherlands Norway	<i>UK</i> Italy Spain	New Zealand Canada Belgium	USA Australia	Ireland
Future time horizon			South Korea	France	Sweden Japan Switzerland	Germany Canada	<i>UK</i> USA Italy	Netherlands Singapore
Long term versus short term	<i>Japan</i> Sweden W. Germany	New Zealand Finland Switzerland	Singapore Norway <i>Denmark</i>	Netherlands France Canada	Belgium Australia	USA Italy	Ireland <i>UK</i>	Austria Spain
Performance measures (1993)								
Extent to which countries protect the environment (copied to attitude)	<i>Denmark</i> Sweden Switzerland Germany	Austria Netherlands Finland New Zealand	Singapore Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>		Italy Spain
Anticipated increase in SMEs	<i>Japan</i> Spain Germany	Ireland Singapore Italy	Netherlands France Belgium	Switzerland <i>Denmark</i> USA	New Zealand Finland	Canada Norway	<i>UK</i> Australia	Sweden
Anticipation of new employment opportunities	<i>Japan</i> Singapore Ireland	Austria Germany	USA Italy <i>Denmark</i>	Belgium Netherlands Australia	Canada New Zealand <i>UK</i>	Spain Switzerland France	Finland Norway	Sweden
								Range 2.3 Mid-range 4.55 (1 = seconds 7 = years)
								Range 1.02 Mid-range 5.29
								Ranked: <i>Japan</i> (longest) to shortest
								Range 45.54% Mid-range 57.75
								Range 30.24% Mid-range 55.12
								Range 28.06% Mid-range 60.97

Corporate culture												
Steep hierarchy	Singapore Austria		Spain Belgium France		Japan Italy Finland		Ireland UK South Korea	Germany Switzerland Netherlands Australia Sweden		Norway Denmark Canada USA		Hierarchy visually represented
Preference for “hands-off” management (reversed)	Singapore			Ireland Japan Spain		Sweden Austria Belgium	Italy UK Netherlands USA		Finland Denmark Norway Germany		France Switzerland Canada Australia	Range 60% Mid-range 62 Base 32–92
Structure (p)	<i>Family:</i>		<i>Elements of family: Incubator</i>		<i>Weak elements of family: Guided missile</i>		<i>Minimal elements of family: Eiffel tower</i>					
	S. Korea	Singapore	Canada	Denmark	Netherlands	USA	Australia	Finland				
	Spain	Italy	UK	Switzerland	Ireland	Norway	Austria					
	Japan	N. Zealand	Germany	Sweden								
	Belgium		France									
Structure denotes locus of authority rather than function	Singapore	Japan		Sweden	Netherlands	UK	Belgium	Australia				Range 45% Mid-range 77.5 Base 55–100
		Spain		USA	Germany	Austria	Canada	Finland				
		Italy		Switzerland	Ireland	France	Norway	Denmark				
	<i>Venezuela omitted because it is 11 points lower than the next country, skewing the data</i>											
Specific versus diffused (the range of involvement)												
Differentiate between public and private roles (reversed)	Sweden	Denmark	Ireland	USA	Spain	New Zealand	South Korea					Range 59% Mid-range 61.5 Base 32–91
	Netherlands	UK	Germany	Norway	Japan	Austria	Singapore					
	Switzerland	France	Belgium	Australia								
	Finland	Canada										
Company should not provide housing (reversed) (p)	Sweden	Netherlands	Austria	Italy			Japan					Range 78% Mid-range 50 Base 11–89
	USA	UK	Canada	Singapore			South Korea					
	Denmark	Australia	Norway	Finland								
	Switzerland	France	Germany									

Appendix 8

Marriage organised by individual (reversed)	Netherlands <i>Sweden</i>	Germany		Spain Italy	<i>Japan</i> France	USA		Singapore <i>UK</i>	Range 33.5% Mid-range 74.5 Base 57.7–91.2
Achievement versus ascription									
Achievement more important than “being yourself” (d)	Norway USA Australia	Canada Ireland New Zealand	<i>UK</i> <i>Sweden</i>	<i>Denmark</i> Finland	Germany Singapore Switzerland	France Italy Netherlands	<i>Japan</i> Austria	South Korea Spain	Range 73% Mid-range 40.5 Base 4–77
You have to earn respect (reversed)	Norway Ireland Denmark <i>UK</i>	Finland New Zealand USA Canada	Sweden Australia France	Spain Italy Singapore	Japan Germany South Korea	Switzerland Belgium	Austria		Range 44% Mid-range 72 Base 50–94
Achievement earns more respect than age (reversed) (pr)(d)	USA Australia Canada	<i>Sweden</i> <i>UK</i> Belgium	Germany France	Italy Netherlands	Singapore	<i>Japan</i> S. Korea		Range 26% Mid-range 50 Base 37–63	Base changed: 23–63 Range 40% Mid-range 43
Drive									
Manager’s sense of drive and responsibility	<i>Sweden</i> USA <i>Japan</i>	Finland Korea Netherlands	Singapore Switzerland Belgium	Ireland France Austria	Denmark Italy Australia	Canada Spain	N. Zealand <i>UK</i>	Norway	Range 24% Mid-range 50 Base 50–74

An initial summary of cultural characteristics

Quartile	<i>Universalism versus particularism</i>				<i>Communitarianism versus individualism</i>				<i>Neutral versus affective</i>				<i>Attitude relating to the environment</i>				<i>Attitude to time</i>			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	3rd	2nd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Australia	3					1	2	4			2		2		1	1	1		2	1
Austria											1		2		1		1			1
Belgium		1	1	1		2	4	1		1				1	3		1		5	
Canada	3	1				2	1	4			2		1	2		1	1	1	3	
Denmark		2				1	2			1			1	2			1	1		
Finland	2						1	1		1			1	1			1	1		
France		3		1	2	1	2		1	1			1	3			1	4		2
Germany	2	1			1	2	1	3		1	1		1	1	2		3	2	1	1
Ireland	2		1			2	1		1				1	1	1					2
Italy		2		1	1	2	3			1	1			1	2	1	1	1	2	1
Japan	1	1	1	1	6	1						2	1	2		1	4	1	2	
N. Zealand												1	2		1		1		1	
Netherlands	2	1				1	2	3	1	1			2		2		1	2		2
Norway						1				1			2	1			1	3		
Singapore		1	2	1	5	1	1			1	1		2		1	1	1	2		2
South Korea				3		1	1							2			4	1	1	
Spain		2	1			1	2		1	1			1	1		1			1	1
Sweden	3	1				2	3	2	1	1			1	1	1	1	4		1	2
Switzerland	3					1	1			1			2		1		1	1	1	
UK	2	1	1			1	3	3		1	1		1		2	1	2	1	2	2
USA	2	2					3	4		1	1		1	1		1	2	2	2	1

Quartile	Drive				Altruism / Humane				Achievement v Ascription				Paternal or Egalitarian			
	4th	3rd	2nd	1st	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th
Australia		1	2	4			1	3				3				8
Austria		2								3						2
Belgium		1	4	1		1	1	1			1	1	1	1	2	2
Canada	1	2		4			2	2				3		1	1	6
Denmark		2	2								1	1		1		1
Finland		1	1	2							1					2
France	1	3	1	1	1	1	1	1		1		2	1	2	2	3
Germany	1	2		3			2	2		1	1	1		1		7
Ireland		2	1	1								2			1	1
Italy	1	3	2		1		3			1	2		2	1	3	1
Japan	4	2		1	2	1		1		2	1		5	2	1	
N. Zealand				1								2	1			
Netherlands		2	2	3	1			2		1	1				2	6
Norway			1	1								2			1	1
Singapore	3	2	2		1	2	1			1	2		3	1	3	1
South Korea	1	2	1	1					1	1	1		2	2		
Spain	2	1	1			1			1		1		1		1	
Sweden		2	3	2	1			3			1	2		2	1	5
Switzerland		2	1							1	1			1		2
UK		1	3	2			1	3			1	2		1	1	6
USA			2	5			1	2				3			1	7

Appendix 9. National Cultures with Imputation Guided by Similar Studies and Retaining the Rank Order

All imputed data are shown in bold italics.

(p) denotes recognition of paternal characteristic (“pr” indicates reversal of measures)

(a) denotes altruistic behaviour (“ar” indicates reversal of measures)

(d) denotes drive/assertiveness (“dr” indicates reversal of measures)

Dimension	Upper/longest quartile*			Second quartile*		Third quartile	Shortest/lowest quartile*	Notes	
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.									
<i>Universalism versus particularism (rules versus relationships), ignoring the Central Europe/eastern bloc countries</i>									
Universalist rather than particular (pr)	Switzerland <i>N. Zealand</i> USA Canada	Ireland <i>Denmark</i> <i>Sweden</i>	Australia <i>UK</i> <i>Finland</i>	Netherlands Germany <i>Norway</i>	Spain France	Singapore <i>Japan</i> <i>Austria</i>	<i>Belgium</i> <i>Italy</i>	South Korea	Range 29% Mid-range 82.5 Base 36–97
Would not be less critical of a friend in a review	Finland Switzerland <i>N. Zealand</i>	Canada Australia	Italy USA <i>Sweden</i>	France <i>Denmark</i> Belgium	Germany Netherlands <i>Austria</i>	<i>UK</i> Ireland <i>Norway</i>	<i>Japan</i> Spain	Singapore South Korea	Range 23% Mid-range 63.5 Base 45–75
Would not keep quiet for a friend	Ireland Finland <i>Germany</i> Switzerland	<i>Sweden</i> Canada <i>Japan</i>	<i>Netherlands</i> <i>N. Zealand</i> <i>Australia</i>	Spain <i>Denmark</i> <i>UK</i>	<i>Norway</i> Italy USA	France <i>Austria</i>	Singapore	South Korea Belgium	Range 28% Mid-range 56 Base 36–70
Should not make allowances for those with specific difficulties (pr)(ar)	<i>Ireland</i> USA Germany <i>Denmark</i>	<i>Sweden</i> <i>UK</i> <i>Finland</i> Netherlands	<i>Switzerland</i> <i>N. Zealand</i> <i>Norway</i> Australia	Canada <i>Austria</i>		Singapore	Belgium <i>Spain</i>	<i>Japan</i> Italy France	Range 52% Mid-range 69 Base 43–95 No adjustment

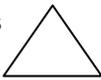
Communitarianism versus individualism (the group versus the individual)									
Look after the group if you are to improve one's quality of life	<i>Japan</i> Austria	France Singapore	Ireland Italy Germany	Ireland Norway Belgium	<i>Sweden</i> Denmark <i>UK</i> Australia	Spain Finland Netherlands N. Zealand	Switzerland <i>Denmark</i> USA Canada		Range 59% Mid-range 59.5 Base 30–89
Group rather than individual credit (dr)	<i>Japan</i> Austria France		Singapore <i>Denmark</i> Germany	Canada Australia Switzerland	<i>Sweden</i> South Korea <i>UK</i> Netherlands	N. Zealand Ireland Norway USA	Italy Belgium Spain	Finland	Range 76% Mid-range 64 Base 40–88
Responsibility for actions lies with the group, not the individual (dr)	Singapore Italy <i>Japan</i>	Austria Germany	Finland <i>Sweden</i> South Korea Belgium	Norway Netherlands N. Zealand	Ireland Switzerland France	Spain <i>UK</i> Canada	<i>Denmark</i> USA Australia		Range 43% Mid-range 47.5 Base 26–69
Should a family help to rebuild a damaged store versus the individual? (a)	Singapore	<i>Japan</i> Spain	Austria Finland	Belgium Ireland Norway	Switzerland Germany France	Italy Netherlands N. Zealand	<i>UK</i> Australia USA	Canada <i>Sweden</i> Denmark	Range 46% Mid-range 61 Base 38–84 Reversed
Salary should consider family size (p)(a)	<i>Japan</i> Spain		Austria Finland	Italy Singapore	France <i>Sweden</i> Denmark Belgium	Ireland Norway Switzerland Germany	Netherlands N. Zealand Australia	Canada USA <i>UK</i>	Range 63.1% Mid-range 36.05 Base 32.4–95.5 Reversed
A job is a job for life (p)(dr)	Singapore	<i>Japan</i> Spain	Austria Finland	Belgium Ireland Norway Switzerland	Italy France <i>Sweden</i> Denmark	Germany Netherlands N. Zealand	<i>UK</i> Australia	Canada USA	Range 67% Mid-range 65.5 Base 32–99 Unchanged
New employees should fit in (p)(dr)	Singapore <i>Japan</i> Spain	Austria Finland	<i>Sweden</i> Denmark	France Italy	Belgium Ireland Switzerland	Norway <i>UK</i>	Germany Netherlands N. Zealand	Australia Canada USA	Range 53% Mid-range 65.5 Base 39–92 Reversed

Neutral versus affective									
Hide emotional responses	<i>Japan</i> New Zealand	Austria Canada	Singapore Australia	<i>Sweden</i> Netherlands <i>UK</i> USA	Finland Belgium Norway Germany	<i>Denmark</i> Italy Switzerland	France Ireland	Spain	Range 66% Mid-range 48 Base 15–81
Feminine characteristics of nurturing including permissiveness (reversed)(a)	<i>Japan</i> Switzerland	Belgium Canada Australia USA	Ireland <i>UK</i> Germany	Italy Austria N. Zealand	Spain France Singapore		<i>Sweden</i> Norway	Netherlands Denmark Finland	Range 90% Mid-range 46.5 Base 5–95 No adjustment
Attitude relating to the environment									
Worth trying to control nature		Spain France <i>Denmark</i>	Norway Canada S. Korea	Austria Ireland New Zealand Australia <i>UK</i> Netherlands	Belgium USA Finland Italy Germany Switzerland	<i>Sweden</i> Singapore	<i>Japan</i>	Range 59% Mid-range 38.5 Base 9–68	
We are the root cause of events	Norway USA Australia New Zealand Canada <i>UK</i> Switzerland	Ireland France Spain Austria Netherlands	<i>Denmark</i> South Korea Italy Belgium	<i>Sweden</i> Finland Germany <i>Japan</i>	Singapore			Range 55% Mid-range 60.5 Base 33–88	
Stakeholder rather than stockholder approach	<i>Japan</i>	Singapore	Spain France	Germany Austria Denmark Finland Norway	Switzerland Belgium Netherlands <i>Sweden</i> Italy	<i>UK</i> Ireland Canada	Australia USA	Range 32% Mid-range 24 Base 8–40	

Appendix 9

Extent to which countries protect the environment (Performance measures (1993))	<i>Denmark</i> <i>Sweden</i> Switzerland Germany Austria Netherlands	Finland New Zealand Singapore Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>	Italy Spain	Range 45.54% Mid-range 57.75		
Attitude to time									
Relationship between the present and future	<i>The future is more important than the present</i>				<i>The future and the present are of the same importance</i>		<i>The future is less important than the present</i>	Merged	
	Switzerland South Korea Australia	Norway Netherlands Denmark Austria	<i>UK</i> Italy Finland Ireland	USA Singapore Belgium	Sweden Germany Canada	<i>Japan</i> Spain N. Zealand	France		
Synchronicity versus sequential	<i>Overlap between present and future in both</i>				<i>Very close proximity in both</i>		<i>Clear divide in both</i>		
	<i>Japan</i> Switzerland Canada	Norway France Germany	Denmark Austria Finland	Ireland Belgium South Korea	<i>UK</i> USA Sweden	Spain N. Zealand	Italy Australia Netherlands Singapore		
Time horizon	<i>Weeks–Months</i>		<i>Weeks</i>			<i>Days–Weeks</i>			Range 2.3 Mid-range 4.55 (1 = seconds 7 = years)
	Austria South Korea	<i>Sweden</i> <i>Denmark</i>	Finland France Switzerland <i>Japan</i> Singapore	Germany Netherlands Norway	<i>UK</i> Italy Spain New Zealand	Canada Belgium USA Australia	Ireland		
Long term versus short term (<i>The Seven Cultures</i> , p.135)	<i>Japan</i> <i>Sweden</i> W. Germany	New Zealand Finland Switzerland	Australia Singapore Norway <i>Denmark</i>	Netherlands France Canada S. Korea	Belgium Australia	USA Italy	Ireland <i>UK</i> Austria Spain	Ranked: <i>Japan</i> (longest) to shortest	

Appendix 9

Corporate culture															
Steep hierarchy	Singapore Austria		Spain Belgium France		Japan Italy Finland	Ireland UK South Korea		Germany Switzerland Netherlands		Australia Sweden	Norway Denmark	Canada USA		Hierarchy visually represented	
Preference for "hands-off" management (reversed)	Singapore		Ireland Japan Spain	Sweden Austria Belgium	Italy UK Netherlands	USA Finland Denmark	Norway Germany France	Switzerland Canada Australia						Range 60% Mid-range 62 Base 32–92	
Structure (p)	<i>Family</i> S. Korea Spain Japan Belgium		Singapore Italy N. Zealand		<i>Elements of family: Incubator</i> Canada UK Germany France		<i>Denmark</i> Switzerland Sweden		<i>Weak elements of family: Guided missile</i> Netherlands Ireland		USA Norway		<i>Minimal elements of family: Eiffel tower</i> Australia Austria		Finland
Structure denotes locus of authority rather than function		Singapore	Japan Spain	Italy	Sweden USA Switzerland Netherlands	Germany Ireland UK Austria	France Belgium Canada Norway	Australia Finland Denmark						Range 45% Mid-range 77.5 Base 55–100	
Venezuela omitted because it is 11 points lower than the next country, skewing the data															
Performance measures (1993)															
Extent to which countries protect the environment (copied to attitude)	Denmark Sweden Switzerland Germany Austria Netherlands	Singapore Norway Australia Finland New Zealand	Canada Japan USA	France Ireland	Belgium UK	Italy Spain								Range 45.54% Mid-range 57.75	
Anticipated increase in SMEs	Japan Spain Germany	Ireland Singapore Italy	Netherlands France Belgium	Switzerland Denmark USA	New Zealand Finland	Canada Norway	UK Australia	Sweden						Range 30.24% Mid-range 55.12	

Appendix 9

Anticipation of new employment opportunities	<i>Japan</i> Singapore Ireland	Austria Germany	USA Italy <i>Denmark</i> Belgium	Netherlands Australia Canada New Zealand	<i>UK</i> Spain Switzerland France	Finland Norway	<i>Sweden</i>	Range 28.06% Mid-range 60.97
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Specific versus diffused (the range of involvement)

Company should not provide housing (reversed) (pr)	<i>Sweden</i> Spain USA <i>Denmark</i>	Switzerland Netherlands <i>UK</i> Australia	France Austria Canada Norway	Germany Italy Singapore Finland	New Zealand	<i>Japan</i> South Korea	Ireland	Range 78% Mid-range 50 Base 11–89
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Achievement versus ascription

Achievement more important than "being yourself" (d)	Norway USA Australia	Canada Ireland New Zealand	<i>UK</i> <i>Sweden</i>	<i>Denmark</i> Finland	Germany Singapore Switzerland France	Italy Netherlands <i>Japan</i> Austria	South Korea Spain	Range 73% Mid-range 40.5 Base 4–77
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You have to earn respect	Norway Ireland <i>Denmark</i> Finland	New Zealand <i>UK</i> USA Canada	<i>Sweden</i> Australia France	Spain Italy Singapore	<i>Japan</i> Germany South Korea	Switzerland Belgium	Austria	Range 44% Mid-range 72 Base 50–94
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Achievement earns more respect than age (pr)(d)	USA Australia Canada <i>Sweden</i> <i>UK</i> Belgium N. Zealand	Spain Switzerland Finland Austria Germany France	Italy Ireland Denmark	Netherlands Singapore	<i>Japan</i> S. Korea			Range 26% Mid-range 50 Base 37–63 Base changed: 23–63 Range 40% Mid-range 43
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Drive

Managerial initiative. Manager's sense of drive and responsibility	<i>Sweden</i> USA <i>Japan</i>	Finland Korea Netherlands	Singapore Switzerland Belgium Ireland France	Austria <i>Denmark</i> Italy Australia	Canada Spain New Zealand <i>UK</i>	Norway	Range 24% Mid-range 50 Base 50–74
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A summary of cultural characteristics including the first imputation

Quartile	Universalism versus particularism				Communitarianism versus individualism				Neutral versus affective				Attitude relating to the environment				Attitude to time			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Australia	4					1	2	4			2		2		1	1	1	1	1	1
Austria		4			4	3					2		2		2		3			1
Belgium		1	2	1		2	4	1		1	1			1	3			1	2	
Canada	3	1				2	1	4			2		1	2		1	1	1	2	
Denmark	2	2				2	3	2	1	1			1	2	1		3	1		
Finland	4				1	3	2	1	1	1			1	1	2		1	3	1	
France		3		1	2	3	1	1	1	1			1	3			1	2		1
Germany	3	1			1	2	1	3		1	1		1	1	2		2	1	1	
Ireland	3		1			2	4	1	1		1		1	1	1	1		2		2
Italy		2	1	1	1	2	4			1	1			1	2	1	1		2	1
Japan	1	1	1	1	6	1						2	1	2		1	2	1	1	
N. Zealand	4					1	3	3			1	1	2		1	1	1		3	
Netherlands	3	1				1	3	3	1	1			2		2		1	2		1
Norway	2	1	1			2	4	1	1	1			2	1	1		2	2		
Singapore		1	2	1	5	1	1			1	1		2		1	1	1	2		1
South Korea				3		1	1										2	2		
Spain		2	2		3	2	2		1	1			1	2		1			3	1
Sweden	3	1				2	3	2	1	1			1	1	1	1	2		2	
Switzerland	4					2	4	1		1		1	2		2		3	1		
UK	2	1	1			1	3	3		1	1		1		2	1	1		2	1
USA	2	2					3	4		1	1		1	2	1			1	3	

Quartile	Drive				Altruism/humane				Achievement versus ascription				Paternal or egalitarian			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th
Australia	4	2	1				1	3				3				8
Austria	1	1	2	3		2	2			2		1	1	2	2	3
Belgium	1	4	1			1	2	1			1	1	1	2	2	2
Canada	4		3				2	2				3		1	1	6
Denmark		5	2		1	2		1			2	1		2	2	4
Finland	3	2	1	1	2	1	1				2	1	1	2		5
France	1	2	3	1	1	1	1	1		1		2	1	2	2	3
Germany	3		2	1			2	2		1	1	1		1		7
Ireland	1	5	1				2	2			1	2	1		4	3
Italy		4	2	1	1		3			1	2		2	2	3	1
Japan	1		2	4	2	1		1		2	1		5	2	1	
N. Zealand	4	1	2				2	2				3	1	2	1	4
Netherlands	3	2	2		1		1	2		2	1				2	6
Norway	1	3	1	1	1		1	2				2			3	2
Singapore		2	2	3	1	2	1			1	2		3	1	3	1
South Korea	1	1	2	1					1	1	1		2	2		
Spain	3	2	1	1	1	3			1		1	1	4	1	1	2
Sweden	2	3	2		1			3			1	2		2	1	5
Switzerland	1	3	3		2		1	1		1	1	1		1	2	5
UK	2	3	3				1	3			1	2		1	1	6
USA	5	2					1	3				3			1	7

Appendix 10. National Cultures with Imputation Guided on the Performance Achieved in Similar Studies

Imputed data are shown in bold italics.

(p) denotes recognition of paternal characteristic (“pr” indicates reversal of measures)

(a) denotes altruistic behaviour (“ar” indicates reversal of measures)

(d) denotes drive/assertiveness (“dr” indicates reversal of measures)

Dimension	Upper/longest quartile*		Second quartile*		Third quartile		Shortest/lowest quartile*		Notes
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.									
<i>Universalism versus particularism (rules versus relationships), ignoring the Central Europe/eastern bloc countries</i>									
Universalist rather than particular (pr)	Switzerland USA Canada	Ireland <i>Sweden</i> Australia	<i>UK</i> Netherlands Germany	Spain France Singapore	<i>Japan</i> <i>Belgium</i> <i>Austria</i>	<i>Italy</i> <i>Finland</i>	<i>Norway</i> <i>N. Zealand</i>	<i>Denmark</i> S. Korea	Range 29 Mid-range 82.5 Base 36–97
Would not be less critical of a friend in a review	Finland Switzerland	Canada Australia	Italy USA <i>Sweden</i>	France <i>Denmark</i> Belgium	<i>Austria</i> Germany Netherlands	<i>UK</i> Ireland <i>Norway</i>	<i>Japan</i> Spain <i>N. Zealand</i>	Singapore S. Korea	Range 23% Mid-range 63.5 Base 45–75
Would not keep quiet for a friend	Ireland Finland Switzerland	<i>Sweden</i> Canada <i>Japan</i>	Spain <i>Denmark</i> <i>UK</i>	Italy USA France	Singapore <i>Germany</i>	<i>Australia</i> <i>N. Zealand</i>	South Korea <i>Netherlands</i>	Belgium	Range 28% Mid-range 56 Base 36–70
Should not make allowances for those with specific difficulties (pr)(ar)	USA Germany <i>Sweden</i> <i>Spain</i>	<i>UK</i> Netherlands Australia	Canada <i>Switzerland</i>	<i>Austria</i>	Singapore <i>Finland</i> <i>N. Zealand</i>	Belgium <i>Ireland</i> <i>Norway</i>	<i>Japan</i> Italy	<i>Denmark</i> France	Range 52% Mid-range 69 Base 43–95 No adjustment

Appendix 10

Communitarianism versus individualism (the group versus the individual)									
Look after the group if you are to improve one's quality of life	<i>Japan</i>	France Singapore	Ireland Italy Germany Austria	Norway Belgium	<i>Sweden</i> UK Australia Spain	Finland Netherlands Switzerland	<i>Denmark</i> USA Canada	N. Zealand	Range 59% Mid-range 59.5 Base 30–89
Group rather than individual credit (d)	<i>Japan</i>	France	Singapore <i>Denmark</i> Germany Austria	Canada Australia Switzerland	<i>Sweden</i> South Korea UK	Netherlands Ireland Norway	USA Belgium Spain	Finland Italy N. Zealand	Range 76% Mid-range 64 Base 40–88
Responsibility for actions lies with the group, not the individual (dr)	Singapore Italy <i>Japan</i> Germany	Finland <i>Sweden</i> South Korea Belgium	Netherlands Ireland Switzerland Spain	UK Austria Canada	<i>Denmark</i> USA France	Australia Norway	N. Zealand		Range 43% Mid-range 47.5 Base 26–69
Should a family help to rebuild a damaged store versus the individual? (a)	Singapore	<i>Japan</i> Spain	Austria	Belgium Ireland Norway Switzerland	Germany France Italy Finland	N. Zealand Netherlands UK	Australia USA Canada	<i>Sweden</i> Denmark	Range 46% Mid-range 61 Base 38–84 Reversed
Salary should consider family size (p)(a)	<i>Japan</i> Spain	Austria		Italy Finland Norway	Singapore Ireland Switzerland	France <i>Sweden</i> Denmark Belgium	Germany Netherlands N. Zealand Australia	Canada USA UK	Range 63.1% Mid-range 36.05 Base 32.4–95.5 Reversed
A job is a job for life (p)(dr)	Singapore <i>Japan</i> Spain	Austria		Belgium Ireland Norway Switzerland	Italy France <i>Sweden</i> Finland	Germany Netherlands N. Zealand	UK Australia Canada	USA Denmark	Range 67% Mid-range 65.5 Base 32–99 Unchanged
New employees should fit in (p)(dr)	Singapore <i>Japan</i> Spain	<i>Sweden</i> France	Austria Italy	Belgium Ireland Norway	Switzerland UK Finland	Germany Netherlands N. Zealand	Australia Canada	USA Denmark	Range 53% Mid-range 65.5 Base 39–92 Reversed

Appendix 10

Neutral versus affective										
Hide emotional responses	<i>Japan</i> New Zealand	Austria Canada	Singapore Australia	<i>Sweden</i> Netherlands <i>UK</i>	USA Finland Belgium	Norway Germany <i>Denmark</i>	Italy Switzerland	France Ireland Spain	Range 66% Mid-range 48 Base 15–81	
Feminine: nurturing and permissiveness (reversed) (ar)	<i>Japan</i> Austria Switzerland	Italy Ireland Germany	<i>UK</i> USA Australia	N. Zealand Belgium Canada	Singapore	France Spain	Finland Denmark Netherlands	Norway <i>Swede</i>	Range 90% Mid-range 46.5 Base 5–95	
Attitude relating to the environment										
Worth trying to control nature		Spain France <i>Denmark</i>	Norway Canada South Korea	Austria Ireland New Zealand	Australia <i>UK</i> Netherlands	Belgium USA Finland	Italy Germany Switzerland	<i>Sweden</i> Singapore <i>Japan</i>	Range 59% Mid-range 38.5 Base 9–68	
We are the root cause of events	Norway USA Australia N. Zealand	Canada <i>UK</i> Switzerland Ireland	France Spain Austria Netherlands	<i>Denmark</i> South Korea Italy	Belgium <i>Sweden</i> Finland	Germany <i>Japan</i>	Singapore		Range 55% Mid-range 60.5 Base 33–88	
Stakeholder rather than stockholder	<i>Japan</i> Singapore	Spain France	Germany Austria Denmark	Finland Norway	Switzerland Belgium	Netherlands <i>Sweden</i> Italy	<i>UK</i> Ireland Canada	N. Zealand Australia USA	Range 32% Mid-range 24 Base 8–40	
Extent to which countries protect the environment (Performance measures (1993))	<i>Denmark</i> <i>Sweden</i> Switzerland Germany	Austria Netherlands Finland New Zealand	Singapore Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>	Italy Spain		Range 45.54% Mid-range 57.75	
Attitude to time										
Relationship between the present and future	<i>The future is more important than the present</i>				<i>The future and the present are of the same importance</i>			<i>The future is less important than the present</i>		Merged
	Switzerland S. Korea Australia	Norway Netherlands <i>UK</i>	Italy USA Singapore	Belgium Austria Denmark	<i>Sweden</i> Germany Finland Ireland	Canada <i>Japan</i> Spain N. Zealand	France			

Appendix 10

Synchronicity versus sequential	<i>Overlap between present and future in both</i>			<i>Very close proximity in both</i>		<i>Clear divide in both</i>		Merged modifying classifications to accommodate similarity	
	Switzerland Japan Canada Norway	France Germany Belgium South Korea	Austria Denmark Ireland	UK USA Sweden	Finland Spain New Zealand	Italy Australia	Netherlands Singapore		
Time horizon	<i>Weeks–Months</i>		<i>Weeks</i>			<i>Days–Weeks</i>			Range 2.3 Mid-range 4.55 (1 = seconds 7 = years)
	Austria S. Korea Sweden Denmark	Finland France Switzerland	Japan Singapore Germany	Netherlands Norway	UK Italy Spain	New Zealand Canada Belgium	USA Australia	Ireland	
Long term versus short term (<i>The Seven Cultures</i> , p.135)	Japan Sweden W. Germany	N. Zealand Finland Switzerland	Singapore Norway Denmark	Netherlands France Canada	S. Korea Belgium Australia	USA Italy	Ireland UK	Austria Spain	Ranked: Japan (longest) to shortest
Corporate culture									
Steep hierarchy	Singapore Austria 	Spain Belgium France 	Japan Italy Finland 	Ireland UK South Korea	Germany Switzerland Netherlands Australia Sweden 	Norway Denmark Canada USA 	Hierarchy visually represented		
Preference for “hands-off” management (reversed)	Singapore		Ireland Japan Spain	Sweden Austria Belgium	Italy UK Netherlands USA	Finland Denmark Norway Germany	France Switzerland Canada Australia	Range 60% Mid-range 62 Base 32–92	
Structure (p)	<i>Family</i>		<i>Elements of family: Incubator</i>		<i>Weak elements of family: Guided missile</i>		<i>Minimal elements of family: Eiffel tower</i>		
	S. Korea Spain Japan	Belgium Singapore Italy N. Zealand	Canada UK Germany France	Denmark Switzerland Sweden	Netherlands Ireland	USA Norway	Australia Austria	Finland	

Appendix 10

Structure denotes locus of authority rather than function		Singapore	<i>Japan</i> Spain Italy	<i>Sweden</i> USA Switzerland	Netherlands Germany Ireland	<i>UK</i> Austria France	Belgium Canada Norway	Australia Finland <i>Denmark</i>	Range 45% Mid-range 77.5 Base 55–100
<i>Venezuela omitted because it is 11 points lower than the next country, skewing the data</i>									
Performance measures (1993)									
Extent to which countries protect the environment (copied to attitude)	<i>Denmark</i> <i>Sweden</i> Switzerland Germany	Austria Netherlands Finland New Zealand	Singapore Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>		Italy Spain	Range 45.54% Mid-range 57.75
Anticipated increase in SMEs	<i>Japan</i> Spain Germany	Ireland Singapore Italy	Netherlands France	Belgium Switzerland	<i>Denmark</i> USA	New Zealand Finland	Canada Norway	<i>UK</i> Australia <i>Sweden</i>	Range 30.24% Mid-range 55.12
Anticipation of new employment opportunities	<i>Japan</i> Singapore Ireland	Austria Germany	USA Italy <i>Denmark</i> Belgium	Netherlands Australia Canada New Zealand	<i>UK</i> Spain Switzerland France	Finland Norway		<i>Sweden</i>	Range 28.06% Mid-range 60.97
Specific versus diffused (the range of involvement)									
Company should not provide housing (reversed) (pr)	<i>Sweden</i> USA <i>Denmark</i> Switzerland Netherlands	<i>UK</i> Australia France Austria Canada	Norway Germany Italy Singapore Finland		<i>Japan</i> South Korea		<i>Ireland</i> <i>N. Zealand</i> <i>Spain</i>		Range 78% Mid-range 50 Base 11–89
Achievement versus ascription									
Achievement more important than "being yourself" (d)	Norway USA Australia	Canada Ireland New Zealand	<i>UK</i> <i>Sweden</i>	<i>Denmark</i> Finland	Germany Singapore Switzerland France	Italy Netherlands <i>Japan</i> Austria	South Korea Spain		Range 73% Mid-range 40.5 Base 4–77

Appendix 10

You have to earn respect (reversed)	Norway Ireland <i>Denmark</i>	USA Canada <i>Sweden</i>	Spain Italy Singapore <i>Japan</i>	Germany South Korea Switzerland Belgium	Austria Netherlands		Range 44% Mid-range 72 Base 50–94
Achievement earns more respect than age (reversed) (pr)(d)	USA Australia Canada <i>Sweden</i>	<i>UK</i> Belgium Germany France Ireland	Italy Denmark N. Zealand Austria	Netherlands Singapore Spain	<i>Japan</i> S. Korea		Range 26% Mid-range 50 Base 37–63 Base changed: 23–63 Range 40% Mid-range 43
Drive							
Managerial initiative. Manager's sense of drive and responsibility (d)	<i>Sweden</i> USA <i>Japan</i>	Finland Korea Netherlands	Singapore Switzerland Belgium Ireland France	Austria <i>Denmark</i> Italy Australia	Canada Spain New Zealand <i>UK</i>	Norway	Range 24% Mid-range 50 Base 50–74

A summary of cultural characteristics incorporating the second imputation

Quartile	Universalism versus particularism				Communitarianism versus individualism				Neutral versus affective				Attitude relating to the environment				Attitude to time			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Australia	2		2			1	2	4			2		2		1	1	1		2	1
Austria		4				7					1	1	2		2		1	2		1
Belgium		2	1	1		2	4	1		1	1			1	3			2	2	
Canada	3	1				2	1	4			2		1	2		1	1	1	2	
Denmark		2		2		1	2	4	1	1			1	2	1		1	3		
Finland	2		2			1	5	1	1	1			1	1	2		1	1	2	
France		3		1	2	1	4		1	1			1	3			1	2		1
Germany	2	1	1		1	2	1	3		1	1		1	1	2		2	1	1	
Ireland	2		2			1	6		1		1		1	1	1	1		1	1	2
Italy		2	1	1	1	2	3	1		1	1			1	2	1	1		2	1
Japan	1	1	1	1	6	1						2	1	2		1	2	1	1	
N. Zealand			4					7			1	1	2		1	1	1		3	
Netherlands	2	1		1		1	2	4	1	1			2		2		1	2		1
Norway			4			1	6		1	1			2	1	1		2	2		
Singapore		1	2	1	5	1	1			1	1		2		1	1		3		1
South Korea				3		1	1										3		1	
Spain	1	2	1		3	2	2		1	1			1	1		2			3	1
Sweden	3	1				2	3	2	1	1			1	1	1	1	2		2	
Switzerland	3	1				2	5			1		1	2		2		3	1		
UK	2	1	1			1	3	3		1	1		1		2	1	1		2	1
USA	2	2					3	4		1	1		1	2	1			1	3	

Appendix 10

Quartile	Drive				Altruism/humane				Achievement versus ascription				Paternal or egalitarian			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th
Australia	2	1	1				1	3				3				8
Austria		1	3			2	1	1		2	1			3	3	2
Belgium		2	1			1	2	1			1	1	2	1	3	2
Canada	2	1	1				2	2				3		1	1	6
Denmark	1	3			2			2			2	1	2	1	1	4
Finland	2	1	1		1	1	2				1	2		2	3	3
France		3	1		1	1	1	1		1		2	1	2	2	3
Germany	1		2				2	2		1	1	1		1		7
Ireland	1	2	1			1	3					3	1	1	4	2
Italy		2	2		1		3			1	2		2	2	3	1
Japan	1		1	2	2	1		1		2	1		5	2	1	
N. Zealand	2		2				2	2			1	2	2		1	3
Netherlands	2		2		1			3		2	1				2	6
Norway	1	2		1	1	2	1					2		2	4	1
Singapore		1	1	2	1	1	2			1	2		3	1	3	1
South Korea	1	1		1					1	1	1		2	2		
Spain		1	1	2	1	2		1	1		2		5		2	1
Sweden	1	2		1	1			3			1	2		2	1	5
Switzerland		2	2				3	1		1	1	1		1	4	3
UK	1	1	2				1	3			1	2		1	1	6
USA	3	1					1	3				3			1	7

Appendix 11. National Cultures with Imputation Guided by Geographic Clusters Identified in House et al (2004)

Imputed data are shown in bold italics.

(p) denotes recognition of paternal characteristic (“pr” indicates reversal of measures)

(a) denotes altruistic behaviour (“ar” indicates reversal of measures)

(d) denotes drive/assertiveness (“dr” indicates reversal of measures)

Dimension	Upper/longest quartile*		Second quartile*		Third quartile		Shortest/lowest quartile	Notes	
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.									
<i>Universalism versus particularism (rules versus relationships), ignoring the Central Europe/eastern bloc countries</i>									
Universalist rather than particular (pr)	Switzerland USA Canada Ireland	<i>Denmark</i> <i>Norway</i> <i>Sweden</i> Australia	<i>UK</i> <i>Finland</i> Netherlands	Germany <i>Austria</i> <i>Belgium</i>	Spain France	Singapore <i>Japan</i>	<i>Italy</i> <i>N. Zealand</i>	South Korea	Range 29 Mid-range 82.5 Base 36–97
Would not be less critical of a friend in a review	Finland Switzerland <i>Norway</i>	Canada Australia <i>Austria</i>	Italy USA <i>Sweden</i>	France <i>Denmark</i> Belgium	Germany Netherlands <i>N. Zealand</i>	<i>UK</i> Ireland	<i>Japan</i> Spain	Singapore South Korea	Range 23% Mid-range 63.5 Base 45–75
Would not keep quiet for a friend	Ireland Finland <i>Germany</i> Switzerland	<i>Sweden</i> Canada <i>Japan</i>	<i>Austria</i> <i>Netherlands</i> <i>Norway</i>	Spain <i>Denmark</i> <i>UK</i>	<i>Australia</i> Italy USA	France <i>N. Zealand</i>	Singapore	South Korea Belgium	Range 28% Mid-range 56 Base 36–70
Should not make allowances for those with specific difficulties (pr)(ar)	USA Germany <i>Denmark</i> <i>Sweden</i>	<i>Norway</i> <i>UK</i> <i>Finland</i>	Netherlands Australia <i>Austria</i>	Canada <i>Ireland</i>	<i>N. Zealand</i>	Singapore Belgium	<i>Spain</i> <i>Switzerland</i>	<i>Japan</i> Italy France	Range 52 Mid-range 69 Base 43–95

Communitarianism versus individualism (the group versus the individual)									
Look after the group if you are to improve one's quality of life	<i>Japan</i>	France Singapore	Ireland Italy Germany	Norway Belgium	<i>Sweden</i> <i>UK</i> Australia Spain	Finland Netherlands Switzerland <i>Denmark</i>	USA N. Zealand Canada	Denmark Austria	Range 59% Mid-range 59.5 Base 30–89
Group rather than individual credit (dr)	<i>Japan</i>	France	Singapore <i>Denmark</i> Germany	Canada Australia Switzerland	<i>Sweden</i> South Korea <i>UK</i> Netherlands	N. Zealand Ireland Norway USA	Italy Belgium Spain	Austria Finland	Range 76% Mid-range 64 Base 40–88
Responsibility lies with the group, not the individual (dr)	Singapore Italy	<i>Japan</i> Germany	Finland <i>Sweden</i> South Korea	Belgium Netherlands Ireland	Spain <i>UK</i> Canada	<i>Denmark</i> USA France	Australia N. Zealand Switzerland	Norway Austria	Range 43% Mid-range 47.5 Base 26–69
Should a family help to rebuild a damaged store versus the individual? (a)	Singapore	<i>Japan</i>	Belgium Ireland Switzerland	Spain Germany France	Italy Netherlands N. Zealand	<i>UK</i> Australia USA	Norway Finland Canada	<i>Sweden</i> Denmark Austria	Range 46% Mid-range 61 Base 38–84
Salary should consider family size (p)(a)	<i>Japan</i>		Italy Spain N. Zealand	Singapore Ireland Switzerland	France <i>Sweden</i> Denmark Belgium	Finland Norway Austria	Germany Netherlands Australia	Canada USA <i>UK</i>	Range 63.1% Mid-range 36.05 Base 32.4–95.5
A job is a job for life (p)(dr)	Singapore <i>Japan</i>		Belgium Ireland Switzerland Italy	Spain France <i>Sweden</i> N. Zealand	Germany Netherlands <i>UK</i>	Finland Norway Denmark	Australia Canada	USA Austria	Range 67% Mid-range 65.5 Base 32–99
New employees should fit in (p)(dr)	Singapore <i>Japan</i>	<i>Sweden</i> France Italy	Belgium Ireland Switzerland	Spain <i>UK</i> N. Zealand	Germany Netherlands Australia	Norway Denmark	Canada USA	Finland Austria	Range 53% Mid-range 65.5 Base 39–92

Appendix 11

Neutral versus affective										
Hide emotional responses (Masculine aggressiveness then controlled)	<i>Japan</i> New Zealand	Austria Canada	Singapore Australia	<i>Sweden</i> Netherlands <i>UK</i> USA	Finland Belgium Norway Germany	<i>Denmark</i> Italy Switzerland	France Ireland	Spain		Range 66% Mid-range 48 Base 15–81
Feminine characteristics of nurturing including permissiveness (reversed) (ar)	<i>Japan</i> <i>Switzerland</i> <i>Austria</i> <i>Belgium</i>		Canada Australia USA	<i>UK</i> Germany Italy	Spain France	Singapore <i>Ireland</i> <i>New Zealand</i>	<i>Sweden</i> <i>Norway</i> Netherlands	<i>Denmark</i> <i>Finland</i>		Range 90% Mid-range 46.5 Base 5–95
Attitude relating to the environment										
Worth trying to control nature		Spain France <i>Denmark</i>	Norway Canada South Korea	Austria Ireland New Zealand	Australia <i>UK</i> Netherlands	Belgium Finland Italy	Germany Switzerland	<i>Japan</i> <i>Sweden</i> Singapore		Range 59% Mid-range 38.5 Base 9–68
We are the root cause of events	Norway USA Australia New Zealand	Canada <i>UK</i> Switzerland Ireland	France Spain Austria Netherlands	<i>Denmark</i> South Korea Italy	Belgium <i>Sweden</i> Finland	Germany <i>Japan</i>	Singapore			Range 55% Mid-range 60.5 Base 33–88
Stakeholder rather than stockholder approach	<i>Japan</i> Singapore	<i>Spain</i> France		Germany <i>Austria</i> <i>Denmark</i> <i>Finland</i>	<i>Norway</i> <i>Switzerland</i> Belgium	Netherlands <i>Sweden</i> Italy	<i>UK</i> <i>Ireland</i> Canada	Australia USA		Range 32% Mid-range 24 Base 8–40
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland	Germany Austria Netherlands	Finland New Zealand Singapore	Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>	Italy Spain		Range 45.54% Mid-range 57.75

Attitude to time									
Relationship between the present and future	<i>The future is more important than the present</i>				<i>The future and the present are of the same importance</i>		<i>The future is less important than the present</i>		Merged
	Singapore South Korea Australia Norway	Netherlands Denmark UK Italy	USA Singapore Belgium	Ireland N. Zealand Finland	Sweden Germany Canada	<i>Japan</i> Spain Switzerland	France Austria		
Synchronicity versus sequential	<i>Overlap between present and future in both</i>			<i>Very close proximity in both</i>		<i>Clear divide in both</i>		Merged	
	Japan Canada Norway France	Germany Ireland N. Zealand Belgium	South Korea Finland Denmark	UK USA Sweden	Spain Switzerland	Austria Italy Australia	Netherlands Singapore		
Time horizon	<i>Weeks–Months</i>		<i>Weeks</i>		<i>Days–Weeks</i>				Range 2.3 Mid-range 4.55 (1 = seconds 7 = years)
	Austria South Korea	Sweden Denmark	Finland France Switzerland <i>Japan</i>	Singapore Germany Netherlands Norway	UK Italy Spain	New Zealand Canada Belgium	USA Australia	Ireland	
Long term versus short term (<i>The Seven Cultures</i> , p.135)	<i>Japan</i> Sweden W. Germany S. Korea	New Zealand Finland Switzerland	Singapore Norway <i>Denmark</i>	Netherlands France Canada	Belgium Australia	USA Italy	Ireland UK	Austria Spain	Ranked: <i>Japan</i> (longest) to shortest
Corporate culture									
Steep hierarchy	Singapore Austria	Spain Belgium France	<i>Japan</i> Italy Finland	Ireland UK South Korea	Germany Switzerland Netherlands	Australia Sweden	Norway <i>Denmark</i>	Canada USA	Hierarchy visually represented
Preference for “hands-off” management (r)	Singapore		Ireland <i>Japan</i> Spain	Sweden Austria Belgium	Italy UK Netherlands	USA Finland <i>Denmark</i>	Norway Germany France	Switzerland Canada Australia	Range 60% Mid-range 62 Base 32–92

Appendix 11

Structure (p)	<i>Family</i>		<i>Elements of family: Incubator</i>		<i>Weak elements of family: Guided missile</i>		<i>Minimal elements of family: Eiffel tower</i>		
	S. Korea Spain Japan Belgium	Singapore Italy N. Zealand	Canada <i>UK</i> Germany France	<i>Denmark</i> Switzerland <i>Sweden</i>	Netherlands Ireland	USA Norway	Australia Austria	Finland	
Structure denotes locus of authority rather than function		Singapore	Japan Spain	Italy	Sweden USA Switzerland Netherlands	Germany Ireland UK Austria	France Belgium Canada Norway	Australia Finland Denmark	Range 45% Mid-range 77.5 Base 55–100
Venezuela omitted because it is 11 points lower than the next country, skewing the data									
Performance measures (1993)									
Extent countries protect environment (copied to attitude)	<i>Denmark</i> <i>Sweden</i> Switzerland	Germany Austria Netherlands	Finland New Zealand Singapore	Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>	Italy Spain	Range 45.54% Mid-range 57.75
Anticipated increase in SMEs	<i>Japan</i> Spain Germany	Ireland Singapore Italy	Netherlands France Belgium	Switzerland <i>Denmark</i> USA	New Zealand Finland	Canada Norway	<i>UK</i> Australia	<i>Sweden</i>	Range 30.24% Mid-range 55.12
Anticipation of new employment opportunities	<i>Japan</i> Singapore Ireland	Austria Germany	USA Italy <i>Denmark</i>	Belgium Netherlands Australia	Canada New Zealand <i>UK</i>	Spain Switzerland France	Finland Norway	<i>Sweden</i>	Range 28.06% Mid-range 60.97
Specific versus diffused (the range of involvement)									
Company should not provide housing (reversed) (pr)	<i>Sweden</i> Spain USA <i>Denmark</i>	Switzerland Netherlands <i>UK</i> Australia	France Austria Canada Norway	Germany Italy Singapore Finland	New Zealand Belgium	Ireland	<i>Japan</i> S. Korea		Range 78% Mid-range 50 Base 11–89

Appendix 11

Achievement versus ascription								
Achievement more important than "being yourself" (d)	Norway USA Australia Belgium	Canada Ireland N. Zealand	<i>UK</i> <i>Sweden</i>	<i>Denmark</i> Finland	Germany Singapore Switzerland France	Italy Netherlands <i>Japan</i> Austria	South Korea Spain	Range 73% Mid-range 40.5 Base 4–77
You have to earn respect (reversed)	Norway Ireland <i>Denmark</i>	Finland New Zealand <i>UK</i>	USA Canada <i>Sweden</i>	Australia France Norway	Spain Italy Singapore <i>Japan</i>	Germany South Korea Switzerland Belgium	Austria	Range 44% Mid-range 72 Base 50–94
Achievement earns more respect than age (reversed) (pr)(d)	USA Australia Canada <i>Sweden</i>	<i>UK</i> Belgium N. Zealand Ireland	Germany France Austria	Italy Switzerland Netherlands	Singapore	<i>Japan</i> S. Korea	Spain Finland Norway Denmark	Range 40% Mid-range 43 Base 23–63.
Drive								
Managerial initiative. Manager's sense of drive and responsibility	<i>Sweden</i> USA <i>Japan</i>	Finland Korea Netherlands	Singapore Switzerland Belgium Ireland France	Austria <i>Denmark</i> Italy Australia	Canada Spain New Zealand <i>UK</i>		Norway	Range 24% Mid-range 50 Base 50–74

A summary of cultural characteristics including the third imputation

Quartile	Universalism versus particularism				Communitarianism versus individualism				Neutral versus affective				Attitude relating to the environment				Attitude to time			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Australia	3	1				1	2	4			2		2		1	1	1	1	1	1
Austria	4							7			1	1	2		2		1			3
Belgium		1	2	1		2	4	1		1		1		1	3			2	2	
Canada	3	1				2	1	4			2		1	2		1	1	1	2	
Denmark	2	2				1	1	5	1	1			1	2	1		3	1		
Finland	4					1	1	5	1	1			1	1	2		3	1		
France		3		1	2	1	3	1	1	1			1	3			1	2		1
Germany	3	1			1	2	1	3		1	1		1	1	2		2	1	1	
Ireland	2	1	1			2	5		1	1			1	1	1	1		2		2
Italy		2	1	1	1	2	4			1	1			1	2	1	1		2	1
Japan	1	1	1	1	6	1						2	1	2		1	2	1	1	
N. Zealand		4					7			1		1	2		1	1	1	2	1	
Netherlands	3	1				1	3	3	1	1			2		2		1	2		1
Norway	4					1	1	5	1	1			2	1	1		2	2		
Singapore		1	2	1	5	1	1			1	1		2		1	1	1	2		1
South Korea				3		1	1							2			3		1	
Spain		2	2			1	6		1	1			1	1		2			3	1
Sweden	3	1				2	3	2	1	1			1	1	1	1	2		2	
Switzerland	3		1			1	5	1		1		1	2		2		1	1	2	
UK	2	1	1			1	3	3		1	1		1		2	1	1		2	1
USA	2	2					3	4		1	1		1	2	1			1	3	

Appendix 11

	<i>Drive</i>				<i>Altruism/humane</i>				<i>Achievement versus ascription</i>				<i>Paternal or egalitarian</i>			
Quartile	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th
Australia	2	1	1				1	3				3				8
Austria	1	1	2					4		3						8
Belgium		2	1	1		1	1	2			1	2	1	1	3	3
Canada	2	1	1				2	2				3		1	1	6
Denmark	1	3			1			3	1		1	1	1	1		6
Finland	2	1	1		1			3	1		1	1		2	3	3
France		3	1		1	1	1	1		1		2	1	2	2	3
Germany	1		2				2	2		1	1	1		1		7
Ireland	1	2	1			1	3					3			6	2
Italy		2	2		1		3			1	2		2	2	3	1
Japan	1		1	2	2	1		1		2	1		5	2	1	
N. Zealand	1	1	2			1	3					3	1	1	5	1
Netherlands	2		2		1		1	2		2	1				2	6
Norway	2	1		1	1			3				2	1		1	6
Singapore		1	1	2	1	2	1			1	2		3	1	3	1
South Korea	1	1		1					1	1	1		2	2		
Spain		2	1	1		2	2		2		1		2	1	4	1
Sweden	1	2		1	1			3			1	2		2	1	5
Switzerland		2	2			1	2	1		1	2			2	4	2
UK	1	1	2				1	3			1	2		1	1	6
USA	3		1				1	3				3			1	7

Appendix 12. National Cultures with Imputation Based on Climate as Identified in House et al (2004)

Imputed data are shown in bold italics.

(p) denotes recognition of paternal characteristic (“pr” indicates reversal of measures)

(a) denotes altruistic behaviour (“ar” indicates reversal of measures)

(d) denotes drive/assertiveness (“dr” indicates reversal of measures)

Dimension	Upper/longest quartile*	Second quartile*	Third quartile	Shortest/lowest quartile*	Notes		
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.							
Universalism versus particularism (rules versus relationships), ignoring the Central Europe/eastern bloc countries							
Universalist rather than particular (pr)	Switzerland USA Canada	Ireland Denmark <i>Sweden</i>	Australia <i>UK</i> Netherlands	Germany N. Zealand Belgium	Spain France Singapore <i>Japan</i>	Finland Austria Norway Italy S. Korea	Range 29 Mid-range 82.5 Base 36–97
Would not be less critical of a friend in a review	Finland Switzerland Canada	Australia N. Zealand	Italy USA <i>Sweden</i>	France <i>Denmark</i> Belgium	Germany Netherlan ds <i>UK</i> Ireland Austria	Norway <i>Japan</i> Spain Singapore S. Korea	Range 23% Mid-range 63.5 Base 45–75
Would not keep quiet for a friend	Ireland Finland Germany	Switzerland <i>Sweden</i> Canada	<i>Japan</i> N. Zealand Netherlands	Spain <i>Denmark</i> <i>UK</i>	Austria Norway Italy USA France	Singapore Australia S. Korea Belgium	Range 28% Mid-range 56 Base 36–70
Should not allow for specific needs (pr)(ar)	Ireland USA Germany	Denmark Norway <i>Sweden</i>	<i>UK</i> Netherlands Switzerland	Australia N. Zealand	Canada Singapore Finland Belgium	<i>Japan</i> Italy Austria Norway Spain France	Range 52 Mid-range 69 Base 43–95
Communitarianism versus individualism (the group versus the individual)							
Look after the group if you are to improve one’s quality of life	<i>Japan</i> France Singapore	Ireland Italy Germany	Norway Belgium	<i>Sweden</i> <i>UK</i> Australia	Spain Finland Netherlan ds Switzerland <i>Denmark</i>	USA Canada N. Zealand Austria	Range 59% Mid-range 59.5 Base 30–89

Appendix 12

Group rather than individual credit (dr)	<i>Japan</i> France	Singapore <i>Denmark</i> Germany	Canada Australia Switzerland	<i>Sweden</i> South Korea <i>UK</i>	Netherlan ds Ireland Norway	USA <i>Italy</i>	Belgium Spain	Finland <i>Austria</i> <i>N. Zealand</i>	Range 76% Mid-range 64 Base 40–88
Responsibility for actions lies with the group, not the individual (dr)	Singapore Italy	<i>Japan</i> Germany	Finland <i>Sweden</i> South Korea Belgium	<i>Norway</i> Netherlands Ireland	Spain <i>UK</i> Canada	<i>Denmark</i> USA <i>Switzerland</i>	<i>France</i> Australia	<i>N. Zealand</i> <i>Austria</i>	Range 43% Mid-range 47.5 Base 26–69
Should a family help to rebuild a damaged store versus the individual? (a)	Singapore		<i>Japan</i> <i>Denmark</i>	<i>Finland</i> <i>Norway</i>	Belgium <i>Switzerland</i> <i>Spain</i> Germany	France Italy <i>Netherlands</i>	<i>UK</i> Australia USA <i>N. Zealand</i>	Canada <i>Sweden</i> <i>Austria</i> <i>Ireland</i>	Range 46% Mid-range 61 Base 38–84
Salary should consider family size (p)(a)	<i>Japan</i>	<i>Norway</i> <i>Finland</i> <i>Denmark</i>	Italy <i>Spain</i> <i>Switzerland</i>	Singapore	France <i>Sweden</i> Belgium	<i>Ireland</i> <i>Austria</i> Germany	Netherlands <i>N.</i> <i>Zealand</i> Australia	Canada USA <i>UK</i>	Range 63.1% Mid-range 36.05 Base 32.4–95.5
A job is a job for life (p)(dr)	Singapore <i>Japan</i>	<i>Finland</i> <i>Denmark</i> <i>Norway</i>	Belgium <i>Switzerland</i> Italy	<i>Spain</i> France <i>Sweden</i>	Germany Netherlands <i>N. Zealand</i>	<i>UK</i> <i>Ireland</i>	Australia Canada	USA <i>Austria</i>	Range 67% Mid-range 65.5 Base 32–99
New employees should fit in (p)(dr)	Singapore <i>Japan</i>	<i>Sweden</i> <i>Denmark</i> France	<i>Finland</i> Italy <i>Norway</i>	Belgium <i>Switzerland</i>	<i>Spain</i> <i>UK</i>	Germany Netherlands <i>N. Zealand</i>	Australia Canada USA	<i>Ireland</i> <i>Austria</i>	Range 53% Mid-range 65.5 Base 39–92
Neutral versus affective									
Hide emotional responses	<i>Japan</i> New Zealand	Austria Canada	Singapore Australia	<i>Sweden</i> Netherlands <i>UK</i>	USA Finland Belgium	Norway Germany <i>Denmark</i>	Italy Switzerland	France Ireland Spain	Range 66% Mid-range 48 Base 15–81
Feminine: nurturing and permissiveness (reversed) (a)	<i>Japan</i>	Canada Australia USA	<i>Denmark</i> <i>Ireland</i> <i>Belgium</i>	<i>UK</i> Germany Italy	<i>Switzerland</i> <i>N. Zealand</i>	Spain France Singapore	<i>Sweden</i> <i>Norway</i> <i>Austria</i>	Netherlands <i>Finland</i>	Range 90% Mid-range 46.5 Base 5–95
Attitude relating to the environment									
Worth trying to control nature		Spain France <i>Denmark</i>	Norway Canada South Korea	Austria Ireland New Zealand	Australia <i>UK</i> Netherlands	Belgium USA Finland	Italy Germany Switzerland	<i>Sweden</i> Singapore <i>Japan</i>	Range 59% Mid-range 38.5 Base 9–68

Appendix 12

We are the root cause of events	Norway USA Australia New Zealand	Canada <i>UK</i> Switzerland Ireland	France Spain Austria Netherlands	<i>Denmark</i> South Korea Italy	Belgium <i>Sweden</i> Finland	Germany <i>Japan</i>	Singapore		Range 55% Mid-range 60.5 Base 33–88	
Stakeholder rather than stockholder approach	<i>Japan</i> Singapore	Spain France	Germany Austria Denmark	Finland Norway Switzerland	Belgium Netherlands	<i>Sweden</i> Italy	UK Ireland Canada	Australia USA	Range 32% Mid-range 24 Base 8–40	
Extent countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland	Germany Austria Netherlands	Finland New Zealand Singapore	Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium UK	Italy Spain	Range 45.54% Mid-range 57.75	
<i>Attitude to time</i>										
Relationship between the present and future	<i>The future is more important than the present</i>				<i>The future and the present are of the same importance</i>		<i>The future is less important than the present</i>		Merged	
	Singapore Switzerland South Korea Australia	Norway Netherlands Denmark N. Zealand	UK Italy Ireland USA	Singapore Belgium Finland Austria	Sweden Germany	Canada <i>Japan</i>	France Spain			
Synchronicity versus sequential	<i>Overlap between present and future in both</i>			<i>Very close proximity in both</i>		<i>Clear divide in both</i>				
	Japan Switzerland Canada Norway	France Germany Denmark Ireland	N. Zealand Belgium South Korea Finland Austria	UK USA Sweden		Italy Netherlands Spain Italy	Australia Netherlands Singapore			
Time horizon	<i>Weeks–Months</i>			<i>Weeks</i>			<i>Days–Weeks</i>			Range 2.3 Mid-range 4.55 (1 = seconds 7 = years)
	Austria South Korea	<i>Sweden</i> <i>Denmark</i>	Finland France Switzerland <i>Japan</i>	Singapore Germany Netherlands Norway	UK Italy Spain New Zealand	Canada Belgium USA Australia	Ireland			
Long term versus short term <i>(The Seven Cultures, p.135)</i>	<i>Japan</i> <i>Sweden</i> W. Germany	New Zealand Finland Switzerland	Singapore Norway <i>Denmark</i> S. Korea	Netherlands France Canada	Belgium Australia	USA Italy	Ireland UK	Austria Spain	Ranked: <i>Japan</i> (longest) to shortest	

Appendix 12

Corporate culture									
Hierarchy	Singapore Austria	Spain Belgium France	<i>Japan</i> Italy Finland	Ireland <i>UK</i> South Korea	Germany Switzerland Netherlands	Australia <i>Sweden</i>	Norway <i>Denmark</i>	Canada USA	Hierarchy visually represented
Prefer "hands-off" management (reversed)	Singapore		Ireland <i>Japan</i> Spain	<i>Sweden</i> Austria Belgium	Italy <i>UK</i> Netherlands	USA Finland <i>Denmark</i>	Norway Germany France	Switzerland Canada Australia	Range 60% Mid-range 62 Base 32–92
Structure (p)	<i>Family</i>		<i>Elements of family: Incubator</i>		<i>Weak elements of family: Guided missile</i>		<i>Minimal elements of family: Eiffel tower</i>		
	S. Korea Spain Japan Belgium	Singapore Italy N. Zealand	Canada <i>UK</i> Germany France	<i>Denmark</i> Switzerland <i>Sweden</i>	Netherlands Ireland	USA Norway	Australia Austria	Finland	
Structure denotes locus of authority rather than function		Singapore <i>Japan</i>	Spain Italy	<i>Sweden</i> USA Switzerland	Netherlands Germany Ireland	<i>UK</i> Austria France	Belgium Canada Norway	Australia Finland <i>Denmark</i>	Range 45% Mid-range 77.5 Base 55–100
<i>Venezuela omitted because it is 11 points lower than the next country, skewing the data</i>									
Performance measures (1993)									
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland	Germany Austria Netherlands	Finland New Zealand Singapore	Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>	Italy Spain	Range 45.54% Mid-range 57.75
Anticipated increase in SMEs	<i>Japan</i> Spain Germany	Ireland Singapore Italy	Netherlands France Belgium	Switzerland <i>Denmark</i> USA	New Zealand Finland	Canada Norway	<i>UK</i> Australia	<i>Sweden</i>	Range 30.24% Mid-range 55.12
Anticipation of new employment opportunities	<i>Japan</i> Singapore Ireland	Austria Germany	USA Italy <i>Denmark</i>	Belgium Netherlands Australia	Canada New Zealand <i>UK</i>	Spain Switzerland France	Finland Norway	<i>Sweden</i>	Range 28.06% Mid-range 60.97

Appendix 12

Specific versus diffused (the range of involvement)									
Company shouldn't provide housing (reversed) (pr)	<i>Sweden</i> Spain USA <i>Denmark</i>	Switzerland Netherlands <i>UK</i> Australia	France Austria Canada Norway	Germany Italy Singapore Finland	New Zealand Ireland Belgium			<i>Japan</i> South Korea	Range 78% Mid-range 50 Base 11–89
Achievement versus ascription									
Achievement more important than "being yourself" (d)	Norway USA Australia	Canada Ireland N. Zealand	UK Sweden	Denmark Finland	Germany Singapore Switzerland	France Belgium Italy	Netherlands Japan Austria	South Korea Spain	Range 73% Mid-range 40.5 Base 4–77
You have to earn respect (reversed)	Norway Ireland Denmark	Finland N. Zealand UK	USA Canada Sweden	Australia France	Spain Italy Singapore	Japan Germany S. Korea	Switzerland Belgium	Austria	Range 44% Mid-range 72 Base 50–94
Achievement earns more respect than age (pr)(d)	USA Australia Canada	<i>Sweden</i> Germany France	<i>UK</i> Belgium N. Zealand	Switzerland Austria Ireland	Italy Finland Denmark	Netherlands Norway Singapore	<i>Japan</i> S. Korea	Spain	Range 40% Mid-range 43 Base 23–63
Drive									
Managerial initiative. Manager's drive/responsibility	<i>Sweden</i> USA <i>Japan</i>	Finland Korea Netherlands	Singapore Switzerland Belgium	Ireland France Austria	<i>Denmark</i> Italy Australia	Canada Spain	New Zealand <i>UK</i>	Norway	Range 24% Mid-range 50 Base 50–74

A summary of cultural characteristics including the fourth imputation

Quartile	Universalism versus particularism				Communitarianism versus individualism				Neutral versus affective				Attitude relating to the environment				Attitude to time			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Australia	3		1			1	2	4			2		2		1	1	1		2	1
Austria			4					7	1		1		2		2		1	1	1	1
Belgium	1	1	1	1		2	4	1		1	1			2	2			2	2	
Canada	3	1				2	1	4			2		1	2		1		2	2	
Denmark	2	2				5	2			1	1		1	2	1		4			
Finland	2		2			5	1	1	1	1			1	1	2		1	2	1	
France		3		1	2	1	3	1		1			1	3			2	1	1	
Germany	3	1			1	2	1	3		1	1		1	1	2		2	1	1	
Ireland	3		1			2	1	4	1		1		1	1	1	1	2			2
Italy		2		2	1	2	4			1	1			1	2	1	1		2	1
Japan	1	1	1	1	6	1					2		1	2		1	2	1	1	
N. Zealand	4							7			1	1	2		1	1	3		1	
Netherlands	3	1				1	3	3	1	1			2		2		1	2		1
Norway			4			6	1		1	1			2	1	1		2	2		
Singapore		1	2	1	5	1	1			1	1		2		1	1	1	2		1
South Korea				3		1	1							2			2	2		
Spain		2	1	1		1	6		1	1			1	1		2			1	3
Sweden	3	1				2	3	2	1	1			1	1	1	1	2		2	
Switzerland	4					2	5			1	1		2		2		3	1		
UK	2	1	1			1	3	3		1	1		1		2	1	1		2	1
USA	2	2					3	4		1	1		1	2	1			1	3	

Quartile	Drive				Altruism/humane				Achievement versus ascription				Paternal or egalitarian			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th

Appendix 12

Australia	2	1	1				1	3				3				8
Austria	1	1	2		2			2		2		1	1	1		6
Belgium		2	2			1	2	1			2	1	1	1	2	4
Canada	2	1	1				2	2				3		1	1	6
Denmark		3	1			2	1	1			2	1		4	1	3
Finland	1	1	2		1	3					3			5	1	2
France		3	1		1	1	1	1		1		2	1	2	2	3
Germany	1		2				2	2		1	1	1		1		7
Ireland	2	1	1				1	3				3			1	7
Italy		2	2		1		3			1	2		3	1	3	1
Japan	1		1	2	2	1		1		2	1		5	2	1	
N. Zealand	2		2				1	3				3	1			7
Netherlands	2		2		1		1	2		2	1				2	6
Norway	1	1	1	1	1	2		1			1	2		3	2	2
Singapore		1	1	2	1	2	1		1	1	2		3	1	3	1
South Korea	1	1		1					1	1	1		2	2		
Spain		2	1	1	1	1	2		1		1	1	3		4	1
Sweden	1	2		1	1			3			1	2		2	1	5
Switzerland		2	2				3	1		1	1	1		1	3	4
UK	1	1	2				1	3			1	2		1	1	6
USA	3		1				1	3				3			1	7

Appendix 13: National Cultures with Imputation Governed by the Average Performance for the Country in Question

Imputed data are shown in bold italics.

(p) denotes recognition of paternal characteristic (“pr” indicates reversal of measures)

(a) denotes altruistic behaviour (“ar” indicates reversal of measures)

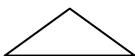
(d) denotes drive/assertiveness (“dr” indicates reversal of measures)

Dimension	Upper/longest quartile*				Second quartile*		Third quartile	Shortest/lowest quartile*	Notes
*Unless otherwise indicated. The exact borders of columns may vary, but the order of quartiles remains the same.									
<i>Universalism versus particularism (rules versus relationships), ignoring the Central Europe/eastern bloc countries</i>									
Universalist rather than particular (pr)	Switzerland USA Canada	Ireland <i>Sweden</i> Australia	<i>UK</i> Netherlands	Germany <i>Finland</i>	Spain France <i>Denmark</i>	Singapore <i>Japan</i> <i>Italy</i>	<i>Belgium</i>	South Korea	Range 29 Mid-range 82.5 Base 36–97
Would not be less critical of a friend in a review	Finland Switzerland	Canada Australia	Italy USA <i>Sweden</i>	France <i>Denmark</i> Belgium	Germany Netherlands	<i>UK</i> Ireland	<i>Japan</i> Spain	Singapore South Korea	Range 23% Mid-range 63.5 Base 45–75
Would not keep quiet for a friend	Ireland Finland <i>Germany</i>	Switzerland <i>Sweden</i>	Canada <i>Japan</i>	<i>Australia</i> <i>Netherlands</i>	Spain <i>Denmark</i> <i>UK</i>	Italy USA France	Singapore	South Korea Belgium	Range 28% Mid-range 56 Base 36–70
Should not allow for specific difficulties (pr)(ar)	<i>Ireland</i> USA Germany	<i>Norway</i> <i>Sweden</i>	<i>UK</i> Netherlands	<i>Switzerland</i> Australia	Canada <i>Denmark</i> <i>Finland</i>	Singapore Belgium	<i>Japan</i> Italy	<i>Spain</i> France	Range 52 Mid-range 69 Base 43–95

Communitarianism versus individualism (the group versus the individual)										
Look after the group to improve one's quality of life	<i>Japan</i> France Singapore	Ireland Italy Germany	Norway Belgium	<i>Sweden</i> <i>UK</i> Australia	Spain Finland Denmark	Netherlands Switzerland <i>Denmark</i>	USA Canada South Korea			Range 59% Mid-range 59.5 Base 30–89
Group rather than individual credit (dr)	<i>Japan</i> France	Singapore <i>Denmark</i> Germany	Canada Australia Switzerland	<i>Sweden</i> South Korea <i>UK</i>	Netherlands Ireland Norway	USA Italy	Belgium Spain	Finland		Range 76% Mid-range 64 Base 40–88
Responsibility for actions lies with the group, not individual (dr)	Singapore Italy <i>Japan</i>	Germany	Finland <i>Sweden</i> South Korea Belgium	Norway Netherlands Ireland	Spain <i>UK</i> Canada	<i>Denmark</i> USA Switzerland	France Australia			Range 43% Mid-range 47.5 Base 26–69
Should a family help to rebuild a damaged store versus the individual? (a)	Singapore	<i>Japan</i>	Belgium Spain Ireland	Germany France Italy	France Norway Netherlands	<i>UK</i> Australia USA	Denmark Switzerland Canada	<i>Sweden</i> Finland South Korea		Range 46% Mid-range 61 Base 38–84 Reversed
Salary should consider family size (p)(a)	<i>Japan</i>		Italy Singapore	France <i>Sweden</i> Belgium Ireland	Finland Denmark Switzerland Spain	Norway Germany Netherlands	N. Zealand Australia Canada	USA <i>UK</i> South Korea		Range 63.1% Mid-range 36.05 Base 32.4–95.5 Reversed
A job is a job for life (p)(dr)	Singapore <i>Japan</i>		Belgium Italy Spain	France <i>Sweden</i> Ireland	Norway S. Korea	Germany Netherlands <i>UK</i>	Denmark Switzerland Australia	Canada USA Finland		Range 67% Mid-range 65.5 Base 32–99
New employees should fit in (dr)(p)	Singapore <i>Japan</i>	<i>Sweden</i> France Italy	Norway Ireland	Belgium Spain	<i>UK</i> S. Korea	Germany Netherlands Australia	Denmark Canada USA	Finland Switzerland		Range 53% Mid-range 65.5 Base 39–92 Reversed
Neutral versus affective										
Hide emotional responses (reversed)	<i>Japan</i> N. Zealand	Austria Canada	Singapore Australia	<i>Sweden</i> Netherlands <i>UK</i>	USA Finland Belgium	Norway Germany <i>Denmark</i>	Italy Switzerland	France Ireland Spain		Range 66% Mid-range 48 Base 15–81

Feminine characteristics of nurturing including permissiveness (reversed)(ar)	<i>Japan</i> N. Zealand	Canada Australia USA Denmark Belgium	<i>UK</i> Germany Italy Switzerland	Spain France Ireland	Singapore Norway	<i>Sweden</i> Austria	Netherlands Finland	Range 90% Mid-range 46.5 Base 5–95 No adjustment	
Attitude relating to the environment									
Worth trying to control nature		Spain France <i>Denmark</i>	Norway Canada South Korea	Australia <i>UK</i> Netherlands	Austria Ireland New Zealand	Belgium USA Finland	Italy Germany Switzerland	<i>Sweden</i> Singapore <i>Japan</i>	Range 59% Mid-range 38.5 Base 9–68
We are the root cause of events	Norway USA Australia N. Zealand	Canada <i>UK</i> Switzerland Ireland	France Spain Austria Netherlands	<i>Denmark</i> South Korea Italy	Belgium <i>Sweden</i> Finland	Germany <i>Japan</i>	Singapore		Range 55% Mid-range 60.5 Base 33–88
Stakeholder rather than stockholder approach	<i>Japan</i> Singapore	France	Germany Austria Denmark Finland	Italy Spain Norway Switzerland	N. Zealand Belgium Netherlands	<i>Sweden</i> Italy S. Korea	<i>UK</i> Ireland Canada	Australia USA	Range 32% Mid-range 24 Base 8–40
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> Switzerland	Germany Austria Netherlands	Finland New Zealand Singapore	Norway Australia	Canada <i>Japan</i> USA	France Ireland S. Korea	Belgium <i>UK</i>	Italy Spain	Range 45.54% Mid-range 57.75
Attitude to time									
Relationship between the present and future	<i>The future is more important than the present</i>				<i>The future and the present are of the same importance</i>		<i>The future is less important than the present</i>		Merged
	South Korea Australia Norway Netherlands	Denmark N. Zealand <i>UK</i> Italy	Ireland Spain USA Singapore	Belgium Finland Austria Switzerland	<i>Sweden</i> Germany	Canada <i>Japan</i>	France		
Synchronicity versus sequential	<i>Overlap between present and future in both</i>				<i>Very close proximity in both</i>		<i>Clear divide in both</i>		
	Japan Canada Norway	France Germany Ireland	Belgium South Korea Finland	Denmark Austria	<i>UK</i> USA <i>Sweden</i>	Switzerland Spain	Italy Netherlands Australia	N. Zealand Singapore	

Appendix 13

Time horizon	<i>Weeks–Months</i>		<i>Weeks</i>				<i>Days–Weeks</i>			Range 2.3 Mid-range 4.55 (1 = seconds 7 = years)
	Austria South Korea	<i>Sweden</i> <i>Denmark</i>	Finland France Switzerland <i>Japan</i>	Singapore Germany Netherlands Norway	<i>UK</i> Italy Spain New Zealand	Canada Belgium USA Australia	Ireland			
Long term versus short term (<i>The Seven Cultures</i> , p.135)	<i>Japan</i> <i>Sweden</i> W. Germany	New Zealand Finland Switzerland	Singapore Norway <i>Denmark</i> S. Korea	Netherlands France Canada	Belgium Australia	USA Italy	Ireland <i>UK</i>	Austria Spain	Ranked: <i>Japan</i> (longest) to shortest	
Corporate culture										
Steep hierarchy	Singapore Austria 	Spain Belgium France 	<i>Japan</i> Italy Finland 	Ireland <i>UK</i> South Korea	Germany Switzerland Netherlands Australia Sweden 	Norway <i>Denmark</i> Canada USA 	Hierarchy visually represented			
Prefer “hands-off” management (reversed)	Singapore		Ireland <i>Japan</i> Spain	<i>Sweden</i> Austria Belgium	Italy <i>UK</i> Netherlands	USA Finland <i>Denmark</i>	Norway Germany France	Switzerland Canada Australia	Range 60% Mid-range 62 Base 32–92	
Structure (p)	<i>Family</i> S. Korea Spain <i>Japan</i> Belgium		<i>Elements of family: Incubator</i> Canada <i>Denmark</i> <i>UK</i> Germany France		<i>Weak elements of family: Guided missile</i> Netherlands Ireland		<i>Minimal elements of family: Eiffel tower</i> USA Norway Australia Finland Austria			
Structure denotes locus of authority rather than function		Singapore	Italy	<i>Sweden</i> USA Switzerland	Netherlands Germany Ireland	<i>UK</i> Austria France	Belgium Canada Norway	Australia Finland <i>Denmark</i>	Range 45% Mid-range 77.5 Base 55–100	
Venezuela omitted because it is 11 points lower than the next country, skewing the data										

Appendix 13

Performance measures (1993)										
Extent to which countries protect the environment	<i>Denmark</i> <i>Sweden</i> <i>Switzerland</i>	Germany Austria Netherlands	Finland New Zealand Singapore	Norway Australia	Canada <i>Japan</i> USA	France Ireland	Belgium <i>UK</i>	Italy Spain		Range 45.54% Mid-range 57.75
Anticipated increase in SMEs	<i>Japan</i> Spain Germany	Ireland Singapore Italy	Netherlands France Belgium	Switzerland <i>Denmark</i> USA	New Zealand Finland	Canada Norway	<i>UK</i> Australia	<i>Sweden</i>		Range 30.24% Mid-range 55.12
Anticipation of new employment opportunities	<i>Japan</i> Singapore Ireland	Austria Germany	USA Italy <i>Denmark</i>	Belgium Netherlands Australia	Canada New Zealand <i>UK</i>	Spain Switzerland France	Finland Norway	<i>Sweden</i>		Range 28.06% Mid-range 60.97
Specific versus diffused (the range of involvement)										
Company shouldn't provide housing (reversed) (pr)	<i>Sweden</i> USA <i>Denmark</i>	Switzerland Netherlands <i>UK</i>	Australia France Austria	Canada Norway Germany	Italy Singapore	Finland <i>Ireland</i>	<i>Spain</i> <i>N. Zealand</i>	<i>Japan</i> S. Korea		Range 78% Mid-range 50 Base 11–89
Achievement versus ascription										
Achievement more important than "being yourself" (d)	Norway USA Australia	Canada Ireland New Zealand	<i>UK</i> <i>Sweden</i>	<i>Denmark</i> Finland	Germany Singapore Switzerland	France Italy Netherlands	<i>Japan</i> Austria	South Korea Spain		Range 73% Mid-range 40.5 Base 4–77
You have to earn respect (reversed)	Norway Ireland <i>Denmark</i>	Finland N. Zealand <i>UK</i>	USA Canada <i>Sweden</i>	Australia France	Spain Italy Singapore	<i>Japan</i> Germany S. Korea	Switzerland Belgium	Austria		Range 44% Mid-range 72 Base 50–94
Achievement earns more respect than age (d)(pr)	USA Australia Canada <i>Sweden</i>	Germany France <i>UK</i>	Belgium <i>Norway</i> <i>N. Zealand</i>	<i>Ireland</i> <i>Finland</i> <i>Denmark</i>	Italy Netherlands	Singapore <i>Switzerland</i>	<i>Japan</i> <i>Spain</i> S. Korea			Range 40% Mid-range 43 Base 23–63
Drive										
Manager's drive, initiative and responsibility	<i>Sweden</i> USA <i>Japan</i>	Finland Korea Netherlands	Singapore Switzerland Belgium	Ireland France Austria	<i>Denmark</i> Italy Australia	Canada Spain	N. Zealand <i>UK</i>	Norway		Range 24% Mid-range 50 Base 50–74

A summary of cultural characteristics including the fifth imputation

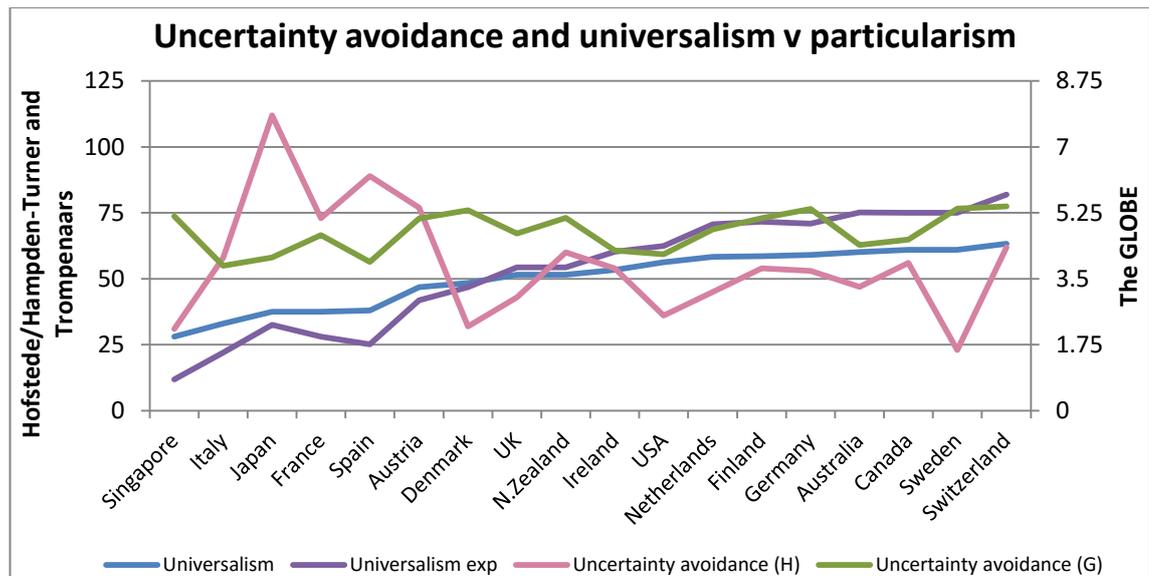
Quartile	<i>Universalism versus particularism</i>				<i>Communitarianism versus individualism</i>				<i>Neutral versus affective</i>				<i>Attitude relating to the environment</i>				<i>Attitude to time</i>			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Australia	4					1	2	4			2		1	1	1	1	1		2	1
Austria									1		1		2		2		1	1	1	1
Belgium		1	2	1		2	4	1		1	1			1	3			2	2	
Canada	3	1				2	1	4			2		1	2		1		2	2	
Denmark		4				1	2	4		1	1		1	2	1		3	1		
Finland	3	1				1	1	5	1	1			1	2	1		1	2	1	
France		3		1	2	1	3	1	1	1			1	3			2	1	1	
Germany	3	1			1	2	1	3		1	1		1	1	2		2	1	1	
Ireland	3		1			3	3	1	1	1			1	1	1	1	2			2
Italy		3		1	1	2	4			1	1			1	2	1	1		2	1
Japan	1	1	1	1	6	1						2	1	2		1	2	1	1	
N. Zealand												2	2		2		2		1	1
Netherlands	3	1				1	3	3	1	1			2		2		1	2		1
Norway						3	3	1		2			2	1	1		2	2		
Singapore		1	2	1	5	1	1			1	1		2		1	1	1	2		1
South Korea						1	4	2						3	1		2	2		
Spain		2	1	1		1	5	1	1	1			1	1	1	1	1		2	1
Sweden	3	1				2	3	2	1	1			1	1	1	1	2		2	
Switzerland	4					1	2	4		1	1		2		2		1	2	1	
UK	2	1	1			1	3	3		1	1		1		2	1	1		2	1
USA	2	2					3	4		1	1		1	2		1		1	3	

Appendix 13

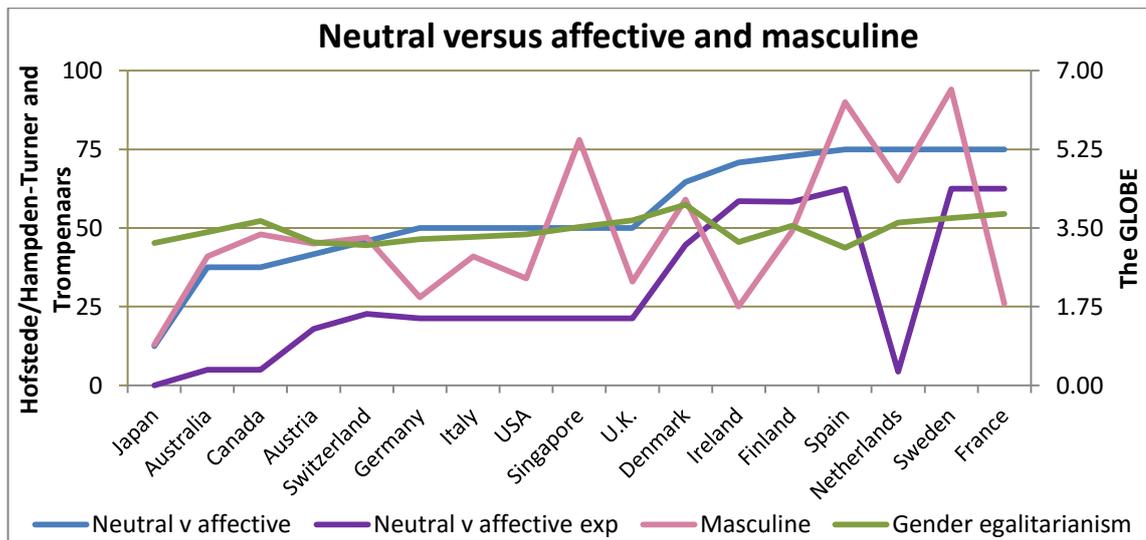
	<i>Drive</i>				<i>Altruism/humane</i>				<i>Achievement versus ascription</i>				<i>Paternal or egalitarian</i>			
Quartile	1st	2nd	3rd	4th	1st	2nd	3rd	4th	4th	3rd	2nd	1st	1st	2nd	3rd	4th
Australia	2	1	1				1	3				3				8
Austria		1	2		2			2		3						1
Belgium		2	1			1	2	1			1	1	1	2	2	2
Canada	2	1	1				2	2				3			2	6
Denmark	1	3				2	1	1			2	1			2	6
Finland	2	1	1		1	3					3			1	1	4
France		3	1		1	1	1	1		1		2	1	2	2	3
Germany	1		2				2	2		1	1	1		1		7
Ireland	1	2	1				1	3				3		1	2	5
Italy		2	2		1		3			1	2		2	1	4	1
Japan	1		1	2	2	1		1		2	1		5	2	1	
N. Zealand	1		2				1	3				3	1			
Netherlands	2		2		1		1	2		2	1				2	6
Norway	1	2		1	1	2		1				3			1	
Singapore		1	1	2	1	2	1			1	2		3	1	3	1
South Korea	1	2		1					1	1	1					
Spain		2	1	1	1	1	2		1		1	1	2	1	4	1
Sweden	1	2		1	1			3			1	2		2	1	5
Switzerland	1	1	2				3	1		1	2			1	1	6
UK	1	1	2				1	3			1	2		1	1	6
USA	3		1				1	3				3			1	7

Appendix 14. Comparison Between the Three Frameworks

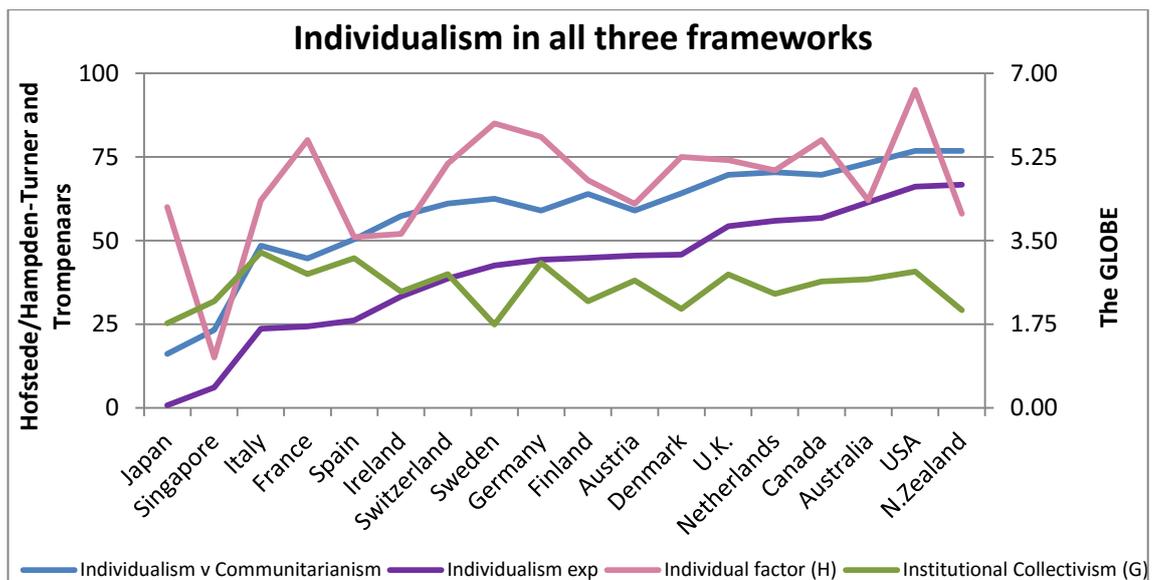
The following charts illustrate the extent of similarity that exists between the three frameworks at a theoretical level. Two versions have been provided for my framework established using Hampden-Turner and Trompenaars' data, the first being calculated using a linear weighting and the second, exponential. Although discrete data are not usually presented on a line graph, they have been in this instance because of the greater clarity that it provides.



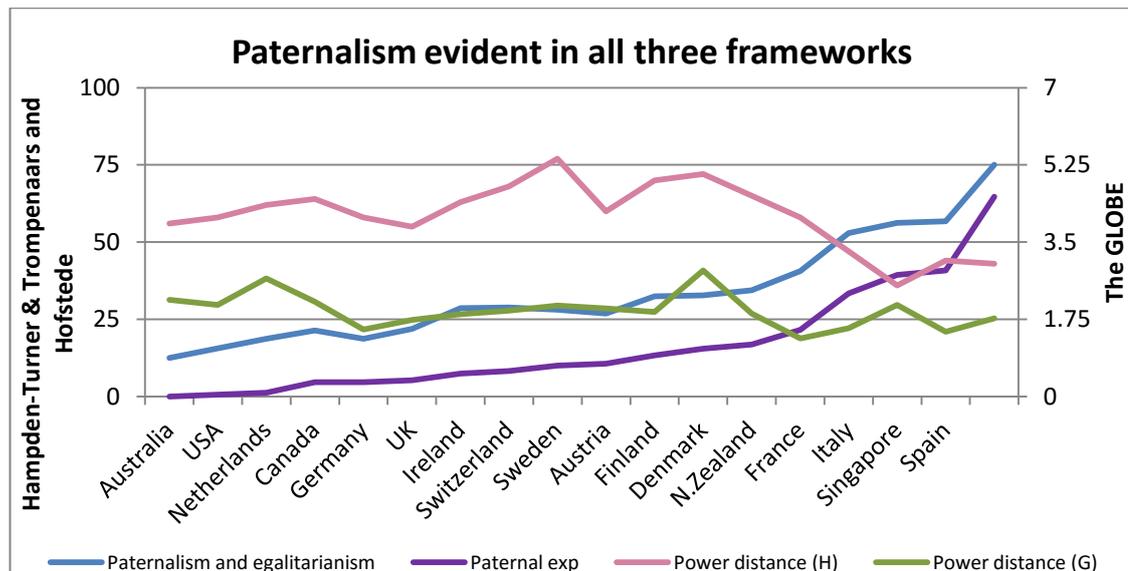
The scores provided by Hofstede are similar to those of the GLOBE project for most of Europe and the English-speaking countries. The blue line representing the scores for Hampden-Turner and Trompenaars, assuming a linear relationship along the continuum, rises at a similar rate to the other two scales, at best echoing the trend. The purple line is the exponential version. It rises at a greater rate than that of the linear weighting and is therefore less similar to the other two frameworks.



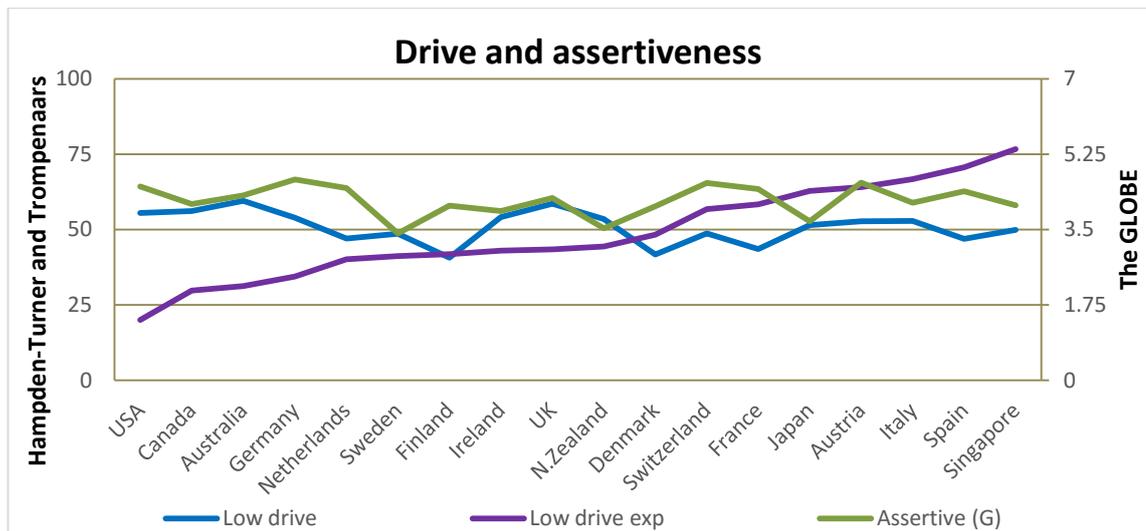
There is very little similarity between scores for Hofstede and the GLOBE project, but the scores of Hampden-Turner and Trompenaars bear greater similarity to Hofstede for the English-speaking and Germanic countries when weighted using a linear scale. The exponential scale shows greater difference.



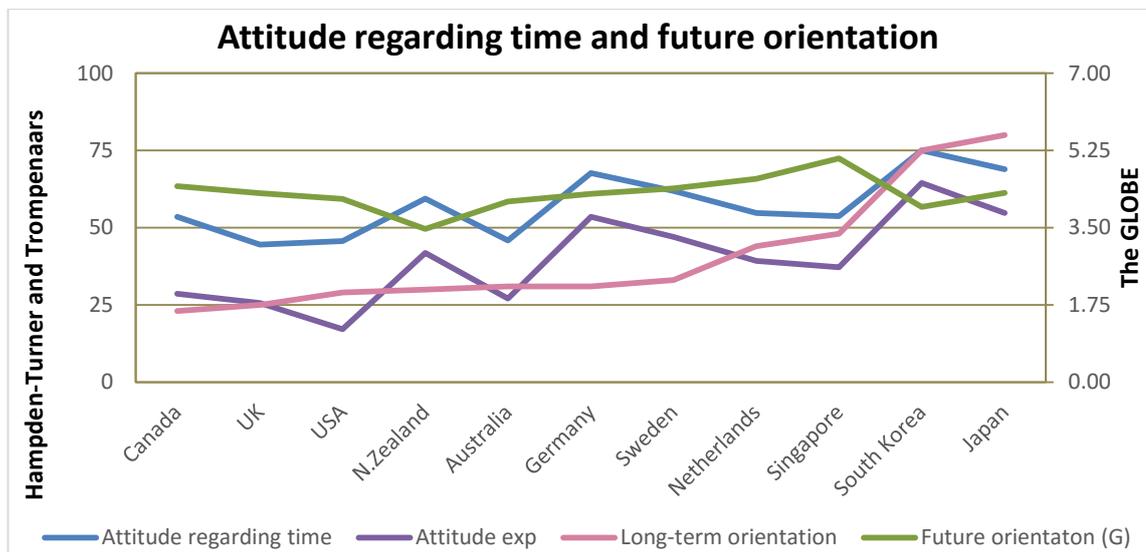
Once again, the linear weighted scores established from Hampden-Turner and Trompenaars' data are compatible with the other two frameworks, reflecting more similarity with the curve evident in Hofstede's work. This is not so apparent with the scores using an exponential weighting, which, although it is very similar, does not have the same level of association that is established in the linear scale.



Paternalism in Hampden-Turner and Trompenaars' framework was identified by examination of the corporate culture, underpinned by the assumption that the paternal characteristic was probably more evident in the family corporate structure and, following that, in the person-centred incubator because a profile that mimicked the low power distance contained this mix. In Hofstede's dimensions, paternalism was the antithesis to hierarchy, and in the GLOBE, it was the flat structure. This comparison would suggest that the assumption was fairly robust for the lower end of the continuum where the GLOBE project is concerned, but not for the Latin and Asian countries. This is the case for both the linear and exponential weightings, although the finer detail of the curve for the linear weightings is a more precise match than that of the exponential weighting. In spite of selecting a characteristic evident in the low end of Hofstede's framework, similarity is more of a negative correlation for the countries that did not match the GLOBE for both of the results from the scores developed from Hampden-Turner and Trompenaars' data.

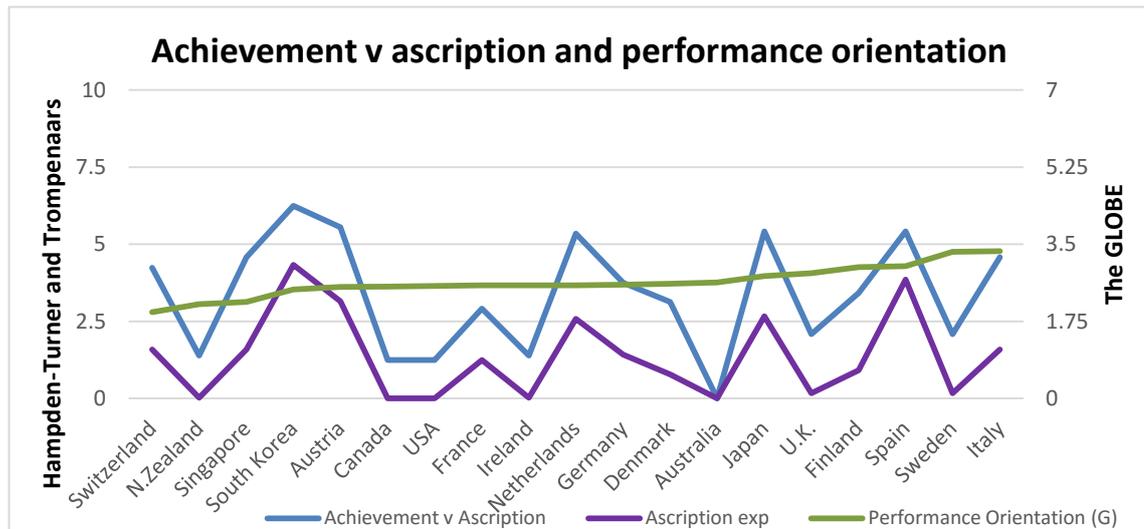


Hofstede did not have a dimension that matched assertiveness, claiming it was a subset of the masculine character. However, his masculine index bore no resemblance to that of the GLOBE. “Drive” is an equivalent measure created using associated responses from Hampden-Turner and Trompenaars. Like the results of the GLOBE project, the range of responses from the countries in question for the scale resulting from the linear weighting is quite limited, and there is a marked similarity in the trend between the two. In this dimension, however, the scale based on the exponential weighting differs appreciably, bearing little resemblance to either of the other two scales.

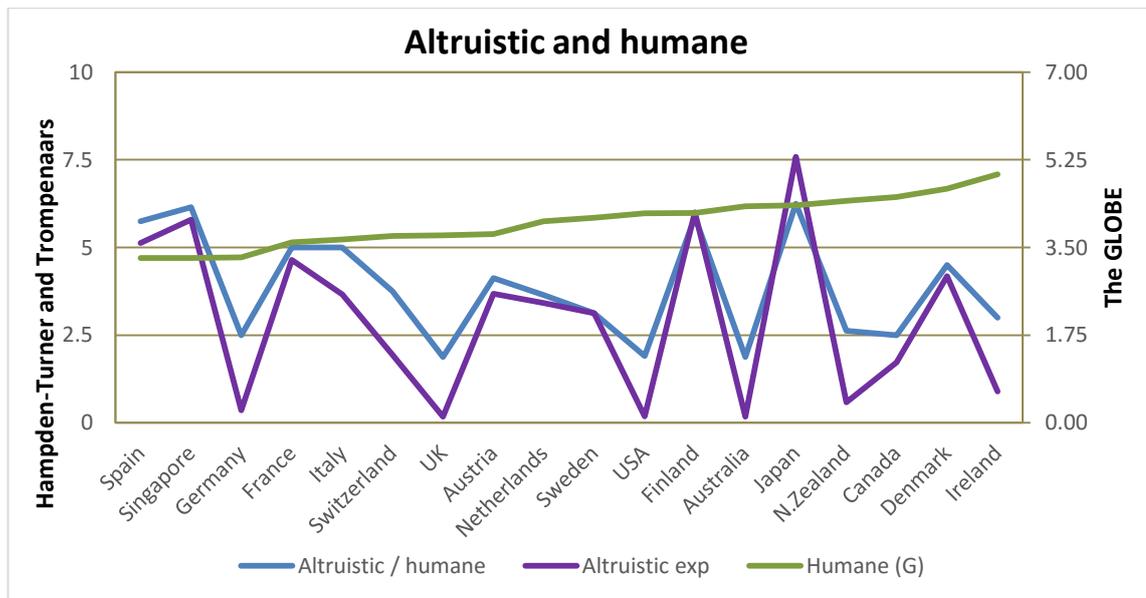


Apart from the responses from Japan and South Korea, the responses between the GLOBE project and Hofstede’s values show a marked similarity which is echoed by Hampden-Turner and Trompenaars’ attitude to time where there is evidence of some association. Of the two scales, once again it is that of the

linear weighting that has greater similarity where the finer detail is concerned.



Hofstede did not identify a dimension to equate with achievement versus ascription. On this occasion the graph has been constructed showing the GLOBE responses as the rising scale because it demonstrates the differences with greater clarity. The frameworks are not compatible but closer examination reveals that there is a pattern in the difference between the two. The GLOBE project produced results that varied very little. The results from Hampden-Turner and Trompenaars' data, however, shows that the English-speaking countries register at the lower end of the scale, being the most achievement-oriented, most of Europe including Scandinavia in the middle ranges and Asia, Spain and Austria at the higher end. This is most apparent with the scale developed from exponential weightings, where the extremes are not so marked. The markedly lower score of the exponential scale is due to the impact of ascription not registering in the upper quartiles and so the potential inertia that use of this weighting was seeking to accommodate is more apparent.



As with the previous dimension, the results from the GLOBE project have been represented on a rising scale to illustrate the degree of difference that is apparent between it and the scale developed using Hampden-Turner and Trompenaars' data. The difference between the two weightings is minimal.

Appendix 15. Consideration of National Performance Based on Culture

Sensitivity to ethical behaviours

When asked if they believed that it was worth seeking to control the environment, delegates from Japan, Sweden and Singapore all registered in the lowest quartile (appendix 3). However, the cultural characteristics of Japan include a paternal culture, a quality that according to research correlates with sensitivity to ethical behaviours.

In contrast, English-speaking delegates, including those from the UK and USA, considered human activity to be the cause of environmental problems, but their dependence on achievement to underpin status and their tendency towards more hierarchical or authoritarian structures undermine their sensitivity to social and environmental protection, although the USA is moderated by a more affective cultural characteristic. Figure A15.1 shows the manner in which the nations in question align with the cultures shown to correlate with sensitivity toward environmental issues.

It is interesting to note anomalies within trends that may provide the basis for investigation as to whether any one characteristic is necessary or sufficient to influence a behaviour. Most notable is that of Japan, which appears to be the most “neutral” nation of the group, in contrast with Sweden, where the affective nature scored highly but those of paternalism/egalitarianism and achieved status were relatively low.

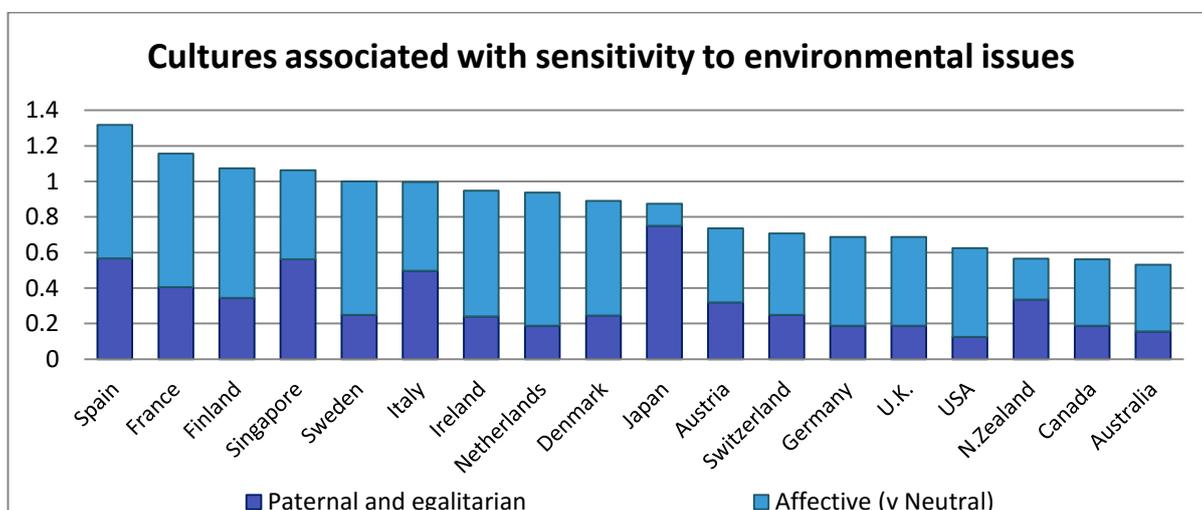


Figure A15.1: National cultures associated with sensitivity to ethical behaviours

The capacity for setting environmental standards

Individualism versus communitarianism was omitted from the groups relating to sensitivity to ethical issues because of the question relating to the accuracy of the findings. However, there was no such question relating to its inclusion in the grouping that was shown to support ethical standards (figure A15.2). It has altered the rank order of only Japan, the Netherlands and Canada by more than one place.

When aggregated, the combined figures for the countries for which there is a complete set of data suggests that Spain, followed by France and the Netherlands, are the most likely nations to be sensitive to ethical behaviours. The analysis suggest that, in spite of their recognition of environmental issues, New Zealand, USA, Canada and Australia would be the least likely to be sensitive to ethical behaviours.

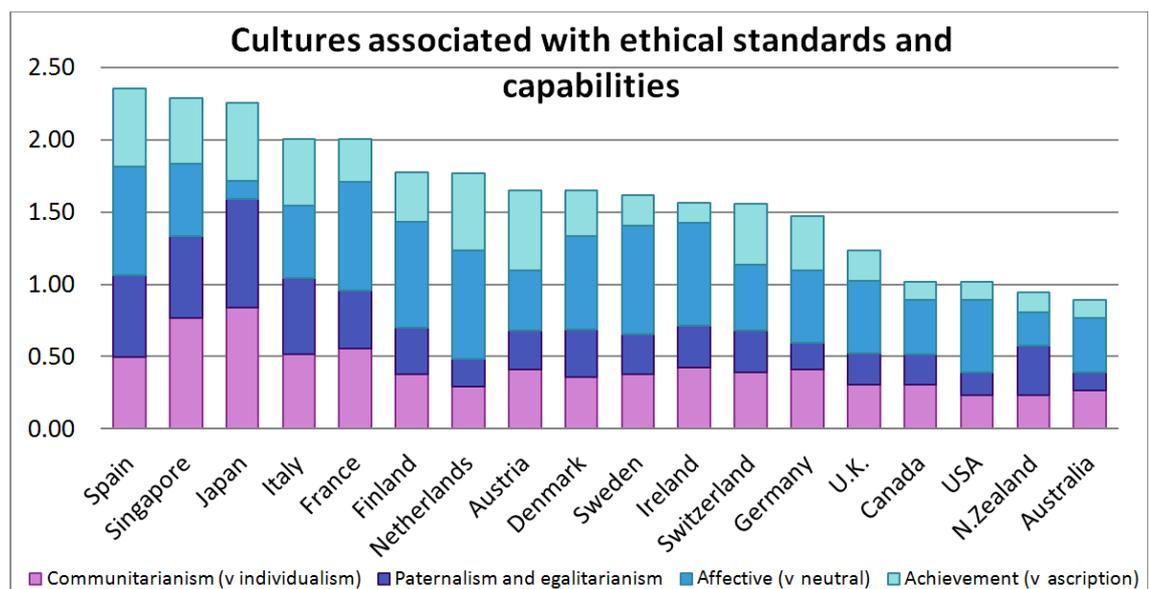


Figure A15.2: National cultures associated with ethical standards and capabilities

Policy development

Figure A15.3 shows the national characteristics that are shown to correlate with policy development. The attitude to the environment has not been correlated to policy development in any prior research, but was included in this analysis because it was deemed a prerequisite for any associated concern. It has therefore been placed on a separate axis as a point of reference rather than a contributory factor.

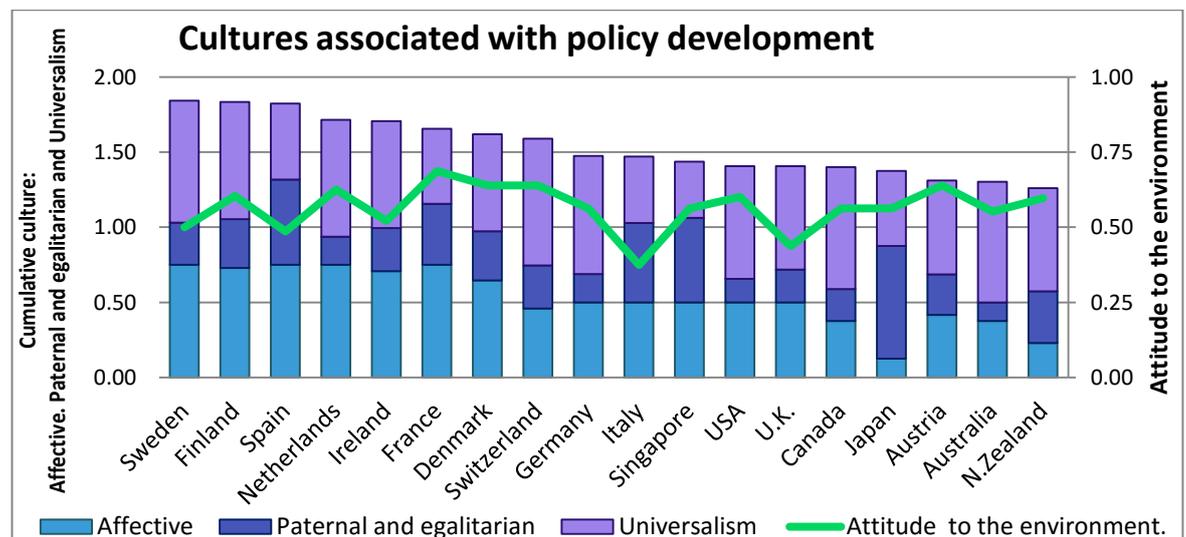


Figure A15.3: National cultures associated with policy development

There is a limited range for the aggregate score, but the individual spread of cultural characteristics includes considerable variety, the most marked being that of affective versus neutral, which, apart from the case of Japan, bears a strong correlation with the overall rank order. This analysis would suggest that Scandinavian countries are most likely to develop policies, along with the Netherlands, Spain and Ireland. Japan and English-speaking countries are the least likely.

Financial support

Japan and Singapore clearly align with the cultures this analysis has found to correlate with that of offering financial support (figure A15.4). The cultures are not so apparent in the English-speaking nations. Both altruism and drive show some correlation and ascription versus achieved status a little less. It is not appropriate to assess whether this is significant because of the hypothetical nature of this part of the work.

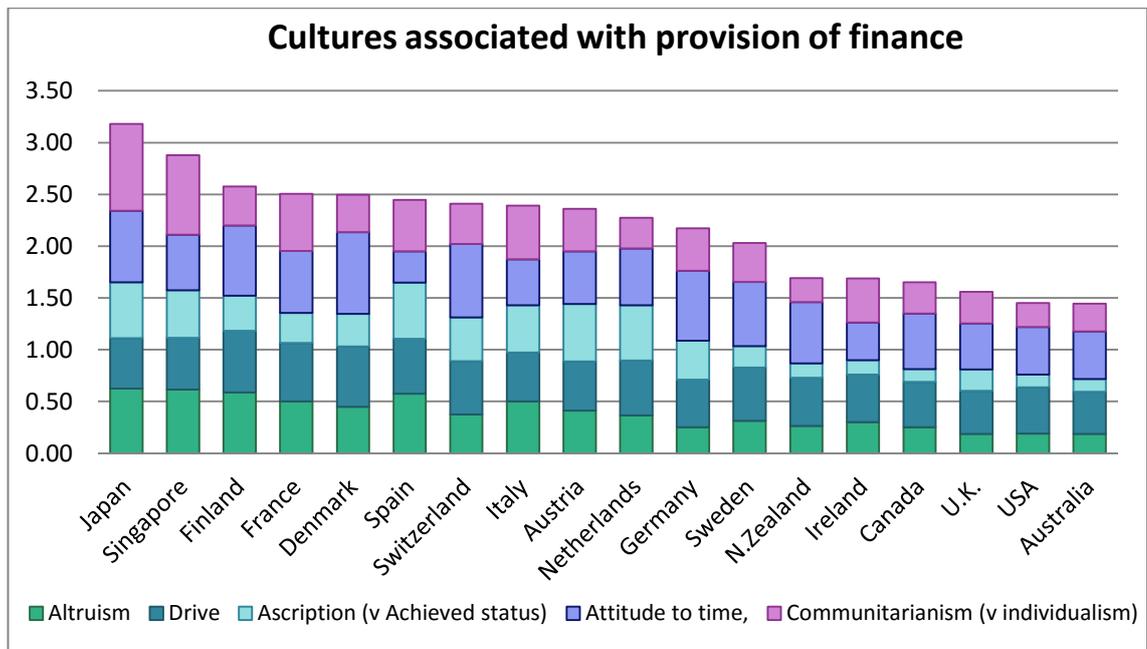


Figure A15.4: National cultures associated with financial support

Diffusion of good practice

Figure A15.5 illustrates the spread of cultures that would support the diffusion of practice. Although the cultural mix differs, there is little difference between the upper 11 countries. The most closely aligned is Denmark and the weakest countries are Japan, Singapore and Spain.

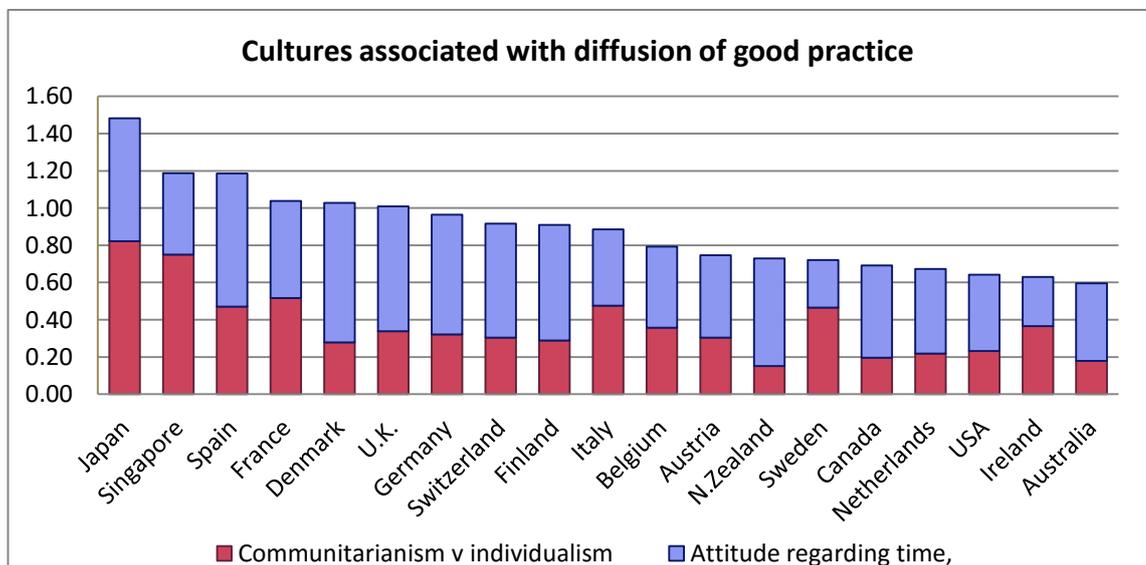
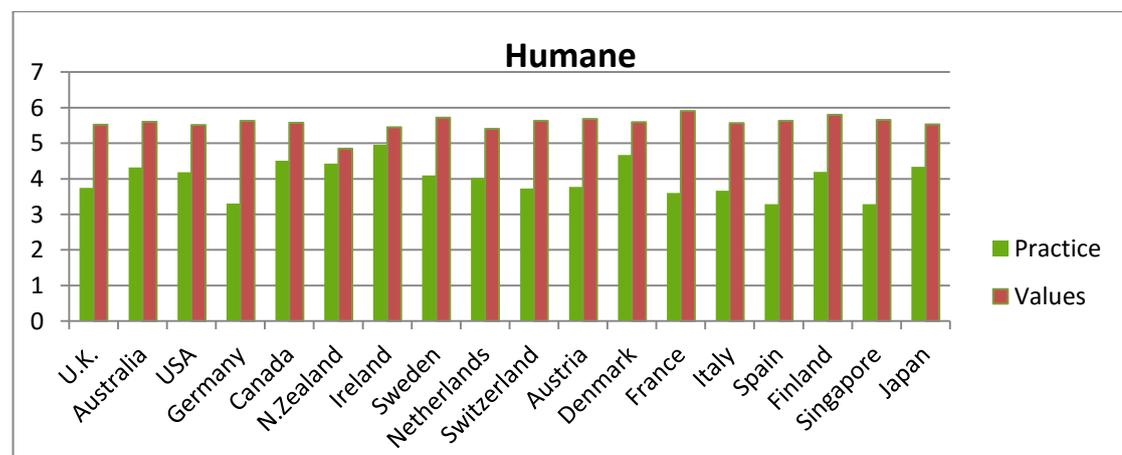
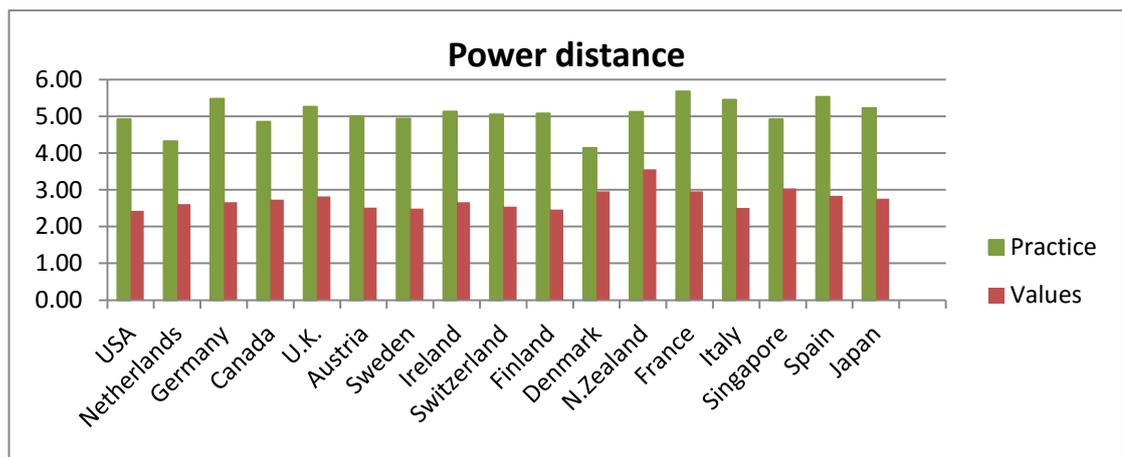
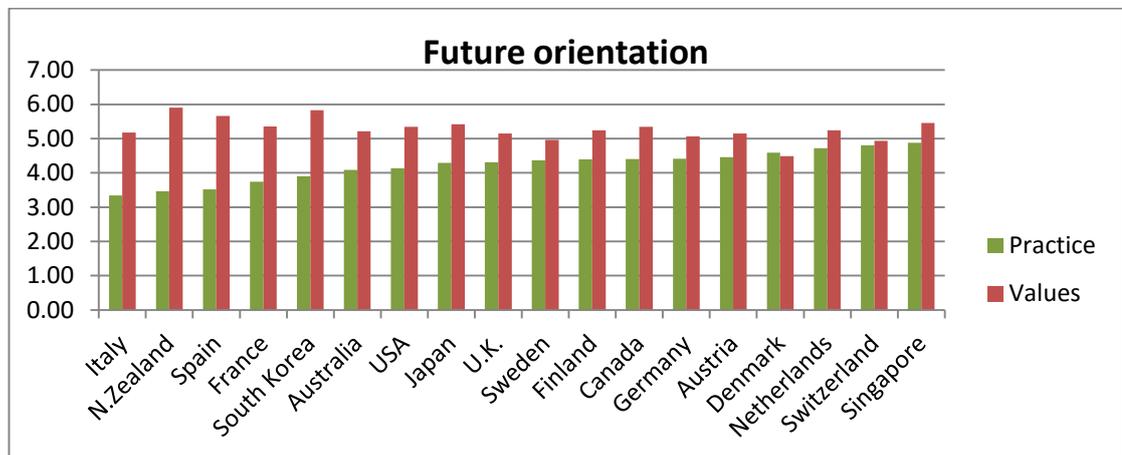
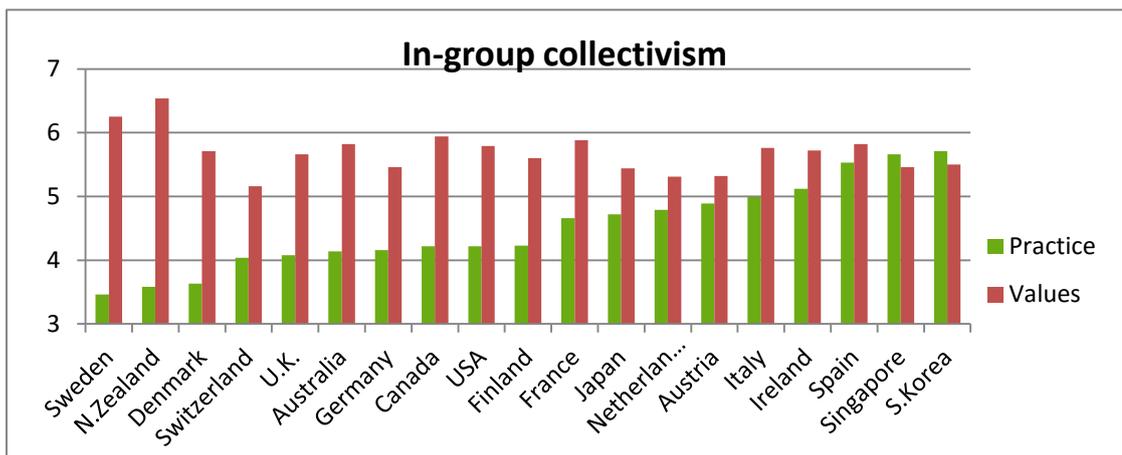
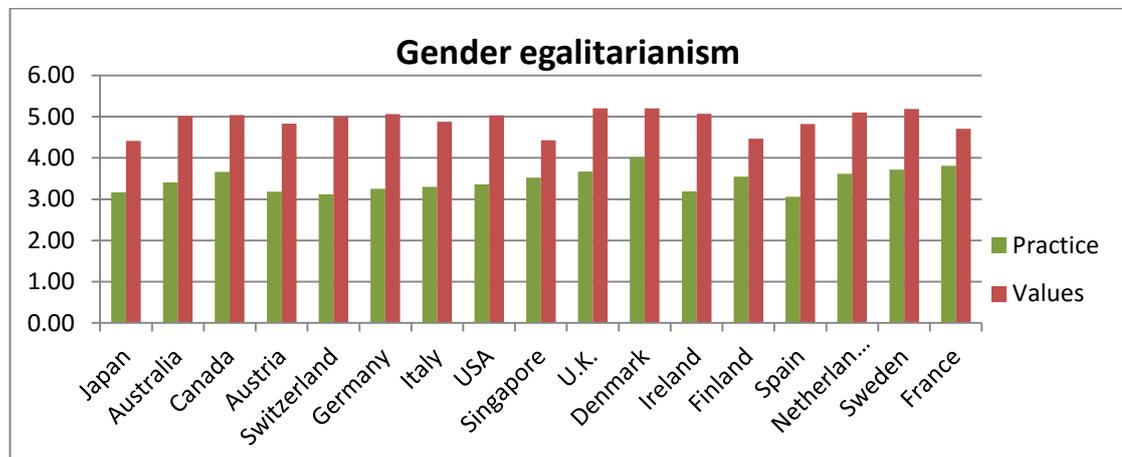
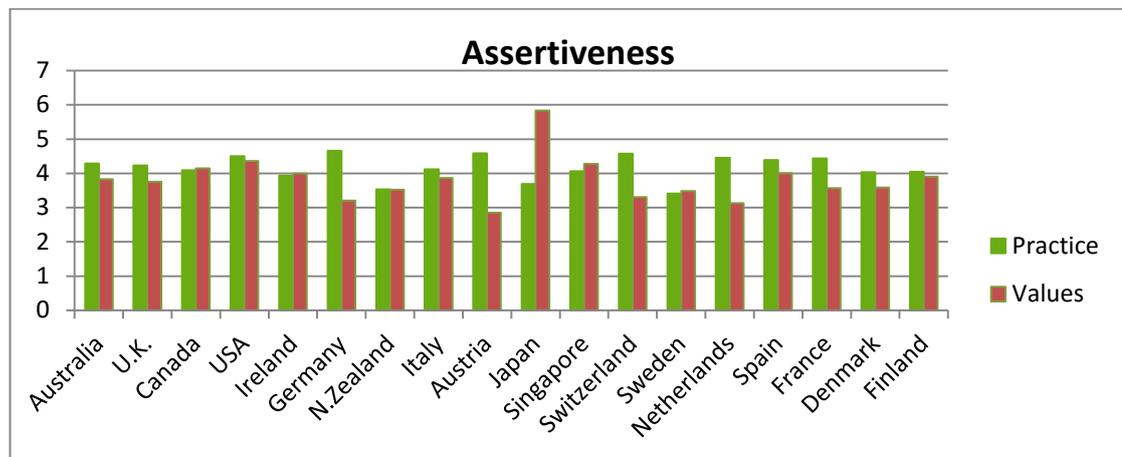
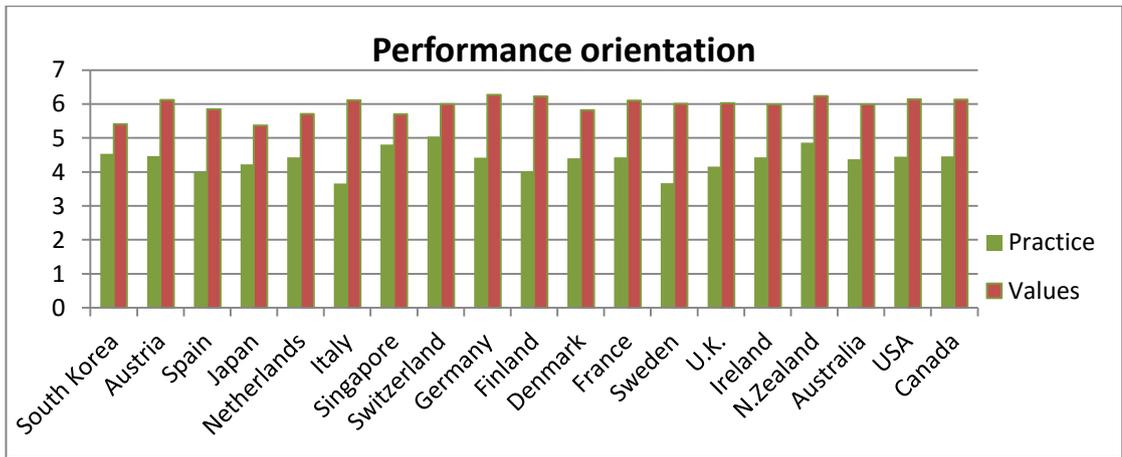


Figure A15.5: National cultures associated with the diffusion of good practice

Appendix 16. Comparing the Scores for Practice and Values in the GLOBE Project

The following charts all show the difference between the practice and value measures established in the GLOBE project.





Appendix 17. Performance Measures Used to Assess Diffusion of Sustainable Practice

OECD measures:

- Production-based CO₂ emissions, production-based CO₂ productivity and non-energy materials productivity in comparison with GDP, all indexed, 1990 = 100.
 - This comparison is indexed so that improvement over the passage of time can be identified.
 - The four measures complement each other and help enhance the comparison.
 - The four measures are indexed to 1990, the same base year as that used in the Kyoto agreement.
 - The gross domestic product is included as a basis of comparison. This enables performance of the other metrics to be compared with economic activity.
 - Production-based CO₂ emissions figure is derived from all uses of fossil fuel within the nation's boundaries. This is the only one of these four indicators where it is desirable to see a fall in performance over time.
 - Production-based CO₂ productivity identifies the GDP derived from each unit of CO₂ emissions. This is not necessarily the inverse of CO₂ emissions and its inclusion can help identify economic value placed on resources.
 - Non-energy materials productivity indicates the remainder of the resources used to underpin generation of the GDP.
- A comparison of per capita municipal waste, material to landfill and domestic materials consumption against the average OECD figure.
 - OECD maintains these measures complement each other, reflecting performance at different stages in the material flow, and can be combined.

- OECD has taken every step to avoid subjectivity with these measures, and where the figure is a score rather than a measure, it has provided a common basis for comparison.
- Materials consumption is a measure created by OECD that includes resource extraction and imports, minus exports. The measure includes financial measures, and includes all resources.
- Together, these figures help identify the resource efficiency of the country concerned. Domestic waste is measured in terms of 1000t and, combined with the total that is sent to landfill, gives an indication of the extent to which the “reduce, reuse, recycle” activities are diffused into practice.
- Domestic materials consumption includes all materials required to underpin the economy. The OECD states this is a measure of mass but does not indicate what the precise measure is. Its recommendation is that these data should be read in conjunction with those provided for waste (OECD, 2008).
- Use of the per capita figure enables comparison between the nations in a way that differentiates between results for total performance on an equal basis. Indexing the figures would show progress over time but would not identify overall performance levels, potentially skewing the results in favour of the country with the worst performance at the beginning of the period in question and therefore with the greatest scope for change.
- The extent to which taxation is directed to encourage “green behaviour” through a comparison of green taxation and the total tax revenue. OECD recommends that both environmental taxation and labour taxation be compared in order to assess the extent to which environmental taxation is used to encourage green behaviour (OECD, 2014d).
- The extent to which revenue raised through taxation and environmental charges is used for environmental purposes.
- Activity towards the development of green technologies through the investment in environmental research and development and the total number of “green” patents taken out.

- These two measures are indexed, which means that only the change over time is evident. A further index is therefore used that provides comparative performance across the different nations.
- The use of subsidies expressed in EUR to aid in the development of sustainable practice.

Quandl:

- Public spending in terms of USD.
 - These data have been used to convert the percentage of public spending to the actual figure spent in terms of USD. This enables comparison between the four countries.
 - This comparison also reveals any relationship between the percentage allocated to environmental R&D and the total of public spending.

Cleantech Innovation Index:

- “Cleantech-specific innovation drivers”.
 - Including government policy, access to finance including public funding for R&D, appropriate infrastructure and industrial support.
- Diffusion to the point of commercial viability.
 - Including listed “cleantech” companies, associated revenues, renewable energy usage, investment patterns.

Notes

- Numeric indicators are normalised to a percentage of GDP.
- Produced in partnership between WWF and the Cleantech group (Pared, 2014).

Appendix 18. The Coding of the Documents for One of the Boroughs: Bromley

Document details	Code
<p>Key Document title: In bold in each of the subsequent cells. Extract provided by the website's search engine in the page of results: in grey regular text. Processing of document and interpretation of content when required: bold, beneath the extract.</p>	
<p>Bromley sustainable schools forum (BSSF) ... Bromley sustainable schools forum (BSSF). What is a sustainable school?... More in sustainable schools forum</p>	
<p>London borough of Bromley Written statement – 2 Interactive UDP Site – Written Statement – 2. SUSTAINABLE COMMUNITIES. London ... COMMUNITIES. Document opened: Application of the London Plan. Included reference to the need to ensure environmental sustainability within the planning.</p>	Strategy/ planning
<p>BTCAAP019 Building a Better Bromley – Sustainable ... London Borough of Bromley download – Bromley Town Centre Area Action Plan – Building a Better Bromley –Sustainable Community Strategy ... Page opened: Link to documents found elsewhere in the search.</p>	
<p>Aims of the BSSF – Bromley Sustainable Schools Forum ... Bromley Sustainable Schools Forum (BSSF). Aims of the BSSF. The aims are: ..More in: Bromley Sustainable Schools Forum (BSSF). ...</p>	
<p>Bromley Town Centre Area Action Plan –Building A Better Bromley %E2%80%93 Sustainable Community Strategy London Borough of Bromley download – Bromley Town Centre Area Action Plan – Building a Better Bromley – Sustainable Community Strategy ... Page opened: Link to documents found elsewhere in the search.</p>	
<p>Btc Appendices 1 To 4 ... A summary of the most relevant ones is set out below. National Policy PPS1: Creating Sustainable Communities (2005) ... Document opened: Included reference to waste and transport management within planning considerations.</p>	Strategy/ planning
<p>Btc Aap Chapter 1 To 3 ... The AAP will provide a strategic planning framework for development, which will ensure a long term viable and sustainable future for the Town. .. Document opened: Bromley's plan and environmental issues.</p>	Strategy/ planning
<p>London Borough of Bromley Written Statement – 14. and the Mayor's Waste and Energy strategies. SUSTAINABLE AND ENERGY EFFICIENT DEVELOPMENT. POLICY ER4. ...</p>	Strategy/ planning
<p>Bromley Environment Awards 2007 Booklet application ... Page 2. Bromley's Environment Awards recognise and reward local sustainable initiatives that really make a ... sustainable approach to education. ...</p>	Awards

<p>Policies To Be Referred To In Place Of Expired Policies application ... ER4 Sustainable and Energy Efficient Development 5.2 ... Development 5.3 Sustainable design and construction National Air Strategy ... Document opened: Bromley’s plan including sustainability issues.</p>	Strategy/ planning
<p>Btc Aap Chapters 4 And 5 application ... Promoting sustainable development by minimising the impacts of town centre development on the environment and ensuring Bromley is an ... Document opened: Provides Bromley’s plan including environmental sustainability issues.</p>	Strategy/ planning
<p>Affordable Housing Spd – Sustainability Appraisal ... uncertainty identified by the draft appraisal and improved the “score” of the document in terms of its contribution to more sustainable development 1 ...</p>	(Residential)
<p>Bromley Environment Awards 2010 Booklet ... & John Hunter The Hunter’s very modern, designer house is complemented by their wonderful garden which has many sustainable features. ...</p>	Awards
<p>Bromley Environment Awards 2008 Booklet ... sustainable work-surface for kitchens, restaurants and bars. ... The judges really liked the low impact manufacturing and sustainable end product. ...</p>	Awards
<p>Bromley Environment Awards 2006 Booklet ... reward local sustainable initiatives that really make a difference ... Dave and Dorothy Witherspoon take sustainable commended ...</p>	Awards
<p>Appendix A2 – Cray Policy Unit ... Ongoing High • To encourage sustainable developments • To reduce the risk of flooding to property, infrastructure and services ... Document opened: Relevant to River Cray and associated flood risk.</p>	Flood risk
<p>Lb Bromley Budget 201415 ... Council has had to take significant action to reduce the cost base while protecting priority front line services and providing sustainable longer term ...</p>	
<p>Lb Bromley Budget 201314 ... Council has had to take significant action to reduce the cost base while protecting priority front line services and providing sustainable longer term ...</p>	
<p>Bromley Environment Awards 2009 Booklet ... The judges said a lot of effort had gone into making this new build sustainable and that a wide range of environmental impacts had been addressed ...</p>	Awards
<p>Dr and Mrs H Edmonds – 2007 winner – Household a ‘House for their Future’ – something that would cater for all their needs in their retirement but also turn them into a truly sustainable household. ...</p>	Awards
<p>London Borough of Bromley Written Statement – 5. It sees better Transport integration as key to providing more sustainable Transport choices and reducing the need to travel. ...</p>	Transport
<p>Change and sustainability (KS2) – Key stage 2 (KS2) courses specifically designed to meet the geographical objectives for knowledge and understanding of environmental change and sustainable development ...</p>	Education
<p>Strategic Flood Risk Assessment – Bromley ... Environment Agency seeks to work with other key decision makers within a river catchment, to identify and agree policies for sustainable flood risk ...</p>	Flood risk
<p>London Borough of Bromley Written Statement – 6. objectives. Sustainable environmental quality means retaining and enhancing the good aspects of the built environment. ... Document opened: Related to development plan for built environment.</p>	Buildings

<p>Btcaap001 – Submission Aap Part 1 ... stimulate renewal of the town centre; protect and enhance existing character and environmental quality and promote sustainable development and ... Document opened: 2008 area action plan; more than just buildings.</p>	Strategy/ planning
<p>Btcaap007 Sustainability Appraisal ... The purpose of Sustainability Appraisal is to promote sustainable development through meaningful integration of sustainability considerations into ... Document not opened: Content clear in extract</p>	Strategy/ planning
<p>Btcaap013 Evidence Base Report ... Providing a home delivery system to residents to reduce car use and increase sustainable Transport usage. CONCLUSION ... Document opened: The working version of the above.</p>	
<p>Adopted Spg1 – General Design Principles ... to maintaining Bromley as a place that is attractive, spacious, safe and green – but also economically vibrant and environmentally sustainable.. . Document opened: Related to all buildings including businesses.</p>	Building
<p>London Borough of Bromley Written Statement – 3. f planning obligations, the Council will ensure the UDP is an effective tool in seeking a viable local economy, a sustainable environment, and ..</p>	Strategy/ planning
<p>Bromley Environment Awards 2012 Booklet ... Seeds are collected each year which helps the garden to be more sustainable, together with using the greenhouse raised beds for raising plants. ...</p>	Awards
<p>Crystal Palace Park Management Board Action Plan 2011–2017 ... should be put in place that brings together the broad range of experience and expertise necessary to guarantee a lasting, sustainable future for the ... Document opened: Relates to management of green space.</p>	
<p>Crystal Palace Park Executive Board Minutes February 2012 ... The project needed to be sustainable with a strong commercial element – the Mayor’s support and the involvement of the other boroughs were ...</p>	
<p>Keston Ce School – Traffic Assessment ... Section 4 – Promoting sustainable Transport states, “Transport policies have an important role to play in facilitating sustainable development but... Document opened: School travel plan with proposed extension.</p>	
<p>Workplace travel planning – Workplace travel planning and impacts. We can support you with practical ways to promote sustainable travel. Benefits. Workplace travel planning ...</p>	Transport
<p>About Crystal Palace Park – About Crystal Palace Park of partners through the Crystal Palace Park Management Board (CPPMB) to secure the long-term restoration and sustainable development of ...</p>	
<p>Council responds to health consultation – London Borough of On the proposal to look to King’s to integrate provision with the PRUH the Council wanted a sustainable solution not a quick fix and would need to ...</p>	
<p>Btcaap003 – Representations 87 – 104 ... Chapter 6: Access and Movement Natural England welcomes and encourages schemes and initiatives promoting sustainable Transport options ... Document opened: A thorough appraisal of the area plan from an environmental perspective.</p>	Strategy/ planning
<p>London Borough of Bromley Written Statement – 11. TOWN ... centre sites. • Local authorities should promote sustainable development and support urban regeneration. • There should ... Document opened: Related to shopping centres.</p>	Strategy/ planning

<p>London Borough of Bromley Written Statement – 15. partnership, and the use of planning obligations, the UDP will be an effective tool in ensuring a viable local economy, sustainable environment, and ...</p>	Strategy/ planning
<p>Btcaap011 Strategic Flood Risk Assessment ... Environment Agency seeks to work with other key decision makers within a river catchment, to identify and agree policies for sustainable flood risk ...</p>	Flood risk
<p>Adopted Affordable Housing Spd ... include: - high quality housing that is well-designed and built to a high standard which contributes to the creation of sustainable, mixed communities ... This is social rather than environmental.</p>	
<p>London Borough of Bromley Written Statement – 10. 10.1 The London Plan and the Mayor of London’s Economic Development Strategy “Sustaining Success” aim to create a sustainable world city with ... Document opened: Related to economic sustainability. There were nine references to the environment, focussed on unsightly buildings, local amenity, traffic on residential roads and creating a business and “pleasant” environment.</p>	
<p>Glebe School – 2007 winner and overall winner – Education Education for Sustainability including ‘Doorways to Sustainability’ for the World Wildlife Fund, and as a pilot school for Ofsted’s ‘Sustainable Schools ..</p>	Awards
<p>The Ravensbourne School – 2011 winner and overall winner about. Pupils continue to be engaged in becoming more sustainable citizens through many different schemes and projects. ...</p>	Awards
<p>St Olave’s Grammar School – 2009 winner – Education Students from St Olave’s Grammar School in Orpington have been instrumental in prioritising sustainable development across the school. ...</p>	Awards
<p>Dorset Road Allotments and Leisure Gardens – 2006 In addition to donating two plots to the local schools, the association continues to promote sustainable and organic gardening by holding..</p>	Awards
<p>Elizabeth Greenwood – 2008 winner – Green Citizen not only volunteers for local charities and conservation groups but she has installed and implemented every conceivable sustainable measur...</p>	Awards
<p>Blenheim Family and Children’s Centre – 2008 winner wheels on the bus..... how children get to school, how they travel to other places and how they could think about using more sustainable Transport ...</p>	Awards
<p>Marc Carlton and Nigel Lees – 2005 household and overall This garden has become something of a Mecca among sustainable and organic gardeners throughout the South East. ...</p>	Awards
<p>Miss Daphne Butler and Dr and Mrs A. Robinson – 2004 joint The judges said of this sustainable duo, “the outstanding dedication shown by this couple proves that you can be sustainable in spite of...”</p>	Awards
<p>Cyclepods Ltd – 2007 business winner – Business choosing. Not surprisingly, he decided to design an attractive, space saving, secure and sustainable bike-parking solution. ...</p>	Awards
<p>Statement of Community Involvement – Statement of The Act introduced a number of changes to the planning system as part of the Government’s commitment to creating sustainable communities and ... Document opened: Statement relating to the intention to include the public in community-related decision making.</p>	

<p>Terms Of Reference Of Crystal Palace Management Board</p> <p>... These recommendations will place an emphasis on: • Sustainable development to promote revenue streams • Restoring and protecting Crystal ...</p>	
<p>Explaining Changes To Council Tax For 201314</p> <p>... The Council has a sustainable community strategy for improving the quality of life in the Borough known as “Building a Better Bromley – 2020 Vision ...</p>	
<p>Draft Spd On Planning Obligations</p> <p>... 1.9 Planning is required to be more spatially aware, ensuring sustainable development as set out in Planning Policy Statement (PPS) 1: Delivering ...</p> <p>Document opened: Related to the council’s obligations under the London Plan and explained requirements that would be made of developers.</p>	Buildings
<p>Appendix A1 – Ravensbourne Policy Unit</p> <p>... needed for defences to be sustainable. ... Our current management relies heavily on conveyance and this is not sustainable. .</p> <p>Document opened: Related to flood risk in the Ravensbourne area where there is building on floodplains.</p>	Flood risk
<p>Economic Development And Employment Land Study 2010</p> <p>... of. Without understanding and promoting its own economic development strategy and sustainable economic investment ...</p>	
<p>Bromley Councils Response To The Consultation On The Trust Special Administrator’s Draft Report</p> <p>... proposed is not sustainable. ... We would want, however, a sustainable solution not a quick fix and whilst we acknowledge that King’s College ...</p>	
<p>Update Winter 2013</p> <p>... Not a decision taken lightly, but we are determined to make the right choices on your behalf to have sustainable finances in place, not just for next ...</p>	
<p>Flood Map Q</p> <p>... application of sustainable drainage techniques; and ii. Relocate existl1g development to land with a lower probability of flooding. ..</p>	Flood risk
<p>Flood Map K</p> <p>... application of sustainable drainage techniques; and ii. Relocate existl1g development to land with a lower probability of flooding. ...</p>	Flood risk
<p>Resources Portfolio Plan</p> <p>... Ensuring that the council has a sustainable revenue and capital position and lives within the resources available. Issues ...</p>	
<p>Road Safety Consultative Panel Minutes July 2011</p> <p>... The aim of mode shift is to get more people cycling confidently on the road and changing their mode of Transport to more sustainable means like ..</p> <p>Document opened: Contained discussion about making roads safer to encourage cyclists.</p>	Transport
<p>Council forced to find further £60 million savings – London ...</p> <p>... years. “We are determined to continue to take a long-term view and achieve a sustainable budget for 2014–15 and beyond. ...</p>	
<p>Validation Guidance And Local Information Requirements Document</p> <p>... The London Plan provides the policy framework in respect of sustainable construction and renewable energy, and attention is drawn to Chapter 5 ...</p> <p>Document opened: Contained guidance with respect to planning applications</p>	Buildings
<p>Update Spring 2013</p> <p>... of the ongoing dramatic reductions in government funding and the Council’s determination to maintain a no- nonsense and sustainable approach to ...</p>	

<p>Weee Secondary School Education Pack ... Provides opportunities to: • Consider sustainable product design • Highlight ...Thinking about sustainable product design. How ...</p>	
<p>London Borough of Bromley Written Statement – 4. 4.2 London Planning Advisory Committee (LPAC) has published interim advice on sustainable residential quality (SRQ) for small and large sites ...</p>	(Residential)
<p>Btc Aap Chapters 6 And 7 ... Development and public realm proposals must be of the highest design quality and incorporate sustainable and innovative building technologies ... Document opened: Planning related to town centre rather than business premises design.</p>	
<p>Btcaap009 Equalities Impact Assessment ... 5.9. The Council’s long-term sustainable community plan (March 2009) sets out a vision for the Borough by 2020 as a place where: ... Document opened: Related to social inclusion.</p>	
<p>Planning – local plans downloads – London Borough of Bromley Town Centre Area Action Plan – Building a Better Bromley – Sustainable Community Strategy. Building a Better ... Document opened: A page with links to documents included elsewhere in the search</p>	
<p>Btcaap002 – Submission Transport Strategy ... Its overriding purpose is to facilitate and support the socio-economic success and sustainable growth of Bromley town centre. ...</p>	Transport
<p>Flood Map A ... level of flood risk in the Mea through the layout and form of -.he development, and the appropriate application of sustainable drainage. ...</p>	Flood risk
<p>Flood Map P ... level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage. ...</p>	Flood risk
<p>Flood Map M ... level of flood risk in the Meil through the layout and form of -.he development, and the appropriate application of sustainable drainage. ...</p>	Flood risk
<p>Bromley Annual Monitoring Report 1 April 2008 – 31 March 2009 ... local level, specifically in connection with housing delivery; • Whether any policies need to be replaced to meet sustainable development... Document opened: Only three references to sustainability in generic terms. No specific sustainability issue addressed.</p>	
<p>Btcaap004 Reg 30D %E2%80%93 Statement Of Consultation ... A more vibrant centre with an extended offer; • A more sustainable centre- a place to shop, work, spend leisure time and live; .</p>	Strategy/ planning
<p>Flood Map I ... application of sustainable drainage techniques; and ii. Relocate exlstl1g development to land with a lower probability of flooding. ...</p>	Flood risk
<p>Flood Map R ... level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage. ...</p>	Flood risk
<p>Btcaap005 Reg 30E %E2%80%93 Statement Of Representation ... Section 3.2.6 Sections 3.2.6 – 3.2.7 on Sustainable Community Strategy need to be summarised and moved to after 1.3.18 in Context section ... Document opened. Sustainability referred to twice, both times referring to the need to edit another document.</p>	

<p>Lb Bromley Budget 201213</p> <p>... The Council places a high priority on having one of the lowest council tax levels in Outer London and achieving a sustainable council tax and ..</p>	
<p>Lb Bromley Budget 201112</p> <p>... The Council places a high priority on having one of the lowest council tax levels in Outer London and achieving a sustainable council tax and ..</p>	
<p>Inspectors Report</p> <p>... 2.3 Vision and objectives are also contained in the Sustainable Community Strategy for improving quality of life in the Borough ...</p> <p>Document opened: Combination of two previously reviewed documents with little relevant content beyond reference to the need to promote sustainable transport and built environment.</p>	
<p>Btcaap019 Building A Better Bromley %E2%80%93 Sustainable Community Strategy</p> <p>... BROMLEY – 2020 VISION Our shared long-term 'sustainable community strategy' for improving quality of life in the Borough March 2009.</p>	Strategy/ planning
<p>London Borough of Bromley Written Statement – 13. ...</p> <p>... Health" recognise that health is affected by a range of factors including: the provision of a safe, secure and sustainable environment; reducing ...</p> <p>Document opened: Related to community service.</p>	
<p>Bromley Annual Monitoring Report 1 April 2007 – 31 March 2008</p> <p>... local level, specifically in connection with housing delivery; • Whether any policies need to be replaced to meet sustainable development...</p> <p>Document opened: Related to the built environment of Bromley town centre. Sustainability referred to twice in generic terms (sustainable community).</p>	
<p>Childcare Sufficiency Report 2011</p> <p>... Council the evidence and information it needs to facilitate and shape a market that contains sufficient, flexible, affordable, sustainable childcare.</p>	
<p>Bromley Public House Evidence Base</p> <p>... At the heart of the NPPF is a presumption in favour of sustainable development highlighting three dimensions of planning, economic, social</p> <p>Document opened: Related to pubs.</p>	
<p>Adopted Spg2 – Residential Design Guidance</p> <p>... Council's commitment to maintaining Bromley as a place that is attractive, spacious, safe and green – but also economically vibrant and sustainable ...</p>	
<p>Leader talks about council tax freeze for 2014–15 – London ...</p> <p>... result of this Council pressing home our concerns with local MPs and Ministers tha accepting the one-off payment was not financially sustainable</p>	
<p>Bromley Environment Awards 2011 Booklet</p> <p>... The roses and co-ordinated hanging baskets add horticultural interest to this modern, low maintenance, very sustainable garden. ...</p>	Awards
<p>Stimulating The Economy Study – Final Report January 2013</p> <p>... 2.1 The UK Government is firmly committed to supporting sustainable economic growth. ... sustainable place to both live and work was recommended. ..</p>	
<p>Statement Of Community Involvement Sci –Adopted Version Sept 2006</p> <p>... The Act introduced a number of changes to the planning system as part of the Government's commitment to creating sustainable communities...</p>	
<p>Crystal Palace Park Management Board Action Plan 2011–2017 Appendix 1 – Monitoring Report – Quarter 1</p> <p>... Install sustainable accessible and simple signage on pathways to encourage confidence in visitors navigating the park ..</p>	

High Elms Country Park Local Nature Reserve – High Elms The site is also home to BEECHE (Bromley Environmental Education Centre at High Elms) which is a sustainable education and visitor centre	
Contract procedure rules and policies – Contract procedure (EU directives apply if over appropriate threshold.). Sustainability. We recognise that we play a leading role in promoting a sustainable community	
Junior road safety officer – Junior road safety officer – London for reminding the whole school community about road safety issues, along with promoting travelling safely to school by sustainable forms...	
Green Building Environment Award – Green Building This Award is given to any building that has been built or refurbished to a high standard using sustainable materials or using renewable ...	Awards
Business Environment Awards – Business Environment Traditional Business Award: carrying out their day-to-day work in a sustainable manner. Green Team. Email: green.team@bromley.gov.uk..	Awards
Garden Environment Awards – Garden Environment Awards We would like to see evidence of how your garden grows throughout the year and will be looking particularly at how sustainable it is. ..	Awards
School travel plans – School travel plans – London Borough of Over 80% of schools in Bromley have achieved an Award under this scheme which ranges from Sustainable level (Bronze), Higher Standards ...	
Proposals for healthcare in south east London – London However, none have delivered the scale of change required to secure clinically and financially sustainable services for the long-term for local ...	
Churchill Place, Bromley Town Centre (opportunity Site G) An aim is to ensure that the prospective private sector partner can develop a high quality and sustainable retail-led scheme. . Document opened: “sustainable” used once, not environmental.	
Sustainability ... Local initiatives that really made a difference. Pages in: Sustainability. Action against climate change; Bromley Sustainable Schools Forum... Document opened: A page of links to other documents already identified in the search.	
Btc Aap Appendices 5 To 7 And Glossary ... Code for Sustainable Homes A national standard for sustainable design and construction of new homes launched in December 2006. ...	(Residential)
London Borough of Bromley Written Statement – GLOSSARY ... Blueprint for a Better Bromley The local action plan for sustainable development, which is a key element of the Local Agenda 21 process. ..	
Bromley Environment Awards 2005 Booklet ... building. Bromley’s Environment Awards recognise and reward local sustainable initiatives that really makes a difference ..	Awards
London Borough of Bromley Written Statement – 12. BIGGIN12.3 Whilst making no mention specifically of Biggin Hill Airport, the London Plan supports the development of a sustainable and balanced London ... Document opened: Strategic and recognised environmental sustainability relating to the business park next to the airport.	Strategy/ planning
London Borough of Bromley Written Statement – APPENDIX Supplementary Planning Documents (in preparation). Affordable Housing. Planning Obligations. Sustainable Design and Construction. ...	(Residential)

<p>London Borough of Bromley Written Statement – 8. GREEN and encourage its enhancement; To preserve good quality agricultural land as a valuable resource and promote sustainable farming, forestry...</p> <p>Document opened: Related to the preservation of green space.</p>	
<p>London Borough of Bromley Written Statement – 7. THE The Council's Countryside Management Service (CMS) aims to reduce conflict to secure the long-term sustainable management of the countryside</p>	
<p>Environmental projects and campaigns – London Borough of projects and campaigns. Big Bromley Brush Up; Bromley Sustainable Schools Forum (BSSF); Bromley's Environment Awards; ...</p> <p>Document opened: Page containing links to documents included elsewhere in the search.</p>	
<p>Council to freeze council tax ... lobbied local MPs and government Ministers regarding this issue arguing accepting one-off payments was not financially sustainable in terms of ...</p>	
<p>London Borough of Bromley Written Statement – Contents Interactive UDP Site – Written Statement – Contents.</p> <p>Document opened: It was the contents page</p>	
<p>Homelessness Strategy 2008–12 ... The Government published its national strategy for tackling homelessness ('Sustainable Communities – Settled Homes, Changing Lives'7) in March ...</p>	
<p>Best Recycling Project Awards – Other Environment Awards show and began a tireless trek around other schools, infants, junior and even secondary passing on the good news about sustainable development</p>	Awards
<p>Awards 2010 – Roger Harrabin – Bromley's Environment such as Panorama, Newsnight and The World at One, and has won many Awards for broadcasting on issues related to sustainable development. ...</p> <p>Document opened: Related to environment awards.</p>	Awards
<p>Parklands Nursery – 2005 winner – Community Environment They have delivered a quality and sustainable education in a re-born building. More in: Community Environment Award. ...</p>	Awards
<p>Women and Girls Network (WGN) – London Borough of overall aim is to promote, preserve and restore the mental health and well-being of women and girls to make a total and sustainable recovery..</p>	

Appendix 19. The Location of the London Boroughs Included in the Sample



Figure A19.1: The distribution of boroughs included in this research (Map: London Biodiversity Partnership, 2011)

Key

●	Conservative control	The green border denotes the councils that were designated low-carbon zones.
●	Labour control	
●	Liberal Democrat control	

Appendix 20. A Cultural Profile of Japan

When reviewing the culture of the Japanese, the overriding characteristics that dominate their culture are those of taking a long-term holistic view and striving to blend diversity into a harmonious whole. These combine to create a culture that is significantly different from those of western nations.

Japanese companies have a steep hierarchy, underpinned by a Confucian ethos (Hofstede, 1981, p.105), which would suggest a high level of bureaucracy. However, in contrast with the western top-down bureaucratic control, there is a bottom-up style of management where every participant has an important voice because it is believed that they are the best placed to make recommendations for their immediate area of activity. Those further up the hierarchy will use the information thus available to them to develop overarching policies incorporating the recommendations of many (Hofstede, 1984, p.124; Hampden-Turner and Trompenaars, 1994, pp.96–99).

The effectiveness of this structure is facilitated by a paternalistic culture that fosters close relationships, maintaining the requisite communication channel (Hampden-Turner and Trompenaars, 1994, pp.96–99 & 159–160). The reward for those lower in the hierarchy becomes theirs as they age and higher status within the hierarchy is conferred upon them (Hampden-Turner and Trompenaars, 1994, pp.88 & 160). However, this paternal nature is tempered by a strong masculine character, demonstrating assertiveness and aggression. Indeed, in Hofstede's analysis of masculinity, the Japanese rank the highest, with a rating of 95% (Hofstede, 1984, pp.189–191; Hampden-Turner and Trompenaars, 1994, p.227).

The Japanese management structure is in harmony with other aspects of Japanese culture. Thus Hampden-Turner and Trompenaars (1994, p.135) identified that of all nations in their survey, Japan took the most long-term view. This means that the Japanese value investment, even when it does not yield immediate returns. In addition, Hampden-Turner and Trompenaars (1994, pp.73–85) found this view was facilitated by the manner in which they were able to consider multiple needs at one time, a skill not easily adopted by others (Trompenaars and Hampden-Turner, 1996, pp.124–129 & 154–157).

The individual within the workforce is seen in a similar way. Each individual is seen to have the potential to fill many roles. Thus they are skilled in multiple functions, developing flexibility and an understanding of the whole procedure rather than the small field from which to contribute that a specialist in a single area would have (Hampden-Turner and Trompenaars, 1994, pp.122–128).

When considering the paternalistic culture, it follows that the Japanese are shown to consider the welfare of other stakeholders, including employees, within their business decisions to a much higher degree than other nations. 92% of Japanese managers responding to the survey confirmed this finding underpinning the ethos of the development of trusting relationships being a core focus of their activities (Hampden-Turner and Trompenaars, 1994, pp.32–37; p168). Indeed, this philosophy of trust confers an onus on the members of communities to work for the greater good (Hofstede, 1984, pp.150–151; Hampden-Turner and Trompenaars, 1994, p.105).

Working for the greater good sits beside their understanding that status is ascribed rather than achieved and upheld by their government (Hofstede, 1984, p.104), based on the belief that ascription of status engenders the ability to develop the necessary qualities that in a western mindset would merit the status (Hampden-Turner and Trompenaars, 1994, p.172). Whilst higher than most European nations, Japan has the lowest power distance of the Asian countries (Hofstede, Hofstede and Minkov, 2010, p.59), caused largely by the extent of its paternalistic culture (Hofstede, 1984, p.88). It is, however, the most advanced, and Hofstede argues that the difference is in part explained by the culture of the status ascribed to the older son who inherits his parents' estate. Other sons have to find their own niche, fuelling a drive towards modernisation (Hofstede, 1984, p.101).

The Japanese ethos of harmony spills over into a highly developed sense of community, with what Hampden-Turner and Trompenaars describe as “outer direction” (Hampden-Turner and Trompenaars, 1994, p.166). Thus cooperative clusters of businesses develop that benefit from their corporate strengths and economies of scale as well as forming highly supportive supply networks (Hampden-Turner and Trompenaars, 1994, p.166). Cooperation is such that patents are not taken out, as they are considered to only benefit individual organisations at the expense of slowing down the process of innovation and

diffusion of superior products by the entire industry (Hampden-Turner and Trompenaars, 1994, p.207).

It is clear that the Japanese have developed a culture that maintains stability in the face of change, by accommodating rather than resisting the direction of change so that the uncertainty of conflict is avoided. Hofstede (1984, p.122) ranked Japan high on the uncertainty avoidance index. This supports Japan's desire for harmony, but his analysis of the characteristics this ranking generally confers does not accommodate the resultant resilience by embracing technological change rather than taking active steps to avoid uncertainty by resisting it (Hofstede, 1984, pp.123–4, pp.132–3, p.140).

Harmony and working to the greater good is intrinsic to the Japanese way of life, to the extent that each situation is judged on its own merit. Their need for overarching regulation is thus diminished because of the fundamental ability to identify the course of action that promotes harmony in any given situation relative to the circumstances that present themselves. This characteristic is so deeply embedded that the Japanese have no word for "objectivity" (Hampden-Turner and Trompenaars, 1994, pp.107–116). Harmony, however, is debilitating in one aspect. The Japanese are unable to take criticism or respond to feedback (Hofstede, 1984, p.267). This renders them resistant to change that is not self-generated and recognised.

The desire to benefit stakeholders including society (Hofstede, 1984, p.125) also underpins a culture that views collaborative partnerships between businesses as a vehicle to better serve the customer, confirmed by three quarters of the Japanese respondents to Hampden-Turner and Trompenaars' questionnaire (1994, p.70). This is augmented by the Japanese unquestioning acceptance of diversity, incorporating difference into a harmonised whole (Hampden-Turner and Trompenaars, 1994, pp.113–116). The Japanese have no term for "decision making" (Hofstede, 1984, p.27), reflecting the extent to which the blending of ideas has become a natural process.

This ability to incorporate many perspectives is translated into their offering of commodities. Rather than develop products to meet specific niches, they have an ability to blend the qualities desired by different market niches into one output. Thus they blend the desire for high quality and low cost and can add

other desired qualities as they become apparent (Hampden-Turner and Trompenaars, 1994, pp.121–122).

These characteristics in combination have enabled the Japanese to pioneer standards in quality not seen elsewhere in the world, which has allowed them to dominate products that demand near-perfection, such as those in the computer industry (Hampden-Turner and Trompenaars, 1994, pp.119–121). Incorporating the preference for using a market pull model enables the Japanese to constantly innovate, manipulating the deployment of resources in a fashion that addresses any bottlenecks that occur in the process. This approach supports the delivery of an entire package of technologies, stretching as far as adjusting the terms of the contract if it ensures the end result is more robust for both parties (Hampden-Turner and Trompenaars, 1994, pp.135–143).

In contrast to the isolated innovator in the West who is seen to challenge a stable status quo and should prove the worth of their ideas, innovation is embedded in the Japanese approach to business. Their unique ability to synchronise activities has enabled them to blend developments in multiple technologies and rapidly produce innovative products, incorporating the contributions of experts from diverse disciplines in order to ensure the success of their innovations (Hampden-Turner and Trompenaars, 1994, pp.143–151).

Hampden-Turner and Trompenaars (1994, p.135) ranked the Japanese first where it comes to taking a long-term view. This long-term view is seen in the form of cycles which occur at many levels: daily, seasonal, and generational. The Japanese see the need to manage the cycles in such a way that each cycle informs the next. They value the long-term cycle to the extent that they will forgo immediate financial gain for the prospect of long-term gain, a model that is incompatible with the western capitalist system that is reliant on short-term profit. Banks will also support businesses through times of hardship, facilitating their recovery and growth (Hampden-Turner and Trompenaars, 1994, p.189).

The extent to which the short term is managed in order to achieve long-term gains spills over into the manner in which significant economies are gained over the long term by addressing apparently trivial waste in the immediate. The manner in which Taiichi Ohno recognised the value within the concept of Just-

in-Time manufacturing that was rejected by the Americans (Peterson, 1999) is understandable.

In spite of the ability to sacrifice immediate gain for future prosperity, the Japanese recognise the transient nature of events and do not believe in the ability to forecast the future with any accuracy (House et al, 2004, p.288). Their open-minded approach enables them to accommodate events as they occur rather than develop long-term plans based on forecasts. However, this mindset does not allow them to accommodate the concept of sustainability (House et al, 2004, p.289).

This cyclical view of time underpins their style of communitarianism, inasmuch as they believe that investment in a person yields benefits that return to the community, which is a stark contrast to the West, which tends to consider investment in individuals futile because those benefiting would use it for personal gain (Hampden-Turner and Trompenaars, 1994, pp.173–179). Thus the West would look to the bottom line, whilst the Japanese would be much more supportive of the individuals within their communities. This influences many aspects of Japanese life, including their quest for knowledge and ability to learn through diverse experiences. This leads to the Japanese strength in knowledge-dependent fields of development (Hampden-Turner and Trompenaars, 1994, pp.173–186).

Long-term thinking, forgoing immediate profits for future communal benefits, and the ability to handle complexity, along with the demands of coping with small areas of habitable land and limited resources such as metal ores, have shaped the focus of Japanese development. This has resulted in a concentration on miniaturisation and the development of substitute materials. The Japanese now lead the world in nanotechnology that has the potential to make them world leaders in sustainable development despite Japan being one of the world's most densely populated regions (Hampden-Turner and Trompenaars, 1994, pp.197–199) and display the characteristic of being efficient in mass production of consumer electronics, with a focus on quality and speed that is associated with the masculine culture (Hofstede, Hofstede and Minkov, 2010).

Appendix 21. Japanese Environmental Policy, 2007

- To address global warming:
 - To meet the 6% reduction of 1990's CO₂ emissions under the terms of the Kyoto agreement.
 - To develop long-term goals for CO₂ emissions.
 - To develop the resilience to cope with climate change.
- To close the loop where resources are concerned:
 - To reduce the material and energy intensity required to meet societal demand.
 - To support activities promoting the ethos of “mottainai”¹ and partnership.
 - To promote the concept of the three “r”s (reduce, reuse, recycle) internationally.
 - To promote systems that support the three “r”s and dispose wisely.
- To manage urban air quality:
 - To achieve urban air quality that supports “pleasant” and healthy living.
 - To reduce emissions of pollutants and heat from industry, individual activity and transport in order to develop sustainable cities.
- To manage water resources:
 - To conserve sustainable water supplies.
 - To manage demand.
 - To control quality.
 - To maintain aquatic life.
 - To conserve waterside areas.
 - To facilitate community access to waterside areas.
 - To develop local plans for water usage and flood control.
 - To maintain, develop water storage and replenishment capacity.
 - To be involved in international knowledge exchange and intervention with respect to water management
- To reduce the potential for toxic substances to cause harm:

¹ The term “mottainai” is of Buddhist origins and refers to respect for resources and regret when value is not realised before resources are disposed of (Web Japan, 2013b).

- To promote risk assessments and collate data relating to hazards and exposure to toxins.
- To adopt appropriate environmental risk management techniques:
 - The precautionary principle.
 - The life cycle analysis.
- To educate the population regarding environmental risk.
 - This includes the need to gain their trust.
- To meet any internationally based requirements and contribute to knowledge exchange activities.
- To protect biodiversity:
 - To conserve sites of scientific interest and develop ecological networks across the nation.
 - To support wildlife and control foreign species.
 - To promote activities relating to agriculture, forestry and fisheries that support the rural environment.
- To embed environmental values in the market:
 - To disclose environmental performance through the relevant labelling of goods and provision of relevant information about services and corporations.
 - To consider the use of economic instruments.
 - To improve environmental management techniques.
 - To promote the use of EMS.
 - To encourage the use of “socially responsible investment” and government procurement.
 - To include markets at an international level.
- To involve individuals and communities in conservation of the environment:
 - To develop the skills required.
 - To promote appropriate education.
 - To develop a national organisation that is focussed on environmental conservation.
 - It should involve stimulation of frequent community activities.
 - To create communities that are sustainable, using their resources and capacities.

- To promote community activities including “vitalisation”.
- To develop an infrastructure, including research and development facilities, knowledge exchange and policy development, that facilitates long-term sustainability:
 - To promote research and development into environmental issues intensively.
 - To develop a “foundation” that will act as a database for the public to utilise.
 - To develop and advertise techniques for including environmental considerations in administrative contexts.
 - Such as strategic environmental assessment.
 - To develop a long-term vision for 2050.
- To contribute to global initiatives promoting sustainable development:
 - To actively participate in international forums developing management structure and directives at all levels of community life.
 - To disseminate best practice with respect to environmental management.
 - A particular focus on South-East Asia.
 - To advertise the support for environmental management in the developing world and international research on environmental issues.
 - To create partnerships between different stakeholders, developing an infrastructure for knowledge management and that of human resources.

(Ministry of the Environment, Government of Japan, 2007)

Appendix 22. Japan's Industrial Pollution

On becoming an industrialised nation, Japan did little to prevent pollution and the people suffered health issues as a consequence, such as those resulting from the release of methylmercury causing what subsequently became known as Minamata disease (Harada, 1995; United Nations Environment Programme, 2013; Web Japan, 2013a) as well as sickness resulting from the release of arsenic in a less well publicised event (Web Japan, 2013a).

These and other instances of ill health caused by pollution alerted the Japanese government to the need to control industrial waste, emissions and effluent as early as the 1960s (United Nations Environment Programme, 2013) but the Environment Agency, a department developed to prevent the incidences of pollution and its associated damage to human health, was not established until 1971 (UNESCO Courier, 19).

Reports of the events following the outbreak of sickness in the region identify delays caused by bureaucracy and the need to satisfy multiple stakeholders. These were exacerbated by inaccurate reporting and a reluctance to impose sanctions on an organisation that employed a large proportion of the residents in the area (Yorifuji, Tsuda and Harada, 2013). In addition to this, appropriate governmental response to the community resulted in part from action taken by grassroots activists which included local doctors (Colligan-Taylor, 2002).

Appendix 23. Japanese Activities at an International Level

- The Ministry of Economy, Trade and Industry hosted round table discussions with the Ministry of New and Renewable Energy of India as part of an ongoing dialogue in which the two countries are supporting each other in joint projects relating to technology that would facilitate the development of clean energy grids. Included were discussions relating to the development of associated technologies including Japan's clean coal burning (Ministry of Economy, Trade and Industry, 2014f).
- The vice minister for the Ministry of Economy, Trade and Industry attended a clean energy conference in Seoul with ministers from other nations. He networked with ministers from America, Korea, India, China and Saudi Arabia, the Director General of the International Renewable Energy Agency (IRENA) and the executive director of the International Energy Executive, promoting:
 - International cooperation in the development of technologies.
 - Japan's clean coal burning technology.
 - Japan's world leading position where large scale batteries are concerned.
 - A more stabilised international market for oil in conjunction with supporting the development of SMEs in Saudi Arabia.

(Ministry of Economy, Trade and Industry, 2014g)

- Japan attended the fourth assembly of the International Renewable Energy Agency (IRENA) and was selected to chair the subsequent assembly, an occasion which it is seeking to use as a further platform to promote Japanese clean technology (Ministry of Economy, Trade and Industry, 2014h).
- Japan instigated the development of a transport plan involving all Asian countries that promoted the sharing of best practice and named Japan as a source of technological expertise (*ASEAN-Japan Action Plan on Environment Improvement in the Transport Sector*, 2010).
- The Japanese presented their action plan for sustainable transport to the 14th World Road Congress held in Mexico (Ministry of Land, Infrastructure, Tourism and Transport, 2011).

- The Institute for Global Environmental Strategies has taken on the role of Secretariat for Asia-Pacific Network for Global Change Research and researches environmental issues that inform the region's policy making (Institute for Global Environmental Strategies, 2014).
- On drafting the cap-and-trade scheme, the Tokyo Metropolitan Government stipulated that it should be copied by other prefectures and cities within Japan as a precursor to a national scheme. It also ensured that its measurement system was kept flexible to enable it to merge with an international scheme, which it envisioned as an essential development (Tokyo Metropolitan Government, 2010).
- Tokyo aligned with 40 of the world's megacities to form C40, a group that is seeking to share best practice where urban sustainability is concerned (Tokyo Metropolitan Government, 2010; C40, 2014).
- In 2013 the Ministry of the Environment of the Government of Japan co-organised the Regional Environmentally Sustainable Transport conference, integrating the first global meeting on sustainable transport with the Ministry of Transport of Indonesia and the United Nations Centre for Regional Development (EST Forum, 2013).
- Japan has established "Concert Japan", an entity that seeks to coordinate research and the development of technology within Japan with that of Europe, establishing a basis for collaboration and multilateral projects (Concert Japan, no date).
- Japan has published its waste management techniques and taken a lead role in the Pacific Island Leaders Meetings on assisting in waste management. Its three core activities involve training islanders and offering strategic and technical advice (Ministry of Foreign Affairs, 2012; United Nations Environment Programme, 2013).

Appendix 24. A Cultural Overview of Sweden

Sweden is considered by many to be a paradox. During the communist era, it sought to merge the values of both communism and the more capitalist West (Hofstede, 1984, p.88; Hampden-Turner and Trompenaars, 1994, p.237), being a comparative latecomer to the global market, rapidly adopting industrialisation and attaining the same levels of prosperity (Hampden-Turner and Trompenaars, 1994, pp.199 & 238). Both communism and capitalism have seen major collapses, yet at the time of writing, Hampden-Turner and Trompenaars (1994, p.237) reported that Sweden, a state that incorporated many of the values held by both, was relatively untouched.

The Swedish culture is one of extremes. It is permeated by feminine characteristics so marked that Sweden leads the 39 nations assessed by Hofstede, where it registers the lowest masculinity with a score of 5% (Hofstede, 1984, p.188; Hampden-Turner and Trompenaars, 1994, p.277). On the individualist/communitarian continuum, Hampden-Turner and Trompenaars (1994, p.167, pp.243–247) found it to be one of the most individual, although Hofstede (1984, p.167) found the reverse. This can be explained by the manner in which individualism is identified by Hampden-Turner and Trompenaars, who show that in Sweden it is tempered by a strong outward-facing perspective. These characteristics are complementary in that the juxtaposition of communism-based outward-directedness and a high level of individualism, supported by the feminine characteristic of nurturing, enables each individual to be developed to their full capacity, strengthening the community as a whole. This supportive culture extends to banks that adopt a supportive role, enabling start-up businesses as well as those seeking a long-term benefit for investment (Hampden-Turner and Trompenaars, 1994, p.189).

In many respects, the corporate world in Sweden is the antithesis of Japan and similar to that of the USA (Hampden-Turner and Trompenaars, 1994, p.239). Although not steeply so, larger organisations tend to be hierarchical in structure, managed with explicit top-down control that invests little in the workforce in terms of patriarchal care (Hampden-Turner and Trompenaars, 1994, pp.96–99). Approval is valued, and is achieved through conscientious attention to work (Hampden-Turner and Trompenaars, 1994, p.274). It is a culture in which

responsibilities are delegated to lower levels of the hierarchy more readily than in any other nation surveyed by Hampden-Turner and Trompenaars, which, together with rewarding individual achievement frequently through celebration and increased salary, allows strong leaders to emerge (Hampden-Turner and Trompenaars, 1994, pp.57, 90 & 250–255).

Bureaucratic management is moderated by recognition that all members within a business have an equal ability to offer valid contributions. This differs from the Japanese desire to blend disparate opinions into a harmonious whole; rather, the Swedish culture identifies value in individual ideas and will encourage everyone to offer solutions and collaborate where necessary to develop acceptable compromises (Hofstede, 1984, p.269; Hampden-Turner and Trompenaars, 1994, pp.253–257). The Swedes also have an ability to engender a sense of belief and enthusiasm in their undertakings, even if the outcome is not as beneficial as hoped (Hofstede, 1984, p.117, pp.122–123), encouraging cooperation within the organisation.

The individualistic culture has also led to the Swedes being highly self-sufficient (House et al, 2004, p.569), evidenced by their being the highest-ranking country when responding to a question assessing their preference for relying on their own resources rather than seeking support from the community as well as the counter-indicator of whether an individual should be left to sort out their own problems or be offered support (Hampden-Turner and Trompenaars, p.167). They rank second to Japan in their preference for being their own boss (Hampden-Turner and Trompenaars, p.225), further evidencing their individualistic preference. Their self-sufficiency is moderated by their nurturing communal focus that has led to Sweden being one of the best-performing nations where social welfare and life expectancy is concerned. This correlates with Hofstede, Hofstede and Minkov's observation (2010, p.146) that individualist cultures that are also feminine rank social welfare highly.

Complementing their individualistic culture and like the Japanese, Swedes have a strong outward focus causing the individual to recognise their role in benefiting the larger society, although in contrast with the Japanese it is justified through logic rather than obligation. This outward focus is also reflected in their view of collaboration between companies (Hofstede, 1984, pp.122–123) whereby marginally less than two thirds of Swedish management perceives

collaboration as a basis for improved economies that can benefit the customer (Hampden-Turner and Trompenaars, 1994, p.71). This results in strong individuals who recognise that collaboration builds a stronger community which, in return, employs and strengthens the individual (Hampden-Turner and Trompenaars, 1994, pp.246–247), reflecting elements of a socialist ethos.

This outward focus extends beyond their national boundaries. Swedish companies are renowned for their international focus (Hofstede, 1984, pp.122–123), in part because of the relatively small home market, but also demonstrating a greater willingness to collaborate with foreign companies than the 22 other leading industrial countries reviewed by Hampden-Turner and Trompenaars (1994, p.259).

Work would appear to be intrinsic to the Swedish culture in more than one respect. Firstly, also reflecting its socialist values, Sweden is ranked first out of 23 major economies where employment levels are concerned including the employment of disabled people. This reflects the Swedish belief that unemployment represents wasted potential and therefore does not make economic sense (Hampden-Turner and Trompenaars, 1994, pp.248–249).

Secondly, the company is seen to be an extension of national status. Swedes value conversation that is centred on work (Hampden-Turner and Trompenaars, 1994, p.243), and failure of an organisation is considered to be equal to failure of the nation (Hampden-Turner and Trompenaars, 1994, pp.250–253). This creates a drive to be the best and to succeed in the long term and, like the Japanese, a preparedness to invest for long-term returns. Indeed, where it comes to taking a long-term view, Sweden ranks second to Japan out of the 31 countries surveyed (Hampden-Turner and Trompenaars, 1994, p.135).

Swedes do not differentiate between the arts and the sciences. They believe such differentiation renders art a pursuit for pure pleasure, and craft, which is associated with the sciences and technology, subordinated to that of meeting customer need. The Swedes by comparison differentiate equally between knowledge and techniques, including those of management. Thus the development of technologies is not constrained by the demands of the customer alone, but a broader remit of improved functionality is incorporated in their solutions for problems (Hampden-Turner and Trompenaars, p.233).

Appendix 25. Sweden's Environmental Policy

Environment policy

- Zero net emissions of greenhouse gases by 2050.
 - Reducing CO₂ emissions to 40% of 1990's levels by 2020 entailing:
 - 50% of energy from renewable sources by 2020.
 - Energy usage to be 20% more efficient.
- Modernising the transport systems and moving away from use of fossil fuel.
 - 10% of the energy within the transport sector to be from renewable resources by 2020.
- Control in the use of hazardous substances.
 - Research into the effect of chemicals on health, especially that of children.
 - Legislation to control the use of chemicals that pose a threat to health.

(The above targets: The Swedish Institute, 2013a.

The above milestones: Government Offices of Sweden, 2014b)

Ecocycle policy

- Control of resource use with the following core considerations:
- Waste should be considered to be a resource.
 - Waste management should be part of the infrastructure.
 - Sustainable ecocycles are dependent on economies of scale
- Waste should be considered an environmental problem.
 - Producers should be held accountable for waste.

(Government Offices of Sweden, 2014c)

The Environmental Code

- **The future environment**

The vision was to solve the core environmental problems, the principal needs being those of:

- Efficient resource use, including land and water masses.
- Clean transport free of GHG emissions by 2030.

- Management of toxic products, including the use of chemicals and the associated emissions.
- Robust buildings.
- **Limitation of climate change**

Supporting the development of renewable energy technologies and using taxation as a tool to manage behavioural change.
- **Sustainable economic growth and competitiveness**

Embedding environmental and social protection within all economic activity. Sustainability is seen to require:

 - Production and consumption at sustainable levels.
 - Maximising education and employment for those entering the employment market, immigrants, the unemployed and sick.
 - Creating green taxes relating to transport, waste management and CO₂ emissions.
 - Simplified regulation and financial support for SMEs.
 - Promotion of environmentally supportive technologies and the associated collaboration and expertise and venture capital.
- **Regional development and regional conditions**

Much of Sweden is under forests and whilst these are seen to be a valuable resource, it is also recognised that they need preservation.
- **Development of sustainable community planning**
 - Develop planning of the infrastructure to support rural and urban living.
 - Secure clean and affordable sources of energy

(The above is from Ministry of the Environment (2003), the headings in bold using the same terms as those in the document)

Appendix 26. A Cultural Overview of Denmark

In many respects the culture of Denmark is similar to that of Sweden (Hofstede, 1984, pp.35–36) including the Danes' preparedness to speak out and challenge authority (Hofstede, 1984, p.99) and their tendency towards a feminine character (Hofstede, 1984, p.189; Hofstede, Hofstede and Minkov, 2010, p.140) and individualist nature (Hofstede, Hofstede and Minkov, 2010, p.147). There are, however, critical differences. The long-term orientation of the Danes appears to be dominant, interacting with their other characteristics to produce a nation that is both stable and tolerant.

Of the four nations, Denmark potentially has the longest-term view¹ and it appears to infiltrate other attitudes to a greater extent. Whereas Japan and Sweden registered the highest response for long-term versus short-term planning, with Denmark trailing in ninth place (Hampden-Turner and Trompenaars, 2004, p.135), in other respects Denmark demonstrated a more consistent long-term view, sharing the Japanese perception that activities in the present have a distinct bearing on the future and placing greater weight on the importance of the future than both Japan and Sweden. This mindset enables the Danes to consider the long-term impact of their actions and act accordingly, supporting their long-term objectives with appropriate performance measures (House et al, 2004, p.310).

Hofstede, Hofstede and Minkov (2010, p.146) found that Denmark is typical of countries that are both feminine and individual, in that it places wellbeing as opposed to survival as its "bottom line". Coupled with its long-term outlook this has resulted in Denmark being one of the lowest-ranking countries where uncertainty avoidance is concerned, with only Singapore beneath it. House et al (2004, p.310) argues that this is a direct result of the Danes' long-term view, which facilitates assessing and managing future risks. Indeed, Denmark was the highest-ranking of 23 principal nations surveyed with respect to the extent to

¹ The studies of the GLOBE and Hofstede use different frameworks to assess long-term orientation, and the results differ significantly. In that Hofstede, Hofstede and Minkov's (2010, p.252) study includes the relationship with the past, focussing on national pride and monumentalism, it does not equate with the future orientation of the GLOBE, which is more relevant to sustainable development. The GLOBE (practice) placed Denmark higher than both Sweden and Japan in this orientation. However the GLOBE study placed it the lowest for values because of the Danes' love of recounting historical events (House et al, 2004, p.305).

which they seek to protect the environment (Hampden-Turner and Trompenaars, 1994, p.262).

The Danes' feminine characteristic together with their low level of uncertainty avoidance also interacts with a low power distance (Hofstede, p.98; Hofstede, Hofstede and Minkov, 2010, p.59), legitimising individual endeavour by those lower in the hierarchy that is contra to accepted norms. This would suggest that radical decisions are entertained with greater confidence. Disagreement is accepted and accord is the result of negotiation (Hofstede, 1984, pp.214–215). It also provides the environment for Danes to become naturally ambitious, seeking managerial positions (Hofstede, 1984, p.122) at a younger age than many nations (House et al, 2004). They are prepared to develop small businesses, not needing the security of many managers (Hofstede, 1984, p.122).

The Danes seek a strong level of organisation with clear boundaries and identities for organisations and entities (Hofstede, 1984, p.154). However, Denmark is found to have a higher proportion of cooperatives than other nations (Hofstede, Hofstede and Minkov, 2010, p.321) and at least half the managers express a preparedness to collaborate with foreign companies (Hofstede, 1984, p.122; Hampden-Turner and Trompenaars, p.159).

Within the leading western nations, Danish managers tend to be the most motivated by the satisfaction of achieving objectives rather than the desire for power, although they are the least likely to consider their professional role to have any political bearing (Hampden-Turner and Trompenaars, 1994, p.361). Their focus on achieving objectives is one of the factors contributing to Denmark's performance ranking among the top countries and above Sweden where it comes to the quality of their products.

Where Denmark differs significantly from Sweden is over the characteristic of individuality (House *et al*, 2004, p.470), in part because Denmark does not rank quite as highly where femininity is concerned. The GLOBE study found that the Swedes were supportive of their societal groups but the Danes recorded responses much lower down the scale, demonstrating a more independent attitude. Social support is minimal, underpinned by the attitude that every individual should use the resources available to them to support their wellbeing

(House et al, 2004, p.568). In spite of this Denmark ranks in the higher end of countries donating to third-world causes, giving over 7% of its GNI (Hofstede, Hofstede and Minkov, p.416).

The need for everyone to rely on their own resources leads to resourcefulness that is evident at a national level with the communities and later the government supporting the development of wind power years before many other nations, motivated by their windy climate and lack of more traditional energy-providing resources (Heymann, 1998).

Appendix 27. Danish Regulation Offering Environmental Protection

The Environmental Protection Act devolves responsibility to municipalities to:

- Collect household waste.
- Provide facilities to dispose of industrial waste.
- Recover energy through incineration from all residual waste that can be incinerated.
- Avoid the use of landfill.

Subsequently emissions from incineration were also regulated.

The Heat Supply Act creates an obligation to ensure energy is used in the most socio-economic and environmentally considerate way in the provision of heat, leading to:

- District heating whenever viable.
- Cogeneration of heat and power.
- Connection of waste incineration plants to the district heating supply.

The Power Supply Act is focussed on sustainable energy production including the use of waste incineration with the following provisions:

- It must be traded commercially.
- It attracts an adjustable surcharge that ensures competitive pricing.

(Ramboll, 2012)

Appendix 28. Copenhagen's Environmental Targets

- 20% reduction in heat and power consumption in business in comparison with 2010.
- 10% reduction of heat and power consumption in household in comparison with 2010.
- Solar power to generate 1% of electricity.
- District heating based on carbon-neutral power.
- Production of more wind and biomass-based power than consumed.
- Removal of plastic from the incineration stream.
- Development of biogasification for organic waste.
- 75% of travel to be without the use of the private car.
- 50% of student and commuter journeys by bicycle.
- Increase of 20% of public transport usage in comparison with 2009.
- Public transport to be carbon-neutral.
- 20–30% cars and 30–40% heavy vehicles running on alternative fuels.
- Council offices to reduce energy consumption by 40% in comparison with 2010.
- All new builds to meet the latest specifications.
- Reduction of energy used for street lighting by 50% (no comparator date provided).
- Installation of 60,000 m² of solar panels on municipal buildings.

(European Commission, 2013)

Appendix 29. The Development of Alternative Energy in Denmark

Denmark is ideally suited to the development of wind turbines because of its geography and has a long history of their use (Hvelplund, no date; Vestergaard, Brandstrup and Goddard, 2004; IRENA, 2013), with Danes producing wind-generated electricity as early as the late 19th century, and by the 1930s it was a well-established technology (Vestergaard, Brandstrup and Goddard, 2004; IRENA, 2013). However, this was not seen as a strategic priority by the government. As a result, cooperatives were developed at a grassroots level supporting the development of wind-powered electricity generation and lobbied the government for support. It was not until the 1980s, when the government recognised their potential financial viability, that the government started to support the use of wind turbines with subsidies, tax breaks and, importantly, an obligation on power companies to buy the electricity (Hvelplund, no date; IRENA, 2013).

Similarly, in the 1990s grassroots action persuaded the government to support the introduction of combined heat and power plants that had been established in cooperatives. In both cases, there was the same pattern. Action was not a result of policy, rather a product of the government system that embodied compromise and allowed individual participation, giving a voice to grassroots activists (Hvelplund, no date).

The above illustrates the influence of grassroots activities and how they influence the government in a “bottom-up top-down” manner circumventing policies and formal planning processes (Hvelplund, no date).

Appendix 30. A Cultural Overview of the United Kingdom

When assessing the strength of any cultural characteristic associated with the British, it is evident that they are not as extreme in their characteristics as many other nations. This is also evident in their governments, which tend towards a middle position (Hofstede, 1984, p.104). However, three characteristics augment rather than moderate each other. They tend to be inner-directed individualists that recognise achieved rather than ascribed status (Hofstede, 1984, pp.127, 151 & 157; Hampden-Turner and Trompenaars, p.301). This is found to be supported by a rule-bound attitude that would not willingly offer an individual any exemption because of special circumstances, lest they be seen to have an unfair advantage (Hofstede, 1984, p.171; Hampden-Turner and Trompenaars, p.301).

Principally governed by a two-party political structure, the approach is largely laissez-faire, whereby the belief in economic theory results in a faith in market forces (Hampden-Turner and Trompenaars, pp.302–305). The British are not very sensitive to short-term feedback, resulting in a tendency to ignore the need for change (Hofstede, 1984, p.114). Their faith in economic theory has not considered that the parameters of business have changed over time and the theory should be subject to revision, meaning that policies that might have been effective in the past are still used, but have lost their effect, because individual self-interest has overtaken market forces (Hampden-Turner and Trompenaars, pp.324–325).

Laissez-faire government has served the interests of individuals, who have been allowed to amass personal wealth (Hofstede, 1984, p.169–173; Hampden-Turner and Trompenaars, pp.302–325), at times undermining the prosperity of their businesses in the process (Hampden-Turner and Trompenaars, p.305). Within the workplace 90% of the British managers surveyed by Hampden-Turner and Trompenaars (1994, p.57) indicated that individuals within the workforce are rewarded for their personal achievements, generally through enhanced salaries.

Historically, the status of “gentleman” conferred trustworthiness enjoyed by Victorian entrepreneurs who upheld the values in order to retain the associated respectability. With the erosion of the “gentleman” class, the constraints of

respectability no longer influenced behaviour, opening the door for unethical action to be adopted for self-interested ends (Hampden-Turner and Trompenaars, p.307).

Individualism has helped to fuel Great Britain's leadership in industrialisation. The culture of leaving estates to the eldest son encouraged the younger ones to make their fortune elsewhere (Hofstede, 1984, p.101). Individual wealth is considered to be an acceptable basis for status and, unlike industry that depends on collaboration with others, financial markets are a preferred arena because the individual can operate to serve their own ends (Hofstede, 1984, pp.123 & 269; Hampden-Turner and Trompenaars, p.313). However, this has a destabilising effect, seeking to extract personal gain rather than offering support (Hampden-Turner and Trompenaars, p.191), placing pressure on business to constantly demonstrate growth in order to attract investment (Hampden-Turner and Trompenaars, 190–193).

Following the American model, the United Kingdom takes a sequential view of time. Each task is seen as an entity in its own right which should be, for the sake of efficiency, completed in as short a time as possible (Hampden-Turner and Trompenaars, 1994, pp.73–85). It follows that the United Kingdom's future time horizon is short (Hofstede, 1984, p.132), being in the region of weeks (Trompenaars and Hampden-Turner, 1996, pp.124–129). Indeed, the United Kingdom ranked 22nd out of 31 countries when Hampden-Turner and Trompenaars (1994, p.135) assessed the extent to which firms take a long-term view. This short-termism is critical for the financial success of a British organisation.

House et al (2004, pp.288–289) counter this view by arguing that the British do produce long-term plans based on long-term forecasts (i.e. have a long future orientation) and augment these with short-term objectives that enable them to achieve the longer-term goal but also evidence a short-term orientation.

The British are seen to be achievement oriented and highly competitive (Hofstede, 1984, pp.122–123 & 127–128). Hofstede argues that this is caused by their mix of low uncertainty avoidance, enabling them to take risks, and their masculine aggression (Hofstede, 1984, p.219). This is augmented further by their individualism that causes organisations to compete with each other to the

extent that it is survival of the fittest (Hampden-Turner and Trompenaars, 1994, pp.189 & 206). Competition is such that departments within organisations are tasked to compete with each other and organisations measure success with each fraction of a percentage growth in market share, encouraging observation of the financial bottom line at the expense of the other stakeholders (Hampden-Turner and Trompenaars, 1994, p.87).

Whilst the British believe in their ability and right to influence the course of events to suit their personal beliefs (Hofstede, 1984, pp.130 & 169–170), they also enter collaborative partnerships. Collaboration between industries is also viewed from the perspective of individual gain, with two thirds of the British respondents to Hampden-Turner and Trompenaars (1994, p.70) believing that the outcome of collaboration between companies would be the formation of a cartel that would provide the strength of a monopolistic position. However, at the time of Hampden-Turner and Trompenaars' research, it was clear that stakeholders beyond the shareholder were considered by two thirds of the respondents (Hampden-Turner and Trompenaars, 1994, pp.32).

Porter, (1998) and Kilroy (1999) argue that nations that are motivated by wealth eventually neglect other critical components of business welfare, namely investment and innovation, and as a result decline economically. Britain was seen to embrace this attitude, although it is questioned whether the Thatcher years reversed the trend (Hampden-Turner and Trompenaars, 1994, pp.313–314).

As with the majority of the western world, the organisational structure in the UK is relatively flat (Hampden-Turner and Trompenaars, 1994, p.94) and tends to be decentralised (Hofstede, 1984, p.198). There is a tendency for top-down management that is explicit, offering little autonomy to those at lower levels in the hierarchy. This structure needs little investment in terms of relationships because the only value offered by the workforce is the requested output (Hampden-Turner and Trompenaars, 1994, pp.96–99).

Underlying British characteristics undermine the extent to which inner-directedness could be sufficient to drive excellence (Hampden-Turner and Trompenaars, 1994, p.301). There tends to be a low level of initiative and drive (Hofstede, 1984, p.123; Hampden-Turner and Trompenaars, 1994, p.301) and

at the time of Hampden-Turner and Trompenaars' survey, poor standards of education were observed with just 35% of managers having achieved a degree (Hampden-Turner and Trompenaars, 1994, p.301), justified by the belief that complex decisions are best addressed by managers who are not blinkered by a specialist education (Hofstede, 1984, p.118) and that decision making does not require detailed information about the business (Hofstede, 1984, p.144).

Under competitive conditions, a classic strategy adopted by the British is to move into uncontested markets, benefiting from the premium that can be gained from being first to market with a new product. However, once the product moves towards maturity, increased competition encourages the management of organisations to look to yet more new markets rather than refine the products themselves to help them compete better (Hampden-Turner and Trompenaars, 1994, pp.190–193), supported by a preparedness to take risks (Hofstede, 1984, p.127).

A criticism levelled at this approach to business is that the focus is entirely financially driven and contract-bound. This inevitably causes the role of the accountant and legal experts to become of more importance than that of the technicians, and thus the focus moves from excellence within the product to extracting the maximum profit from it (Hampden-Turner and Trompenaars, 1994, p.194). Similarly, the unmoderated individualist culture creates celebrity status for individuals outside the sphere of business, subordinating the scope of influence of leading businessmen below that of the commentator or newscaster (Hampden-Turner and Trompenaars, 1994, p.301).

Finally, the British are poor with regard to handling difference. They see little scope for harmony between different characteristics. All of the characteristics they possess within the culture tend to one cohesive self-perpetuating position. The concept of the balancing of opposing qualities and seeking a harmonious compromise accepted by the greatest number with opposing views is anathema to them. For the British, an adversarial approach including a readiness to strike is the only way, producing clear winners that augment the status of the individual (Hofstede, 1984, p.209; Hampden-Turner and Trompenaars, 1994, pp.332–336).

Appendix 31. The Responsibilities of Local Authorities

The London Plan (GLA, 2013) devolves monitoring the activities of local authorities to the Planning Inspectorate, which provides substantive support and guidance (the Planning Inspectorate, no date).

The local authorities are responsible for maintaining most of the services in their borough, including waste collection and transport systems as well as planning and environmental protection (Department for Business, Innovation and Skills, 2014; London European Partnership for Transport, 2014), delivery of initiatives such as the Green Deal and the Energy Company Obligation (Gov.UK, 2014b) and supporting biodiversity (DEFRA, 2014).

The GLA is responsible for:

- Developing the transport policy including cycle tracks and main thoroughfares
- Provision of green space and the associated infrastructure

and looks to local authorities to take the initiative to develop these further at a local level. The need for the central management lies with planning of corridors that cross local authority boundaries.

The other obligations of local authorities where sustainable development is concerned are:

- To review air quality (London Borough of Barking and Dagenham, 2014).
- Pollution prevention and control (London Borough of Barking and Dagenham, 2014).
- To take action to meet London's pledge to reduce CO₂ by 60% by 2025 (London Borough of Barking and Dagenham, 2014).
- Building practice to demonstrate best available technology (BAT) (Gov.UK, no date d).
- To develop an action plan and work towards protecting their residents from the increased risks from climate change, especially that of flooding (Sutton, 2014).
- Granting of permits for environmentally harmful operations.
Environmental permits are subject to the Environmental Permitting

(England and Wales) Regulations 2012, whereby the activities that carry the greatest environmental risk are regulated by the Environment Agency and the local authority regulates the remainder (DEFRA, 2011).

Support for sustainable business development is included in the remit for local authorities, but it is in a catch-all position, in that businesses are referred to in conjunction with households. It is therefore up to the local authority to decide on the extent to which support should be targeted specifically towards the business.

The Nottingham Declaration on Climate Change was created in 2002. Those councils that advertise their allegiance to the declaration are committed to achieve “significant reduction of greenhouse gas emissions” from their own operations and to encourage and work with all sectors within their community to move towards sustainability.

Appendix 32. British Government Departments with a Remit to Protect the Environment

The Department for Environment, Food and Rural Affairs is the department that is responsible for environmental policies that are designed to manage the change to a low-carbon community (Committee on Climate Change, no date a). It is supported by 35 agencies including the Environment Agency, the Science Advisory Council (SAC) and the Advisory Committee on Releases to the Environment (ACRE). The remainder are focussed on rural issues and the national parks (Gov.UK, no date b).

The Environment Agency has a broad remit with specific business-facing activities. These involve:

- Monitoring emissions and pollution caused by business activity.
- Managing permits.
- Advising on management waste and emissions.
- Promoting EMS.

(Environment Agency, 2014; Committee on Climate Change, no date a).

The climate change and energy management provision by the Environment Agency includes the provision of compliance tools and guidance needed for energy-intensive businesses to meet climate change agreements, the operation of which provides qualifying businesses with a 90% discount on the Climate Change Levy attached to usage of electricity and a 65% discount on the levy attached to other fuels (Gov.UK, 2014c). Interest-free loans are available for the funding of such projects through a publicly funded company, Salix Finance Ltd (Gov.UK, 2014c; Salix, no date), which since 2004 has funded £303 million across 12,080 projects (Salix, no date).

The Science Advisory Council reports to DEFRA on a wide range of issues, providing independent advice relating to the environment that informs DEFRA's action (DEFRA Science Advisory Council, 2013).

The Department of Energy and Climate Change was established in the wake of the Climate Change Act 2008 and is responsible for developing policies designed to reduce emissions (Committee on Climate Change, no date a) whilst

also ensuring the provision of affordable fuel supplies for business and households to provide for transport, lighting, heating and their need for power. Its target is to cut greenhouse gas emissions by 80% by 2050 and achieve 15% of the demand for fuel from renewable sources by 2020 (base year not provided) (Department of Energy and Climate Change, 2014). The department is seeking to deliver these targets in a manner that protects the vulnerable and supports business growth (Department of Energy and Climate Change, 2014). It is supported by eight agencies including Ofgem, the Coal Authority, the Committee on Climate Change and four relevant to nuclear power (Gov.UK, no date b).

The Committee on Climate Change, established in the wake of the Climate Change Act 2008, is tasked with providing independent and balanced advice to the government. Its focus is on both reducing the emission of harmful gases and developing strategies to cope with the harmful effects of climate change (Committee on Climate Change, no date d).

Ofgem is a customer-facing agency that introduces regulation to protect consumers. Its principal role is to monitor power producers and mediate as required, and in seeking to protect the interests of consumers it promotes sustainability (Ofgem, 2014a). Ofgem manages government initiatives; those of relevance to small businesses are:

- Climate Change Levy exemption.
- Nondomestic Renewable Heat Incentive, long-term finance offered to those taking up renewable heat options such as biomethane.
- Feed-in tariff scheme, enabling those with an excess of renewable energy to feed it into the grid.

The Coal Authority is responsible for managing past and present coal extraction including the environmental effects of such activity (the Coal Authority, 2014). In that it is seeking to look after the interests of both society and the environment its activities relate to sustainable development, but they are outside the remit of this thesis.

The Department for Business, Innovation and Skills prioritises economic growth through investment in education and assistance in start-up businesses

and innovation. Further objectives are to promote global trade and productivity and reduce business-facing regulation (Department for Business, Innovation and Skills, no date). It is supported by 46 agencies of which the Council for Science and Technology and the UK Green Investment Bank are the only ones relevant to this study (Gov.UK, no date b).

The only environmental issue within the business support is a link to advice about “waste and environmental impact” (Gov.UK, no date a). This in turn provides a list of links to support pages for domestic and business use that offer a somewhat eclectic mix of support:

- Incentives, namely information about green taxes, the “Green Deal” and “renewable heat incentives”, the latter two being for domestic users.
- Information about land, from identifying protected areas to information about the responsibility for cleaning contaminated land.
- Waste management, relating to packaging obligations for both the designer and the supplier, locating hazardous waste disposal services and running landfill sites.
- Fuel use, namely vehicle consumption and emissions, locating energy assessors.
- Air quality with regard to prevention of pollution and maintenance of air conditioning units.

The links offering local support or information take the user to the relevant London borough or local authority.

The Department for Communities and Local Government is a government department tasked with supporting local government. It has developed the National Planning Policy Framework (Department for Communities and Local Government, 2012), designed to be an online guide for local authority planning and decision making (Gov.UK, 2014), and is supported by ten agencies including the Planning Inspectorate and the Building Regulations Advisory Committee (Gov. UK, No date b).

Appendix 33. Business-facing Environmental Policies

There is only one policy that expressly concentrates on the relationship between business and the environment:

Encouraging businesses to manage their impact on the environment

This policy is the principal vehicle that focusses support for business. This is being achieved through the following measures:

- Resource efficiency/environmental management.
 - Funding the Waste and Resources Action Programme (WRAP), a support agency to advise and support in the efficient usage of materials, water and energy.
 - Developing a “resource security action plan”, which includes partnering organisations to promote resource management, providing information and supporting innovation (DEFRA, 2012).
 - Ensuring public procurement supports sustainable production.
 - Providing tools for business such as EMS and emissions detectors/calculators.
 - Supporting the Royal Society for the encouragement of arts in the development of sustainability awards.
- Supporting the development of eco-innovations. In addition to the measures to generally support innovation, the government undertakes the following:
 - Promoting the European move to verify new technologies in order to assist in their attraction of funding and getting to market. Two technological strengths have already been established in Britain, one focussed on physics and the other on water technologies.
 - Assisting in the application for EU funding to support the development of clean technologies.
 - Running competitions for funding in order to encourage innovation.
- Supporting moves towards sustainable consumption. This is in response to the data suggesting that 75% of the carbon footprint is from the use of products and services. The government is seeking to establish where attention should be targeted.

- Publishing annual statistics relating to the carbon footprint.
- Providing evidence to demonstrate the geographic origin of carbon emissions.
- Assisting consumers in making informed choices.
 - Advising on the manner in which environmental performance can be advertised.
 - Supporting and enforcing the use of the EU energy efficiency labelling and eco-labelling.

The other policies that could influence business directly, such as reducing the carbon footprint, do not add any action that is not listed above (Gov.UK, 2014c).

Appendix 34. The Mayor of London's Climate Change Control Measures

Climate change control measures

The Mayor's plan (Mayor of London, 2009) involves the following:

In terms of open space and trees, which together with its lakes and rivers account for half of the area, London is a green city. Green space, however, including back gardens, has been eroded as pressure for housing is satisfied (Mayor of London, 2009). Conserving this valuable resource is a priority for the Mayor, who recognises the value of the regeneration of brown field sites and promoting allotment use for the local production of food (Mayor of London, 2009).

Managing climate swings

- Provide guidance for architects and developers explaining best available techniques (BAT) for including passive temperature control within buildings.
- Promote the use of trees. 10% of tree cover has been shown to moderate surface temperature by 3–4°C, mitigating the “heat island effect”.
- Help London boroughs conduct risk assessments.

Flood protection

- Manage green space in conjunction with flood plans.
- The East London Grid to be spread to all of London.
- Promote green technologies including tree planting, green roofs/walls and green space management to mitigate flood risk from rainfall.

Traffic

Transport produces one fifth of the CO₂ emissions in London, along with other health-impairing pollutants including nitrous oxide and particulates. The Mayor is taking action to reduce this which should also ease congestion, assisting in the ability for business travel. His initiatives in his strategy are:

- Encourage walking, improving signage, clearing obstacles from pavements and improving the safety and visual appeal of the streets.

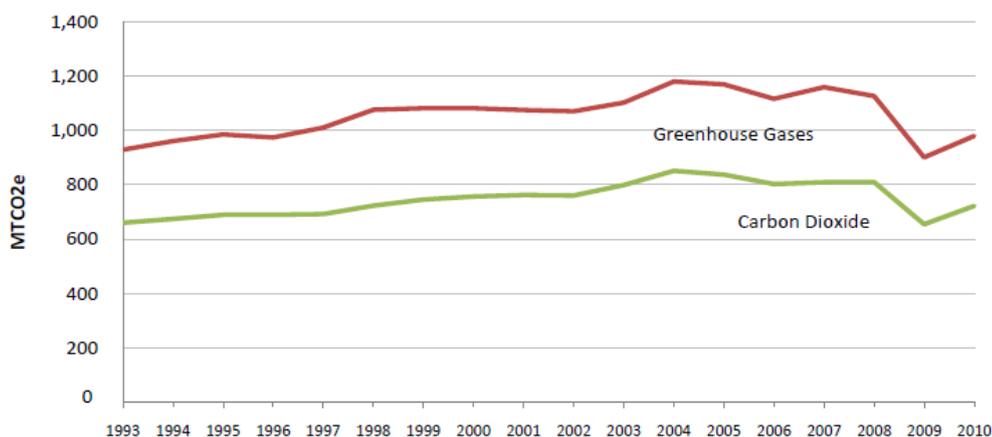
- Introduce cycle hire and cycle superhighways, cycle training and parking facilities.
- Work with the smarter travel unit, promote working from home, car clubs, school travel plans.
- Encourage the use of greener vehicles, leading the way with public transport and council-owned vehicles.
 - This action includes the provision of more electric car recharging points, which only has the benefit of moving the point of pollution to the energy provider unless all electricity is through renewable sources.
- Reduce congestion caused by poorly phased traffic lights and roadworks, including introducing a permit scheme for the utility companies so that their activities are regulated.

(All the above was sourced from Mayor of London, 2009)

Appendix 35. A Review of British Reporting of Environmental Performance

Extracts from DEFRA's Sustainable Development Indicators (2013):

Figure 9.2: Greenhouse gas emissions (million tonnes of carbon dioxide equivalent (MTCO₂e)) associated with UK consumption, UK, 1993 to 2010



Source: Defra.

Notes: The greenhouse gases figures for consumption emissions are currently classified as experimental statistics.

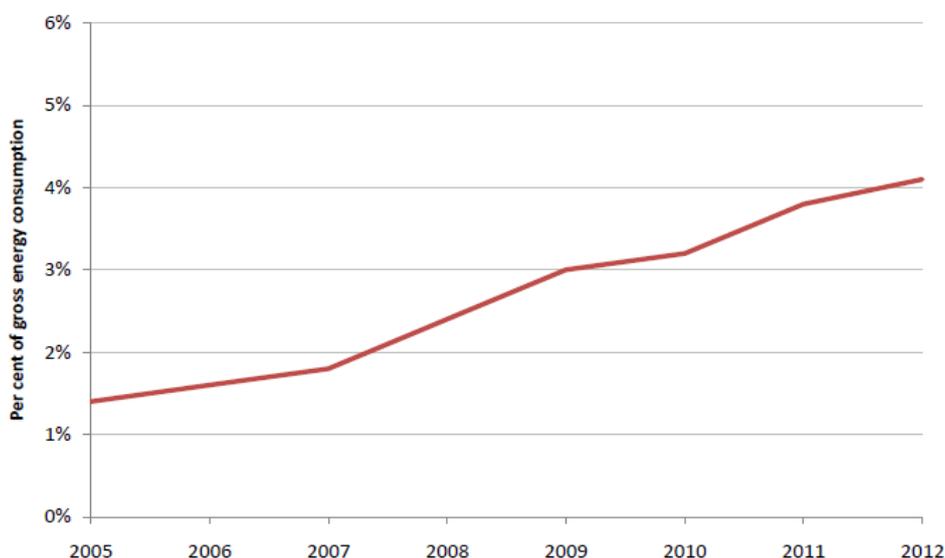
- Carbon dioxide emissions fell 15 per cent from their peak in 2004 although emissions rose 10 per cent between 2009 and 2010. The notable rise between 1993 and 2004 can be partially accounted for by our increased reliance on imports as there is some evidence that imported products are associated with a higher level of emissions
- Greenhouse gas emissions were 16 per cent lower in 2010 than in 2004. However, between 2009 and 2010, consumption emissions of all greenhouse gases increased nine per cent, and in 2010 emissions were five per cent higher than in 1993. It should be noted that emissions of greenhouse gases are currently classified as experimental.

Figure A35.1: DEFRA's report on carbon dioxide and greenhouse gas emissions (DEFRA, 2013)

Whilst factually correct, it is interesting to note that each bullet initially celebrated the dramatic fall since the peak of 2004. However, there was only a marginal fall between 2004 and 2008, and the significant drop that then occurred could have legitimately been attributed to the recession. The rise was partially attributed to the higher levels of imports, the explanation given that such foreign manufacture involved poorer technologies where emissions were concerned. No comment was raised beyond the factual reporting of the rise between 2009 and 2010. However, this was a significant rise, the steepest since records had started, and it needed to be assessed in the light of the desired recovery from the recession.

Similarly, reporting of renewable energy consumption also sidesteps highlighting mediocre performance. The chart presented in the report shows a dramatic increase and the factual account records the 2.7 percentage point increase. However, whereas the report for emissions elaborated on potential causes of change, the report on energy consumption is devoid of discussion. Figure A35.2 shows how the report points to a tripling of consumption of renewable energy but does not comment on the paucity of the total, being only 4.1% of the total energy consumed in the light of the 2020 target of 15% (the Green Investment Bank, 2014).

Figure 27.1: Proportion of gross energy consumption from renewable sources, UK, 2005 to 2012



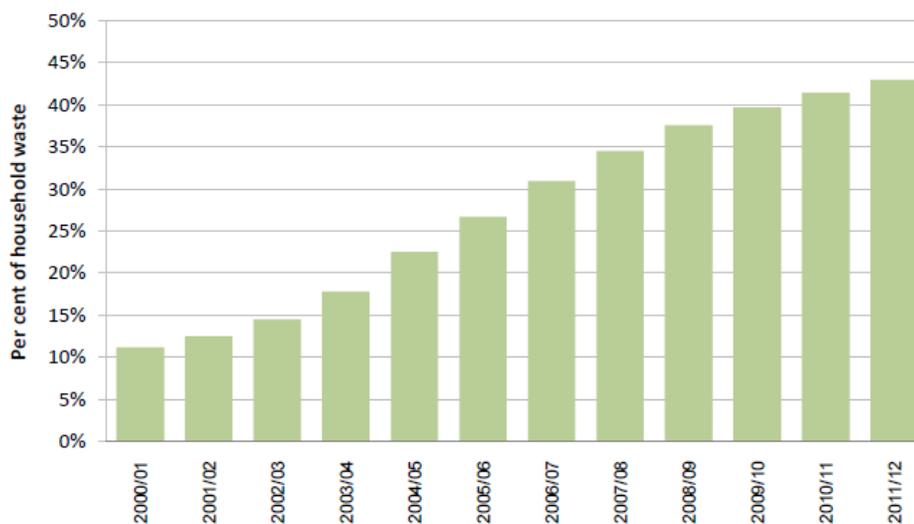
Source: DECC Energy Trends

Notes: Figures show overall renewable consumption as a percentage of capped gross final energy consumption using net calorific values (normalised), calculated using the methodology proposed in the 2009 Renewable Energy Directive.

- In the UK during 2012 4.1 per cent of final energy consumption was from renewable sources.
- Between 2005 and 2012 the proportion final energy consumption from renewable sources has almost tripled, from 1.4 per cent to 4.1 per cent. This represents a 2.7 percentage point increase.

Figure A35.2: DEFRA's reporting of renewable energy use (DEFRA, 2013)

In contrast to this, when reporting on the recycling of waste, DEFRA did include reference to a more concerning trend. Figure A35.3 shows how the increase in recycling is forming an “s” curve suggesting the rate of increase is tailing off. This has been acknowledged in the report.

Figure 29.1: Household waste recycling rate, England, 2000/01 to 2011/12

Source: WasteDataFlow.

Note: Indicator is under development and will eventually cover the UK and be published by calendar year.

- Between 2000/01 and 2011/12 the household waste recycling rate increased from 11 per cent to 43 per cent.
- The amount of waste recycled, composted or reused in 2011/12 was 10.7 million tonnes out of a total of 25.6 million tonnes collected from households.
- The increase in 2011/12 was the smallest for ten years with the rate of increase slowing since its peak around 2005.

Figure A35.3: DEFRA's report on household waste (DEFRA, 2013)

Appendix 36. The Development of Wind Power in the UK

1993 saw a change in the approach to governmental influence on the development of new technologies brought about by the realisation that a long-term view was needed, in what was referred to as technology foresight. To achieve this the Delphi technique, involving 10,000 industrialists, engineers and scientists, was adopted (Elliott, 1996). This is a process by which two rounds of questionnaires are distributed to experts. Anonymity enables them to express their opinion freely and it is hoped that this enables them to express opinions that might not be otherwise aired. The panel is given all of the results of the first round to examine before the questionnaire process is repeated, facilitating a more informed response (Cuhls, no date).

Completed in 1996, the process was judged to be both too ambitious and somewhat constrained. Its principal flaw lay in seeking to identify the most viable technology for subsequent development, when it was argued that there was a need for further research and development that would facilitate the development of a wider range of prospective technologies from which to select potential winners (Elliott, 1996).

At the time there had been significant reductions in departmental budgets and the result of the exercise was seen as an excuse to target expenditure, cutting R&D funding for some sectors. In order to achieve faster payback from investment, funding moved from R&D to the more near-to-market position of demonstration and diffusion, limiting the scope of technologies that could be considered to that of wind power and geothermal production, wave power already receiving some funding from Europe (Elliott, 1996).

In targeting support for the wind power industry, the government recognised the benefit of supporting the development of large-scale turbines as opposed to the small-scale ones developed by the Danes on the premise that development of the less costly smaller turbines was achievable without government support (Elliott, 1996).

The Fossil Fuel Levy was problematic. Initially, 98% funded nuclear power development and little was left for the remaining energy producers. It was raised through an extra tax paid by consumers which was deemed illegal by the

European Commission, being considered a subsidy that distorted the market. This led to an end date of 1998 that limited the period in which producers could reclaim their capital expenditure, further alienating the technologies that were not close to market (Elliott, 1997).

Appendix 37. Financial Support for Business

Within the 475 finance packages offered to SMEs in the UK are 17 that encourage sustainable development:

- Loans to assist in innovation and waste reduction.
- Loans that should be match funded encouraging development of eco-businesses in the South-East.
- Interest-free loans in Northern Ireland to promote energy efficiency.
- “Enhanced capital allowances” that provide reductions in tax to cover the cost of specific water and energy reduction technologies.
- Five initiatives offering grants to businesses in Wales, the east of England and four other counties for installing carbon reduction technologies or obtaining advice about suitable technologies.
- Grants to cover part of the cost of selecting and installing low-energy technologies.
- Grants for sustainable aquaculture and fisheries.
- Grants to support eco-innovation.
- Grants to encourage Scottish businesses to transport goods by rail or water.
- Grants for SMEs to invest more in recycling schemes in Wales.
- Funding to help Welsh manufacturers include recycled materials in their operations.
- Funding to support the generation of renewable energy in the Orkneys.
- Support to obtain consultancy relating to sustainability.

(Gov.UK, no date h)

Appendix 38. The London Boroughs

Barking and Dagenham

Controlling party	Labour (94.1% majority)
Low-carbon zone	Yes
Budget per capita	£864.47 (London Councils, 2014)
Sustainability standard	<p>Nottingham Declaration on Climate Change by 2005 (IdeA Knowledge, 2006).</p> <p>Awarded the Beacon Award for work relating to climate change (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013o).</p>
Population density	20.72151 people per acre (5th lowest in the sample)
Business type	<p>Majority of local businesses are SMEs (London Borough of Barking and Dagenham, 2013c). 95% less than 20 employees; 78% with 4 or fewer. The largest sector is “construction” followed by “retail”, “motor trade, transport and storage”, “professional, scientific and technical”, and “production” (Federation of Small Businesses, 2010a).</p>
Federation of Small Businesses report	<p>35% of businesses surveyed did not believe the council was interested in their needs. 15% had a sympathetic response and 15% had been contacted by the council for opinions (Federation of Small Businesses, 2010a).</p>
Strategy	To work with business and showcase best available technologies (London Borough of Barking and Dagenham, 2005).
Business-facing support	<p>Running part-EU-funded Greening Business Project:</p> <p>12 hours of consultations offering money/environmental saving advice (London Borough of Barking and Dagenham, 2013d).</p> <p>Free advice on setting up and EMS/ISO 1400 (London Borough of Barking and Dagenham, 2013d).</p> <p>Offering free water-saving devices (London Borough of Barking and Dagenham, 2013e).</p> <p>Awards include one for green business (2013g).</p> <p>Barking centre being developed into a low-carbon zone (London Borough of Barking and Dagenham, 2006; London Borough of Barking and Dagenham, no date) including office space.</p> <p>Developers provided with planning advice and must submit a “sustainability statement” (London Borough of Barking and Dagenham, 2013i).</p> <p>Starting to turn Dagenham Dock into a green business area with a vision for it to be entirely sustainable based on a closed loop concept; businesses must prove their attention to the triple bottom line. EMS will apply to the entire area. River transport (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013f; London Borough of Barking and Dagenham, 2013n).</p> <p>Attracting businesses that are key to sustainability such as recycling plastics (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013f).</p>

Activities to support business performance including educating the market	<p>Developing brown field sites into “sustainable” housing and business areas (London Borough of Barking and Dagenham, no date; London Borough of Barking and Dagenham, 2013q).</p> <p>Developing district heating and causing new developments to have the facility to upgrade as new technologies are adopted (e.g. heat exchange) and include solar panels.</p> <p>New developments currently 75% more fuel-efficient than average properties (TGE Group, no date; London Borough of Barking and Dagenham, 2013p).</p> <p>Encouraging residents to become engaged (London Borough of Barking and Dagenham, 2013j).</p> <p>Educating residents in low-carbon and low-water technologies and green roofs (London Borough of Barking and Dagenham, 2013i).</p> <p>Holding environment festivals – scope for knowledge exchange. Wide range of schemes.</p> <p>Funding applications for internal projects must include reference to sustainability issues.</p>
Future plans	<p>Planning more resilient infrastructures including water-saving technologies, an educational eco-centre. Encouraging walking, cycling, car club and public transport use. Promoting electric car¹ (London Borough of Barking and Dagenham, 2013h).</p> <p>Decentralised energy for “London riverside” in conjunction with neighbouring boroughs (Energy for London, no date).</p> <p>London Thames Gateway Heat Network (Energy for London, no date).</p> <p>Mayor’s Anaerobic Digestion Plant: creating power and compost (Energy for London, no date).</p>
Website	<p>Links for both “Business” and “Environment” on the home page.</p> <p>“Green” business links from Business support page:</p> <p>“Greening Business Support project”</p> <p>“Green industry” (the Dagenham Dock development)</p> <p>“Town Centre Management” includes EMS for the town centres in the borough</p> <p>Business support on a separate site. No apparent links to environmental issues, although support is referred to in other pages.</p> <p>There is a link to TURaS which as yet offers no tangible support.</p> <p>Three clicks to links to the most useful page of support but not linked to the business pages. Environment>Environmental sustainability>Greening your business: information on energy. Waste, water, transport, procurement and EMS (EMAS/ISO14001).</p> <p>Business support pages good: examples of potential savings. Very useful advice across a range of activities (London Borough of Barking and Dagenham, 2013k). Link to the environmental project (2013l) but the link changed dependent upon the page being visited, and this meant that pages were found by accident rather than design (e.g. for the Dagenham Docks project).</p>
Language	<p>“Environment” referred to the green environment (London Borough of Barking and Dagenham, 2013r).</p> <p>Also used “environmental sustainability”, “green environment”.</p> <p>Referred to “greening” the business and travel (London Borough of Barking and Dagenham 2013e; 2013h).</p>

¹ The electric car cannot be considered a sustainable technology until we have renewable electricity provision.

External support	Carbon Trust, Energy Savings Trust, Envirowise, WRAP, London Remade. No links; just mentioned in the advice.																																	
Targets	<p>Energy Strategy (2005).</p> <p>Carbon reduction from its buildings and operations: 20% of 2010/11's emissions by 2016 (London Borough of Barking and Dagenham, 2012). The document stated the plan fell short of the target by 20%.</p> <p>No annual reports on attainment of targets found more recent than 2009/10.</p> <p>Barking and Dagenham ranks 6th in the sample with respect to recycling (24th of 32 London boroughs) and is the worst for residual waste (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 1037, Barking and Dagenham ranks 6th in the sample (23rd out of the 32 London boroughs) in the Environment Agency's carbon rankings for reporting year 2011/12 (2013).</p>																																	
Documents	<p>174 documents included the term "sustainability"</p> <table> <tr> <td>Policy/strategy: 4</td> <td>Transport: 1</td> <td>Waste: 3</td> </tr> <tr> <td>Building control: 3</td> <td>Pollution: 1</td> <td>Energy/carbon: 5</td> </tr> <tr> <td>Rivers/floods: 2</td> <td>Air quality: 1</td> <td>Business: 2</td> </tr> <tr> <td>General: 6</td> <td></td> <td></td> </tr> </table> <p>92 documents included the term "sustainable"</p> <table> <tr> <td>Policy/strategy: 3</td> <td>Transport: 1</td> <td>Waste: 1</td> </tr> <tr> <td>Building control: 1</td> <td>Pollution: 1</td> <td>Energy/carbon: 5</td> </tr> <tr> <td>Rivers/floods: 1</td> <td>Air quality: 1</td> <td>Business: 4</td> </tr> <tr> <td>General: 1</td> <td></td> <td></td> </tr> </table> <p>1792 documents included the term "environment"</p> <table> <tr> <td>Policy/strategy: 3</td> <td>Transport: 2</td> <td>Waste: 1</td> </tr> <tr> <td>Building control: 2</td> <td>Pollution: 2</td> <td>Air quality: 1</td> </tr> <tr> <td>Business: 2</td> <td>Resilience: 1</td> <td>General: 2</td> </tr> </table>	Policy/strategy: 4	Transport: 1	Waste: 3	Building control: 3	Pollution: 1	Energy/carbon: 5	Rivers/floods: 2	Air quality: 1	Business: 2	General: 6			Policy/strategy: 3	Transport: 1	Waste: 1	Building control: 1	Pollution: 1	Energy/carbon: 5	Rivers/floods: 1	Air quality: 1	Business: 4	General: 1			Policy/strategy: 3	Transport: 2	Waste: 1	Building control: 2	Pollution: 2	Air quality: 1	Business: 2	Resilience: 1	General: 2
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Barnet

Controlling party	Conservative (60.3% majority)
Low-carbon zone	No
Budget per capita	£723.12 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change by 2005 (IdeA Knowledge 2006)
Population density	16.45011 people per acre (2nd lowest in the sample)
Business type	97% fewer than 20 employees; 83% with 4 or fewer. The largest sector is "professional, scientific and technical", followed by "information and communications", "construction", "retail" and "property" (Federation of Small Businesses, 2010b).
Strategy	Little beyond the minimum for either the business or the resident.
Federation of Small Businesses report	30% of businesses surveyed did not believe the council was interested in their needs, although 10% had had a sympathetic response and 5% had been contacted by the council for opinions (Federation of Small Businesses, 2010b).

Business-facing support	<p>The business pages have a link to free advice from Netregs (London Borough of Barnet, no date a).</p> <p>No recycling services are currently offered to businesses but the council's webpages include waste reduction advice and details of external agencies (London Borough of Barnet, no date b).</p> <p>Environmental forum.</p> <p>There is a simple statement on the business pages that the council monitors pollution (London Borough of Barnet, no date e) and "has powers to tackle noise pollution" (LLB, no date c). In 2001 the area became an "Air Quality Management Area" due to rising traffic pollution and measures were tightened in 2010 due to a failure to meet the required standards (London Borough of Barnet, no date d).</p> <p>Big Society Innovation Bank (2013–14) invited projects that included the category of supporting the environment, but the successful applicants related to other categories (London Borough of Barnet, no date g).</p> <p>A furniture recycling project is underway, principally with a focus on supporting financially challenged residents (LLB, no date e). A knock-on benefit is that of employment opportunities.</p> <p>In line with the Mayor's plan: initiatives within schools disseminate the value of recycling (LLB, no date h) and include development of travel plans (London Borough of Barnet, no date i).</p> <p>Wormeries promoted (London Borough of Barnet, no date k).</p>
Activities to support business performance including educating the market	<p>Household advice given on its flood relief page (London Borough of Barnet, no date f), sustainable design standards (London Borough of Barnet, no date j) and the development of travel plans for schools (London Borough of Barnet, no date i) clearly indicate the London Borough of Barnet will not go beyond its legal obligations.</p> <p>District heating proposed (but no evidence of completion found).</p>
Future plans	<p>The sustainable management plan (London Borough of Barnet, 2012a; London Borough of Barnet, 2012b) reveals little proactive management of issues such as carbon, the term only appearing four times in the latter document, once to report that the borough failed to meet targets, once to indicate the source of carbon and the other times referring to the need to manage new builds.</p>
Website	<p>The words "environment" or "sustainability" are not visible on the home page. The closest are "conservation" and "regeneration" but these links contained little if anything relating to sustainability.</p> <p>Searching through Google revealed a link to the charity London Sustainability Exchange within the council's pages. Not easily found.</p>
Language	<p>The term "environment" related mostly to the local environment.</p> <p>"Greening" was used in conjunction with planning policy for fleet vehicles and also tree planting.</p>
External support	<p>Barnet Furniture Centre, ReStore Community Projects, Freecycle, Netregs.</p> <p>Apart from Netregs, there were no links.</p>

Targets	<p>The environmental policy applies to council activities and relates to travel, procurement, waste, energy and water use.</p> <p>Action plans and quarterly reviews reveal that the only environmental targets focus on the reduction of waste and traffic management. (London Borough of Barnet, no date k)</p> <p>According to their most recent overview of progress the target for waste has not been achieved. The performance has stagnated between a reduction of 29–35% and the council is now seeking other initiatives (London Borough of Barnet, 2011). This appeared to be ongoing in 2012/13 and the cause attributed to colder weather meaning that less kerbside waste generated from gardening was collected (London Borough of Barnet (2013). The London Borough of Barnet is 16th out of 32 London boroughs in the percentage of waste that is recycled and 27/32 for residual waste (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 579, Barnet ranks 10th in the sample (31 out of the 32 London Boroughs) in the Environment Agency's Carbon rankings for reporting year 2011/12 (2013)</p>																									
Documents	<p>Sustainable: 6700 documents</p> <table> <tr> <td>Policy / strategy: 6</td> <td>Transport: 2</td> <td>Air quality: 1</td> </tr> <tr> <td>Building Control: 4</td> <td>Pollution: 2</td> <td>Business: 1</td> </tr> </table> <p>Sustainability: 5260 documents</p> <table> <tr> <td>Policy / strategy: 2</td> <td>Building controls: 2</td> </tr> <tr> <td>Business Recycling: 1</td> <td>Household recycling: 13</td> </tr> </table> <p>Environment: 45100</p> <table> <tr> <td>Policy / strategy: 2</td> <td>Transport: 2</td> <td>Waste: 10</td> </tr> <tr> <td>Building controls: 4</td> <td>Rivers /Flood risk: 1</td> <td></td> </tr> </table> <p>(Filtered to Information 272 documents)</p> <table> <tr> <td>Waste / recycling: 7</td> <td>Transport: 2</td> <td>Innovation: 2</td> </tr> <tr> <td>Building / Construction: 1</td> <td>Air quality: 1</td> <td>Rivers /Flood risk: 2</td> </tr> <tr> <td>Planning / permits: 3</td> <td></td> <td></td> </tr> </table>	Policy / strategy: 6	Transport: 2	Air quality: 1	Building Control: 4	Pollution: 2	Business: 1	Policy / strategy: 2	Building controls: 2	Business Recycling: 1	Household recycling: 13	Policy / strategy: 2	Transport: 2	Waste: 10	Building controls: 4	Rivers /Flood risk: 1		Waste / recycling: 7	Transport: 2	Innovation: 2	Building / Construction: 1	Air quality: 1	Rivers /Flood risk: 2	Planning / permits: 3		
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Bromley

Controlling party	Conservative (88.3% majority)
Low carbon zone	No
Budget per capita	£649.75 (<i>London councils, 2014</i>)
Sustainability standard	Nothing apparent
Population density	8.274757 people per acre (The lowest)
Usage	60% greenbelt and an "area of outstanding beauty". 6 sites of special scientific interest. (London Borough of Bromley, 2009). 96% less than 20 employees; 82% with 4 or fewer. The largest sector is "professional, scientific and technical", followed by "information and communications" construction and business administration (Federation of Small Businesses, 2010c)
Federation of Small Business report	5% of surveyed businesses considered their queries were sympathetically handled. None were contacted by the borough. (Federation of Small Businesses, 2010c)
Comment	The borough of Bromley produced detailed quarterly reports.
Strategy	Environmental needs are referred to only as a response to legislation (London Borough of Bromley, 2009). Bromley is referred to as having the cleanest and greenest environment in London, but "green" is open spaces and the clean aspect is largely

	<p>aesthetics and local environment facing.</p> <p>States that “Bromley’s approach is to monitor and report on greenhouse gas emissions associated with energy use” in a range of sectors (London Borough of Bromley, 2013)</p>
Business facing support	<p>Very little. Most sites in the business pages are largely household facing. Financial incentives for the installation of renewable electricity devices. Bromley’s environmental awards: Nothing since 2012</p>
Activities to support business performance including educating the market.	<p>Business pages contain nothing overtly relating to sustainability issues. Apart from a link to commercial waste services (London Borough of Bromley, 2014b).</p> <p>Within that page is a link to business recycling services.</p> <p>“Environment and planning” is listed as a link under “Business Support and Advice”, and the key topics are parks/open spaces, planning and recycling, rubbish and waste, but not business-facing (London Borough of Bromley, 2014c).</p> <p>A few links to external agencies.</p> <p>Waste and recycling facilities offered.</p> <p>The legal position relating to pollution is provided.</p> <p>“Transport” is all about aesthetics, safety and parking although there are links to cycling and walking that provide information about rights of way.</p> <p>“Action against climate change” just contained links to Directgov, Energy Savings Trust and the Carbon Trust. It reported substantial carbon savings and provided a link to the council’s progress report. This just related to council premises and activities (London Borough of Bromley, 2014d).</p> <p>Distributes an “Environment matters” paper to all residents. Not that helpful for business.</p>
Future plans	<p>None evident. The Bromley carbon report only refers to the need to adapt to changing legislation. There was nothing apparently proactive (London Borough of Bromley, 2009).</p> <p>The page for environmental projects and campaigns lists numerous awards and a campaign undertaken by resident to promote real nappies (London Borough of Bromley, 2014f).</p>
Website	<p>Home page has a link for “Business”, “Environmental planning”, and two related to waste (London Borough of Bromley, 2014a).</p> <p>“Community and living” link contains information on pollution and waste collection.</p> <p>Downloads offered on many pages but nothing to indicate their content until the link is opened.</p> <p>“Environment matters” is a document distributed to all households in the borough advising on waste and recycling (London Borough of Bromley, 2014g).</p> <p>Sustainability documents are in the “Council and democracy” links.</p> <p>“Environment and Planning” has a link to the above two pages.</p> <p>The three downloads in the sustainability section are the council’s carbon footprint progress reports.</p> <p>“Environmental education” relates to ecology.</p>
Language	<p>“Environment” largely focussed on the “local” and “trading environment” (London Borough of Bromley, 2014c).</p> <p>“Sustainability” related to carbon emissions alone (London Borough of Bromley, 2014d).</p>

External support	Directgov, Energy Savings Trust, Carbon Trust
Targets	<p>25% carbon reduction, the base year being 2006/7 but the target date not specified. Carbon emissions dropped significantly in 2009/10 (recession year) but rose by 4% in the year between 2011/12 and 2012/13.</p> <p>Reports having one of the best recycling rates in London but still one of the worst-performing boroughs where waste generation is concerned. (London Borough of Bromley, 2009).</p> <p>The carbon report only referred to the need to adapt to changing legislation. There was no proactive comment (London Borough of Bromley, 2009).</p> <p>The council report identifies a shortfall of 11% in seeking to achieve its carbon reduction target. It attributes not achieving the target to overambition, an inability to control schools' consumption and a cold winter (London Borough of Bromley, 2013).</p> <p>Waste: the borough is the best-performing borough in the sample where recycling is concerned (2nd out of 32 London boroughs) and 2nd for residual waste (5th out of 32 London boroughs) (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 1472, Bromley ranks 2nd in the sample (7th out of the 32 London boroughs) in the Environment Agency's carbon rankings for reporting year 2011/12 (2013).</p>
Documents	<p>315 documents included the term "sustainable"</p> <p>Policy/strategy: 15 Flood risk: 11 Building control: 5 Awards: 24 Transport: 4</p> <p>650 documents included the term "sustainability"</p> <p>Some webpage links had no content, such as "sustainability news" (London Borough of Bromley, 2014e).</p> <p>Policy/strategy: 2 Building control: 1 Flood risk: 9 Awards: 18 Transport: 2 Carbon reports:5 General: 1</p> <p>1250 documents included the term "environment"</p> <p>Awards: 56 Waste: 1 Transport: 1 Permit applications: 4 Building control: 6 Business: 1</p>

Greenwich

Controlling party	Labour (78.4% majority)
Low-carbon zone	No
Budget per capita	£983.26 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change (2008)
Population density	21.36104 people per acre (6th in the sample)
Business type	IT and communications, office and light industry. Tourism, creative industries, retail construction and manufacturing (Royal Borough of Greenwich, 2014e). 96.5% fewer than 20 employees; 82.5% with 4 or fewer (Federation of Small Businesses, 2010d).
Federation of Small Businesses report	35% of businesses surveyed did not believe the council was interested in their needs, and none reported a sympathetic response or had been contacted by the council for opinions (Federation of Small Businesses, 2010d).
Strategy	<p>Encourage the design of buildings and environments that minimise energy usage.</p> <p>Minimise waste and achieve higher recycling rates with the help of local residents and visitors.</p>

	<p>Develop clean energy sources, such as bio-fuels and hydrogen. (Royal Borough of Greenwich, 2012a)</p> <p>Combined heat and power/cooling to be mandated for all new developments with connection to district heating when not feasible, and biomass to be used where a sustainable source is available within 100km.</p> <p>Investigate thermal storage.</p> <p>Promote the development of renewable power and review potential for wind turbines and photovoltaic panels.</p> <p>Help businesses develop better practice where CSR is concerned, including energy usage.</p> <p>Address transport-based pollution, including by insisting that new developments are linked to a robust public transport provision. (Royal Borough of Greenwich, 2012b)</p>
Business-facing support	<p>Extensive, but largely in the form of links to external support (see below). No loans are provided but businesses are directed to other sources of support (Royal Borough of Greenwich, 2014f).</p> <p>Advice of sources of support provided for businesses seeking to manage their environmental footprint (Royal Borough of Greenwich, 2014g).</p> <p>Provides advice to businesses on what can be recycled (Royal Borough of Greenwich, 2014h). Also offers recycling facilities.</p>
Activities to support business performance including educating the market	<p>The Queen's Award for Enterprise in Sustainable Development (Royal Borough of Greenwich, 2014d).</p> <p>Greenwich Peninsula designated a low-emission zone by the borough council (Royal Borough of Greenwich, 2014l).</p> <p>Electric vehicle recharging points installed (Royal Borough of Greenwich, 2014i).</p>
Future plans	<p>To improve transport links between residential areas and business.</p> <p>To improve walking, cycling and public transport routes.</p> <p>To reduce water and power consumption.</p> <p>To instigate low- and zero-carbon zones.</p> <p>To improve waste management. (Royal Borough of Greenwich, 2008)</p>
Website	<p>Links to both "Business" and "Environment" pages on the home page.</p> <p>"Business and the environment" link three clicks from home page on "Business support and advice".</p> <p>Website business-friendly. Each subject has links to external agencies and documents for downloading.</p>
Language	<p>"Environment" largely related to local environment and conservation (Royal Borough of Greenwich, 2014j), but "business and the environment" pages were focussed on the green environment (Royal Borough of Greenwich, 2014k).</p>

External support	<p>Students' Union University of Greenwich Sustainability Hub (Royal Borough of Greenwich, 2014a)</p> <p>TFL: Free cycle stands (Royal Borough of Greenwich, 2014b)</p> <p>ReEnergise SmartEnergy Finance: commercial loans targeted at specific sectors of SME (Royal Borough of Greenwich, 2014c)</p> <p>The government's Waste and Environmental Impact webpage (Gov.UK, no date e)</p> <p>Evocate: a project commissioned by ERDF and the Environment Agency in conjunction with Middlesex University that expired in 2012 but provides resources and case studies</p> <p>Groundwork: a charity that assists businesses of all sizes in developing or joining local CSR projects focussed on societal and environmental need (Groundwork, 2014)</p> <p>London Remade: an organisation promoting sustainable London, highlighting the issues it faces (London Remade, no date)</p> <p>Environment Agency business regulations (Royal Borough of Greenwich, 2014f)</p> <p>123 Recycle for Free (Royal Borough of Greenwich, 2014h)</p> <p>Industrial emissions guidance (DEFRA) (Royal Borough of Greenwich, 2014f)</p> <p>HM Gov and HSBC publication "Can you afford not to? Business success in a low carbon community", dated 2009 and removed during the process of data collection</p> <p>Further reference to: Business Link, Carbon Trust, Big London Energy Switch, Energy Savings Trust, Zipcar, Netregs</p>																								
Targets	<p>80% reduction of carbon by 2050 (base year 2005) (Royal Borough of Greenwich, 2012b).</p> <p>25% reduction of greenhouse gases by 2015 (base year 2009/10). As of July 2012, 19% reductions reported (Royal Borough of Greenwich, 2012a).</p> <p>All new homes to be zero-carbon by 2016 and all new builds by 2019 (Royal Borough of Greenwich, 2012b).</p> <p>The borough performed 3rd-best in the sample for recycling (10th out of the 32 London boroughs) and 5th in the sample for residual waste (18th of 32 London boroughs) (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 963, Greenwich ranks 8th in the sample (27 out of the 32 London boroughs) in the Environment Agency's carbon rankings for reporting year 2011/12 (2013).</p>																								
Documents	<p>These appeared to be low in number, but this was in part because the searches identified webpages with a number of reports that could be downloaded rather than listing them individually.</p> <p>524 documents included the term "environment"</p> <table border="0"> <tr> <td>Business support: 3</td> <td>Business awards: 1</td> <td>Emissions: 1</td> </tr> <tr> <td>Policy/strategy: 13</td> <td>Electric vehicles: 1</td> <td>Energy: 1</td> </tr> <tr> <td>Waste/recycling: 7</td> <td>Building control: 6</td> <td>Pollution: 5</td> </tr> <tr> <td>Environmental crime: 2</td> <td>Sustainability: 1</td> <td></td> </tr> </table> <p>56 documents included the term "sustainability"</p> <table border="0"> <tr> <td>Awards: 2</td> <td>Business:1</td> <td>Suppliers: 1</td> </tr> <tr> <td>Policy/strategy: 1</td> <td>Transport: 3</td> <td></td> </tr> </table> <p>49 documents included the term "sustainable"</p> <table border="0"> <tr> <td>Policy/strategy: 7</td> <td>Procurement: 3</td> <td>Sustainability: 2</td> </tr> <tr> <td>Building control: 4</td> <td>Electric vehicles: 1</td> <td>Business: 1</td> </tr> </table>	Business support: 3	Business awards: 1	Emissions: 1	Policy/strategy: 13	Electric vehicles: 1	Energy: 1	Waste/recycling: 7	Building control: 6	Pollution: 5	Environmental crime: 2	Sustainability: 1		Awards: 2	Business:1	Suppliers: 1	Policy/strategy: 1	Transport: 3		Policy/strategy: 7	Procurement: 3	Sustainability: 2	Building control: 4	Electric vehicles: 1	Business: 1
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Hackney

Controlling party	Labour (87.7% majority)
Low-carbon zone	No
Budget per capita	£1248.80 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change (2008) (Hackney Green Party, 2014)
Population density	51.84312 people per acre (2nd highest in the sample)
Business type	48% “professional, scientific, technical, information and communication” 14% “retail and hospitality” 14% “art, entertainment and leisure” (London Borough of Hackney, 2013c) 96% fewer than 20 employees; 80% with 4 or fewer (Federation of Small Businesses, 2010e)
Comment	Hackney Borough Council reports that it is one of the greenest boroughs but attributes it to the low economic welfare of the residents, not being able to afford cars. Some activities undertaken in conjunction with other North London boroughs. Hackney has a Sustainable Environment Board that used to meet quarterly. Its remit was addressing sustainability at a social rather than an economic level. In 2013 it moved to a maximum of half-yearly public meetings. Team Hackney has a separate website that is not apparent on their home page. It was relaunched in 2013 and appears to concentrate on social rather than environmental activities within Hackney (London Borough of Hackney, 2014e).
Federation of Small Businesses report	10% of businesses surveyed did not believe the council was interested in their needs, although 15% had had a sympathetic response and 25% had been contacted by the council for opinions (Federation of Small Businesses, 2010e).
Strategy	Waste: managed through North London waste plan. Consultation for the new strategy was commenced in 2013 with a view to adoption in 2017. To offer businesses low-cost units and ensure buildings are built or retrofitted to perform well with respect to energy demand (London Borough of Hackney, 2013f). Nothing was overtly directed towards knowledge exchange.
Business-facing support	Largely through Green Light North London. Commercial waste and recycling facilities offered. A tool for workplace travel plans (London Borough of Hackney, 2014b) including advice and promotion of cycle stands (London Borough of Hackney, 2011). Advice on waste reduction and an offer of a waste management plan for events. Recycling advice facilities priced at half that of landfill. Glass collection (London Borough of Hackney, 2010).
Activities to support business performance including educating the market	Business award for “Best sustainable business” (London Borough of Hackney, 2014c). Overt management of pollution, land, air and water (London Borough of Hackney, 2013b). Comprehensive energy saving tips (London Borough of Hackney, 2014d). Ran a pilot project encouraging low-carbon living (London Borough of Hackney, 2013d).
Future plans	The latest scoping report for the North London Waste Plan incorporated

	the need to consider resource management, pollution, biodiversity, air and water quality, energy security, transport, and mitigate the effects of global warming (NLWP, 2014).																		
Website	<p>The home page has links to both environment and business.</p> <p>“Green business” is a link in a list on the business page, but is not one of the featured links with a picture in the centre of the page (London Borough of Hackney, no date a).</p> <p>Business support pages refer to “green business” at the foot. No reference to sustainability or similar (London Borough of Hackney, 2014a).</p> <p>“Do Green Business” provides information about waste and recycling and directs users to Green Light North London (London Borough of Hackney, 2014b).</p> <p>Advice and facilities for handling redundant furniture (London Borough of Hackney, 2013a).</p> <p>A document providing advice about reducing commercial waste in the refuse section (London Borough of Hackney, 2014g).</p>																		
Language	Used the word “green” rather than “sustainable” (London Borough of Hackney, 2014b) and referred to “regeneration” when discussing restoring the local environment (London Borough of Hackney, 2014f).																		
External support	<p>Green Light North London: part ERDF funded in collaboration with the London boroughs of Islington and Haringey. Offers broad range of free support: waste management, carbon control, EMS. Available for medium and micro-businesses (Green Light North London, 2012)</p> <p>North London Waste Authority booklet offering business-centred advice on waste reduction (NLWA, 2010)</p> <p>Recycle for London</p> <p>WRAP</p> <p>London Sustainability Exchange: including toolkits for small businesses and a link to Ecovate, where further support for small businesses can be found</p> <p>London Re-use Network: will also repair goods (London Borough of Hackney, 2013a)</p>																		
Targets	<p>Targets relate to increased biodiversity, cleanliness of the streets, carbon and waste. Hackney exceeded its target of 13% commercial waste recycled by 0.8% (London Borough of Hackney, 2013e).</p> <p>However, it is 8th in the sample where recycling is concerned (26th out of 32 boroughs) and 7th with respect to residual waste (22nd out of 32 boroughs) (London Borough of Wandsworth, 2014m).</p> <p>It had a target of a 15% reduction in carbon emissions.</p> <p>With a weighted score of 1382, Hackney ranks 4th in the sample (14th out of the 32 London boroughs) in the Environment Agency’s carbon rankings for reporting year 2011/12 (2013).</p>																		
Documents	<p>1140 documents included the term “sustainability”, although the search was capped at 100. Scoping reports were numerous but have not been included.</p> <table border="0"> <tr> <td>Waste: 1</td> <td>Air pollution: 1</td> <td>Action plan: 1</td> </tr> <tr> <td>Strategy: 5</td> <td>Sustainability: 5</td> <td>External support: 1</td> </tr> <tr> <td>Procurement: 2</td> <td>Transport: 2</td> <td></td> </tr> </table> <p>1830 documents included the term “sustainable”, although the search was capped at 100.</p> <table border="0"> <tr> <td>Strategy: 4</td> <td>Sustainable environment group: 6</td> <td></td> </tr> <tr> <td>Procurement: 2</td> <td>Transport: 4</td> <td>Plan and review: 2</td> </tr> <tr> <td>Air pollution: 1</td> <td>Awards: 1</td> <td>External support: 2</td> </tr> </table>	Waste: 1	Air pollution: 1	Action plan: 1	Strategy: 5	Sustainability: 5	External support: 1	Procurement: 2	Transport: 2		Strategy: 4	Sustainable environment group: 6		Procurement: 2	Transport: 4	Plan and review: 2	Air pollution: 1	Awards: 1	External support: 2
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	<p>5770 documents included the term “environment”, although the search was capped at 100.</p> <p>Sustainable environment group: 4</p> <p>Pollution: 8 Action plan: 1 Sustainability: 3</p> <p>Business: 2 External support: 2</p>
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Kensington and Chelsea

Controlling party	Conservative (77.8% majority)
Low-carbon zone	No
Budget per capita	£1192.80 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change, signed 2007 (Royal Borough of Kensington and Chelsea, 2014a)
Population density	51.93835 people per acre (highest in the sample and second highest in London)
Business type	<p>Wealthy and white collar: “Business services, retail, hospitality, real estate, medical, personal service” (Royal Borough of Kensington and Chelsea, 2014b).</p> <p>97% fewer than 20 employees; 83% with 4 or fewer. The largest sector is “professional, scientific and technical”, followed by “arts and leisure”, “retail” and “information and communications” (Federation of Small Businesses, 2010f).</p>
Federation of Small Businesses report	20% of businesses surveyed did not believe the council was interested in their needs and none had been contacted by the council for opinions, although 30% had had a sympathetic response (Federation of Small Businesses, 2010f).
Strategy	Mitigation of climate change.
Business-facing support	Comprehensive guidance on green supply chains and use of ICT.
Activities to support business performance including educating the market	<p>Climate change pages educate the public.</p> <p>Encourages interest in the local environment (Royal Borough of Kensington and Chelsea, 2014h).</p> <p>Broad advice on transport and air quality.</p> <p>Published its IT strategy, enabling business to copy it (Royal Borough of Kensington and Chelsea, 2008b).</p> <p>Provides a CO₂ calculator (Royal Borough of Kensington and Chelsea, 2014i).</p> <p>Involved in Greening Business (the lead council is Wandsworth). This provides 12 hours of support that includes a review and audit, assistance in finding environmentally compatible solutions, action planning and follow-up (Bennett, 2013).</p> <p>Electric car charging points (Royal Borough of Kensington and Chelsea, 2009).</p> <p>District heating and local power both proposed but no evidence found of existence (Royal Borough of Kensington and Chelsea, 2014m).</p>
Future plans	Nothing business-facing: all planned activity focussed on municipal residential activity including housing, municipal and household waste management and municipal carbon reduction (Royal Borough of Kensington and Chelsea, 2008a).
Website	<p>“Business and Enterprise” and “Environment and Transport” both visible on the home page (Royal Borough of Kensington and Chelsea, 2014c).</p> <p>Links to “Corporate responsibility”, “Procurement” and “Greener Business” on the business and enterprise page (Royal Borough of Kensington and Chelsea, 2014d).</p> <p>“Business advice” included environmental impact reduction (Royal</p>

	<p>borough of Kensington and Chelsea, 2014f).</p> <p>“Corporate responsibility” was defined as social responsibility; no content related to environmental concern apart from reference to the Royal Borough Environment Project (Royal Borough of Kensington and Chelsea, 2014g) which was focussed on improving the local environment (Royal Borough of Kensington and Chelsea, 2014h).</p> <p>“Procurement” included “sustainable procurement” link (Royal Borough of Kensington and Chelsea, 2014n) which contained useful advice and a link to “A practical approach to greener contracts” which provided comprehensive advice (Royal Borough of Kensington and Chelsea, 2014e).</p> <p>“Greener Business” provided links for waste management (Royal Borough of Kensington and Chelsea, 2014i), but a link for workplace travel was dead. It also had a link to the borough’s climate change page, which was more informative than assistive (Royal Borough of Kensington and Chelsea, 2014j).</p> <p>“Environment and Transport”: core environmental focus was on air quality and transport. “Green” referred to the local environment and included the links to the greener business and waste & recycling pages (Royal Borough of Kensington and Chelsea, 2014k).</p> <p>“Air quality” mostly educational about the problem. One link provided advice on how to reduce impact on air quality (Royal Borough of Kensington and Chelsea, 2014l).</p>																					
Language	<p>Referred to green and social responsibility rather than referencing the environment (Royal Borough of Kensington and Chelsea, 2014g).</p> <p>Environmental projects related to the local environment (Royal Borough of Kensington and Chelsea, 2014h).</p>																					
External support	<p>Manufacturing advisory service, knowledge transfer partnerships, Chartered Institute of Wastes Management, The Environment Agency, The Environment Services Association, Barclays cycle hire scheme, Carbon Trust, WRAP, Act on CO₂, DEFRA, Walkit.com, City Car Club, Zipcar</p>																					
Targets	<p>Climate change strategy that is still in force contained no targets related to business (Royal Borough of Kensington and Chelsea, 2008).</p> <p>Municipal activities to be carbon-neutral by 2020.</p> <p>The borough ranks seventh in the sample in relation to recycling (25th out of the 32 boroughs) but is the top-ranking borough in the sample for residual waste (4th of 32 boroughs) (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 1700, Kensington and Chelsea ranks 1st in the sample (2nd out of the 32 London boroughs) in the Environment Agency’s carbon rankings for reporting year 2011/12 (2013).</p>																					
Documents	<p>4770 documents included the term “environment”:</p> <table> <tr> <td>Strategy/planning: 5</td> <td>Transport: 3</td> <td>Procurement: 1</td> </tr> <tr> <td>Rivers/flood risk: 1</td> <td>Air quality: 3</td> <td>Business waste: 1</td> </tr> <tr> <td>External support: 2</td> <td>Building regulations: 3</td> <td></td> </tr> </table> <p>92 documents included the term “sustainable”:</p> <table> <tr> <td>Strategy/planning: 12</td> <td>Transport: 7</td> <td>Procurement: 2</td> </tr> <tr> <td>Rivers/flood risk: 2</td> <td>Air quality: 3</td> <td>Carbon reduction: 1</td> </tr> <tr> <td>Building regulations: 5</td> <td></td> <td></td> </tr> </table> <p>152 documents included the term “sustainability”:</p> <table> <tr> <td>Strategy/planning: 12</td> <td>Transport: 4</td> <td>Procurement: 3</td> </tr> </table>	Strategy/planning: 5	Transport: 3	Procurement: 1	Rivers/flood risk: 1	Air quality: 3	Business waste: 1	External support: 2	Building regulations: 3		Strategy/planning: 12	Transport: 7	Procurement: 2	Rivers/flood risk: 2	Air quality: 3	Carbon reduction: 1	Building regulations: 5			Strategy/planning: 12	Transport: 4	Procurement: 3
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	Building regulations: 3		

Kingston upon Thames

Controlling party	Liberal Democrat (54.2% majority)
Low-carbon zone	No
Budget per capita	£804.18 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change signed 2007 (Royal Borough of Kingston upon Thames, 2009, p.11).
Population density	16.99105 people per acre (third lowest in the sample)
Business type	Retail Relatively affluent, largely service sector (Kingston online, 2014). 96% fewer than 20 employees; 82% with 4 or fewer. The largest sector is “professional, scientific and technical”, followed by “information and communications”, “construction” and “business administration” (Federation of Small Businesses, 2010g).
Federation of Small Businesses report	20% of surveyed businesses considered their queries to have been sympathetically handled. None were contacted by the borough (Federation of Small Businesses, 2010g).
Strategy	Reduce fuel demand through modifying behaviour or infrastructure. Use energy-efficient technology and renewable fuel and cut fuel wastage (Royal Borough of Kingston upon Thames, 2009, 2013b).
Business-facing support	The Kingston Green Pledge, although this is combined with residential support, so not entirely relevant (Royal Borough of Kingston upon Thames, 2014f).
Activities to support business performance including educating the market	The Kingston Green Pledge, educating the purchaser (Royal Borough of Kingston upon Thames, 2014f). Green festival fortnight every year. Eco-footprint workshop (Kingston Borough Liberal Democrats, no date). In partnership with Zipcar car club (Royal Borough of Kingston upon Thames, 2014n).
Future plans	District heat network. Internal staff training re water and energy. Develop small-scale renewable energy capacity (Royal Borough of Kensington, 2013b). Aim to become the most sustainable borough in London, including the provision of green energy and heat, and reduce packaging and landfill. However, nothing in the borough’s campaign document is overtly addressed to business (Kingston Borough Liberal Democrats, no date).
Web site	First set of links on the home page: “Environment and waste”. “Business and Trade” is in the “more categories” section at the foot of the page (Royal Borough of Kingston upon Thames, 2014a). Links to “Energy, climate change and sustainability” and “flooding and drainage” three clicks away (the actual pages four clicks) (Royal Borough of Kingston upon Thames, 2014b). “Business and trade”: no relevant links on the first page (Royal Borough of Kingston upon Thames, 2014g). Pollution included under “Environmental Health” (in most boroughs this has related to pest control), which focusses on the council’s powers to prosecute and stipulates regulation relating to visible emissions to air (Royal Borough of Kingston upon Thames, 2014h). “Business support and advice” does not include any mention of sustainability, and the only reference to the environment is redirecting the reader to the pages on environmental health (Royal Borough of Kingston upon Thames, 2014i).

	<p>“Energy, climate change and sustainability” advertised the council’s activity including its strategy, resident-facing energy saving advice, green travel and planning details (Royal Borough of Kingston upon Thames, 2014c). Advertised local environmental groups (Royal Borough of Kingston upon Thames, 2014d) but the sustainability initiatives are all household-facing (Royal Borough of Kingston upon Thames, 2014m).</p> <p>Seven clicks from the home page: “The Kingston Green Pledge”. Open to businesses and householders alike to commit to reducing their environmental impact (Royal Borough of Kingston upon Thames, 2014e). Of the ten behaviours encouraged, only five are relevant to business (Royal Borough of Kingston upon Thames, 2014f).</p> <p>“Waste and recycling”: all content is household-facing (Royal Borough of Kingston upon Thames, 2014j).</p> <p>Four clicks from the home page (not following anything overtly business-oriented): travel plans were advertised supported by an e-mail link to “smarter travel” (Royal Borough of Kingston upon Thames, 2014k). All downloads on the page promoted and supported cycling (Royal Borough of Kingston upon Thames, 2014l).</p>																								
Language	“Environment” related to environmental health (Royal Borough of Kingston upon Thames, 2014i). Used more appropriately elsewhere.																								
External support	Energy Saving Trust, Zipcar, DEFRA, Environment Agency, Big London Energy Switch, Carbon Trust																								
Targets	<p>In line with national targets: 26% of 1990’s consumption by 2020. 15% energy from renewable sources by 2020. Only the first year’s progress reported (2010) and this shows little progress (Royal Borough of Kingston upon Thames, 2013a).</p> <p>The borough is 2nd in the sample and 3rd of all 32 London boroughs where it comes to recycling, and is also 3rd in the sample (9th of 32 boroughs) in respect to residual waste (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 964, Kingston upon Thames ranks 7th in the sample (26 out of the 32 London boroughs) in the Environment Agency’s carbon rankings for reporting year 2011/12 (2013).</p>																								
Documents	<p>This site included material subdivided into windows with minimal content, increasing the apparent number of documents.</p> <p>330 documents included the term “sustainability”:</p> <table> <tr> <td>Strategy: 9</td> <td>Energy/carbon: 20</td> <td>Building: 17</td> </tr> <tr> <td>The pledge: 6</td> <td>Procurement: 2</td> <td>Transport: 3</td> </tr> <tr> <td>Environmental groups: 1</td> <td></td> <td></td> </tr> </table> <p>215 documents included the term “sustainable”:</p> <table> <tr> <td>Strategy: 12</td> <td>Energy/carbon: 4</td> <td>Building: 7</td> </tr> <tr> <td>The pledge: 1</td> <td>Procurement: 1</td> <td>Transport: 8</td> </tr> <tr> <td>Rivers/flood risk: 7</td> <td>Waste: 1</td> <td></td> </tr> </table> <p>6160 documents included the term “environment”:</p> <table> <tr> <td>Strategy: 1</td> <td>Transport: 2</td> <td>Energy/carbon: 1</td> </tr> <tr> <td>Rivers/flood risk: 2</td> <td>Waste: 8</td> <td>Environmental protection: 1</td> </tr> </table>	Strategy: 9	Energy/carbon: 20	Building: 17	The pledge: 6	Procurement: 2	Transport: 3	Environmental groups: 1			Strategy: 12	Energy/carbon: 4	Building: 7	The pledge: 1	Procurement: 1	Transport: 8	Rivers/flood risk: 7	Waste: 1		Strategy: 1	Transport: 2	Energy/carbon: 1	Rivers/flood risk: 2	Waste: 8	Environmental protection: 1
Strategy: 9	Energy/carbon: 20	Building: 17																							
The pledge: 6	Procurement: 2	Transport: 3																							
Environmental groups: 1																									
Strategy: 12	Energy/carbon: 4	Building: 7																							
The pledge: 1	Procurement: 1	Transport: 8																							
Rivers/flood risk: 7	Waste: 1																								
Strategy: 1	Transport: 2	Energy/carbon: 1																							
Rivers/flood risk: 2	Waste: 8	Environmental protection: 1																							

Newham

Controlling party	Labour (100% majority)
Low-carbon zone	No
Budget per capita	£952.42 (London Councils, 2014)
Sustainability	Nottingham Declaration on Climate Change and the 10:10 agreement in

standard	2009
Population density	34.18027 people per acre (mid-range)
Business type	<p>Fewer businesses than average for London; the ratio of business to resident is half the average London borough's but growth is higher than the average. Majority of employment is within SMEs (<200 employees) and the public sector. Nearly half are in the service sector including public services and retail is the next largest sector (London Borough of Newham, 2011).</p> <p>96.5% fewer than 20 employees; 83% with 4 or fewer (Federation of Small Businesses, 2010f).</p>
Federation of Small Businesses report	30% of businesses surveyed did not believe the council was interested in their needs, although 10% had had a sympathetic response and 5% had been contacted by the council for opinions (Federation of Small Businesses, 2010f).
Strategy	Sustainability becomes "resilience" and there is next to nothing relating to the environment.
Business-facing support	<p>Nothing on the website.</p> <p>Development of the Royal Docks Enterprise Zone spearheaded by the development of the Siemens Urban Sustainability Centre (HM Government, 2014).</p>
Activities to support business performance including educating the market	<p>Educating market regarding energy-efficient products.</p> <p>Stimulating the development of district heating for the docklands region (London Borough of Newham, 2013b).</p>
Future plans	<p>Newham's Sustainable Community Strategy does not refer to the green environment (London Borough of Newham, 2013a).</p> <p>The borough's corporate plan refers to a cleaner greener environment, but this relates to cleanliness and green space (London Borough of Newham, 2010).</p>
Website	<p>Nothing relating to business and no category for the environment on the home page. There is a link for "green waste collection" (London Borough of Newham, 2014a) but this relates to requesting collection of garden waste. It is necessary to use the index, which places the business pages a long way down the relevant "B" page (London Borough of Newham, 2014b).</p> <p>The options do not provide anything overtly sustainable or environmental.</p> <p>The words "sustainable", "sustainability" and "environment" do not appear on the business support pages:</p> <p>"Newham Business Network" (London Borough of Newham, 2014c).</p> <p>"Business Continuity Advice" (London Borough of Newham, 2014d).</p> <p>"Checklist for Business start-ups" (London Borough of Newham, 2014e).</p> <p>"Advice on starting a business" (London Borough of Newham, 2014f).</p> <p>"Environmental health" relates to cleanliness and pest control (London Borough of Newham, 2014g).</p> <p>"Advice on waste management" includes a link to recycling advice that simply indicates what can be recycled and provides the costs (London Borough of Newham, 2014h).</p> <p>There are three entries for the environment in the index: "Environment", "Environmental monitoring" and "Environmental sustainability" (London Borough of Newham, 2014i).</p>

	<p>“Environment” leads to “environment planning”, where the term relates to local environment, and includes information about recycling and waste facilities, regeneration, planning and building control, environmental health and pollution issues (London Borough of Newham, 2014j). The pollution page, which is also available from the “Environmental monitoring” link in the index, relates to monitoring and reporting issues rather than providing advice and support (London Borough of Newham, 2014k).</p> <p>“Environmental sustainability” leads to household-facing advice. There is one entry for “sustainability” in the index (London Borough of Newham, 2014l). “Sustainable Community Strategy” does not provide any support for business. It only explains council activities (London Borough of Newham, 2013a).</p>
Language	“Environment” related to local environment (London Borough of Newham, 2014j). “Green waste” management related to garden waste (London Borough of Newham, 2014a).
External support	Big London Energy Switch
Targets	<p>27% increase in recycling rate by 2011/12, the baseline being 2007/8 when 14.49% was recycled. This was not achieved and Newham is the worst-performing London borough in the sample for recycling rates and last but one (31st out of 32 boroughs) where residual waste is concerned (London Borough of Wandsworth, 2014m).</p> <p>CO₂ reduction only related to council activities and 2010/11’s target was a 7% reduction on 2008/9’s performance. Data were not provided relating to whether or not it was achieved (London Borough of Newham, 2010).</p> <p>With a weighted score of 460, Newham ranks last in the sample (32nd out of the 32 London boroughs) in the Environment Agency’s carbon rankings for reporting year 2011/12 (2013).</p>
Documents	<p>243 documents included the term “sustainable”:</p> <p>Strategy and plans: 9 Procurement: 4 Air quality: 2 Building regulations: 1 Waste: 1</p> <p>121 documents included the term “sustainability”:</p> <p>Strategy and plans: 4 Procurement: 3 Air quality: 2 Building regulations: 3 Waste: 1 District heating: 1</p> <p>1160 documents included the term “environment”:</p> <p>Strategy and plans: 2 Waste: 4 Building regulations: 1 Transport: 4 District heating: 1 Pollution: 1</p>

Sutton

Controlling party	Liberal Democrat (77.8% majority)
Low-carbon zone	Yes
Budget per capita	£744.08 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change by 2005 (IdeA Knowledge 2006) Seven Transport Awards (London Borough of Sutton, 2014s)
Population density	17.41011 people per acre (4th lowest in sample)
Business type	Majority employ fewer than 10 (Sutton Chamber of Commerce Ltd, no date). 97% fewer than 20 employees; 83% with 4 or fewer. The largest sector is “construction” followed by “professional, scientific and technical”, and “information and communications” (Federation of Small Businesses, 2010i).

Federation of Small Businesses report	20% of businesses surveyed did not believe the council was interested in their needs. 5% had had a sympathetic response and 10% had been contacted by the council for opinions (Federation of Small Businesses, 2010i).
Strategy	<p>Raise awareness of sustainability issues.</p> <p>Be an example.</p> <p>Build sustainability into the structure of new developments.</p> <p>Integrate sustainability into all policies and strategies.</p> <p>Use thermal storage underground water cooling technologies.</p> <p>Review and improve water management.</p> <p>(London Borough of Sutton, 2011b)</p>
Business-facing support	<p>Hackbridge Project – ambitious plan to be “UK’s first sustainable suburb” (London Borough of Sutton, 2014g, 2014n).</p> <p>Hackbridge Green business network, a two-year project funded by ERDF, now expired.</p> <p>Provision of a calculator to assess carbon footprint (London Borough of Sutton, 2014m).</p> <p>SMEs will be offered energy audits through the environmental charity Bioregional (London Borough of Sutton, 2014o).</p> <p>Provision of advice regarding an environmental policy (London Borough of Sutton, 2014p).</p> <p>Provision of an environmental improvement plan template (London Borough of Sutton, 2014q).</p> <p>Provision of a flowchart to assist in the greening of the supply chain (London Borough of Sutton, 2014r).</p>
Activities to support business performance including educating the market	<p>Promoting cycling and public transport resulting in 50% increase in cycling, 13% public transport. Training/advisors and school travel plans in place.</p> <p>Car club run by Streetcar.</p> <p>Reducing the transport requirement through planning developments appropriately (London Borough of Sutton, 2011a).</p> <p>Adopted One Planet Living; largely at the planning stage but some initiatives underway</p> <p>Carbon-neutral buildings: improving building performance to best available technologies, modifying behaviours, minimising consumption and using renewable sources of energy (London Borough of Sutton, 2014i).</p> <p>Educating public to be waste aware (London Borough of Sutton, 2014j) and water aware (London Borough of Sutton, 2014l) and to assess the environmental impact of their purchases (London Borough of Sutton, 2014k).</p>
Future plans	Included in Strategy.
Web site	<p>Links to “Business” and “Waste, Environment and Planning” on the home page (London Borough of Sutton, 2014a).</p> <p>“Business”: nine categories of information, of which three included relevant material. There’s also a link to “waste, environment and planning” (London Borough of Sutton, 2014b).</p> <p>“Business Support”: advertises Sutton’s position as a leader in environmental performance in pages seeking to attract new businesses (London Borough of Sutton, 2014c). Support does not relate to environmental matters (London Borough of Sutton, 2014d).</p> <p>“Waste and recycling services for business”: encourages businesses to separate paper and cardboard for recycling, enabling them to comply with legislation. Includes links to recycling services (London Borough of</p>

	<p>Sutton, 2014f).</p> <p>“Smarter Travel Sutton”: developing sustainable transport links (London Borough of Sutton, 2014g).</p> <p>“Environmental Sustainability” contains the most business-facing support (London Borough of Sutton, 2014h).</p>																											
Language	<p>“Environment” used locally, suffixed with “sustainability” when referring to nature (London Borough of Sutton, 2014u). “Sustainable” is used with transport, as is “smarter” (London Borough of Sutton, 2014g).</p> <p>Refers to “greening business” (London Borough of Sutton, 2014o).</p>																											
External support	Recycle.co.uk, Bioregional, Envirowise, ERDF, 123 Recycle for Free																											
Targets	<p>“One Planet Sutton” target to reduce CO₂ emissions by 20%, reduce household waste by 5% and increase sustainable transport usage to 50% by 2017. Claims to be “London’s first sustainable transport borough” (London Borough of Sutton, 2014e).</p> <p>All homes in Hackbridge to be net zero-carbon by 2011 and in Sutton by 2014 (London Borough of Sutton, 2014i).</p> <p>Sutton is the 4th borough in the sample (13th of 32 boroughs) where recycling is concerned but is only 8th in the sample (23rd of 32 boroughs) with regard to residual waste (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 1371, Sutton ranks 5th in the sample (16th out of the 32 London boroughs) in the Environment Agency’s carbon rankings for reporting year 2011/12 (2013).</p>																											
Documents	<p>852 documents included the term “sustainable”:</p> <table> <tr> <td>Strategy: 10</td> <td>Transport: 9</td> <td>Building: 6</td> </tr> <tr> <td>Waste: 1</td> <td>One Planet: 5</td> <td>Energy/carbon: 2</td> </tr> <tr> <td>Behavioural change: 2</td> <td>Rivers/flood risk: 2</td> <td>Procurement: 2</td> </tr> </table> <p>570 documents included the term “sustainability”:</p> <table> <tr> <td>Strategy: 10</td> <td>Transport: 4</td> <td>Building: 5</td> </tr> <tr> <td>Waste: 6</td> <td>One Planet: 5</td> <td>Behavioural change: 2</td> </tr> </table> <p>1456 documents included the term “environment”:</p> <table> <tr> <td>Strategy: 2</td> <td>Transport: 6</td> <td>Building: 5</td> </tr> <tr> <td>Waste: 4</td> <td>One Planet: 2</td> <td>Air quality: 4</td> </tr> <tr> <td>Behavioural change: 2</td> <td>Rivers/flood risk: 3</td> <td>Procurement: 1</td> </tr> <tr> <td>Pollution: 2</td> <td>Green environment: 4</td> <td></td> </tr> </table>	Strategy: 10	Transport: 9	Building: 6	Waste: 1	One Planet: 5	Energy/carbon: 2	Behavioural change: 2	Rivers/flood risk: 2	Procurement: 2	Strategy: 10	Transport: 4	Building: 5	Waste: 6	One Planet: 5	Behavioural change: 2	Strategy: 2	Transport: 6	Building: 5	Waste: 4	One Planet: 2	Air quality: 4	Behavioural change: 2	Rivers/flood risk: 3	Procurement: 1	Pollution: 2	Green environment: 4	
Strategy: 10	Transport: 9	Building: 6																										
Waste: 1	One Planet: 5	Energy/carbon: 2																										
Behavioural change: 2	Rivers/flood risk: 2	Procurement: 2																										
Strategy: 10	Transport: 4	Building: 5																										
Waste: 6	One Planet: 5	Behavioural change: 2																										
Strategy: 2	Transport: 6	Building: 5																										
Waste: 4	One Planet: 2	Air quality: 4																										
Behavioural change: 2	Rivers/flood risk: 3	Procurement: 1																										
Pollution: 2	Green environment: 4																											

Wandsworth

Controlling party	Conservative (78.3% majority)
Low-carbon zone	No
Budget per capita	£669.67 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change in 2009 (London Borough of Wandsworth, 2014o)
Population density	35.62017 people per acre (mid-range)
Business type	<p>95% fewer than 20 employees; 84% with 4 or fewer. The largest sector is “professional, scientific and technical”, followed by “information and communications”, “arts and leisure” and “business administration and support” (London Borough of Wandsworth, 2010).</p> <p>40% green space.</p>
Federation of Small Businesses report	<p>10% of businesses surveyed did not believe the council was interested in their needs. 10% had had a sympathetic response and 5% had been contacted by the council for opinions (Federation of Small Businesses, 2010i).</p>

Strategy	<p>Reduce emissions to address climate change, develop resilience, address resource depletion and pollution. Business is not specifically mentioned (London Borough of Wandsworth, 2014q).</p> <p>Hold awards for green businesses, develop an environmental forum, promote waste reduction, increase proportion being recycled or composted. Zero waste to landfill</p> <p>Use the services of the Salix fund (a rolling fund of £100,000 which was matched by the council for energy-saving initiatives which provide payback).</p> <p>Provide tailored support for businesses to help them reduce emissions.</p> <p>Involve large organisations in developing a working group.</p> <p>Promote car clubs.</p> <p style="text-align: right;">(London Borough of Wandsworth, 2011)</p>
Business-facing support	<p>Provides a travel footprint calculator to support informed decision making (London Borough of Wandsworth, 2014e) and advice about different fuels, but electricity heads the list (London Borough of Wandsworth, 2014f).</p> <p>Tips for reducing waste at work (London Borough of Wandsworth, 2014h).</p> <p>Spearheaded “Go Green Business” (London Borough of Wandsworth, 2014j).</p> <p>Provides contact details for an extensive list of companies that recycle materials (London Borough of Wandsworth, 2008).</p> <p>Established the Wandsworth Environment Managers Forum (London Borough of Wandsworth, 2011).</p>
Activities to support business performance including educating the market	<p>Educating market regarding packaging and transport and waste.</p> <p>Maintains a green energy blog.</p> <p>Encourages green pledges.</p> <p>Provides electric car charging points (London Borough of Wandsworth, 2014r) and a car club (London Borough of Wandsworth, 2014s).</p> <p>Proposing to investigate local renewable power provision (London Borough of Wandsworth, 2014t).</p>
Future plans	<p>Granting permission for local onsite renewable power creation (London Borough of Wandsworth, 2014p).</p>
Website	<p>Links to business and the environment on the home page (London Borough of Wandsworth, 2014a).</p> <p>“Business”: nothing to support sustainable development or the environment (London Borough of Wandsworth, 2014b).</p> <p>“Community and living”: nothing supporting sustainable development or the environment (London Borough of Wandsworth, 2014c).</p> <p>“Environment and planning”: little on the environment apart from the local environment. Links for building control and planning; details about the conservation areas, waste management and pollution. There is a link to “sustainability” under “environmental planning” but no associated central area on the page, meaning that it could be missed (London Borough of Wandsworth, 2014d). Provides a tool for calculating vehicle-produced pollution (London Borough of Wandsworth, 2014e), advice about fuels (London Borough of Wandsworth, 2014f) and economical driving (London Borough of Wandsworth, 2014g).</p> <p>“Waste management”: explains waste handling provision, but pages include more; they give supportive advice on getting value for money (London Borough of Wandsworth, 2014i) and further detailed environmental advice including 12 hours of tailored support that involves</p>

	a site audit, assistance in finding environmentally compatible solutions, action planning and follow-up (London Borough of Wandsworth, 2014j). There is guidance on application of the waste hierarchy (London Borough of Wandsworth, 2011) and case studies (London Borough of Wandsworth, 2014k; Greening Business, no date).
Language	“Environment” largely relating to local environment as well as the green environment (London Borough of Wandsworth, 2014j, 2014k).
External support	Energy Savings Trust, Ecomodo (a sharing site), European Week for Waste Reduction, Valpak (free waste audits), MCC business solutions, Plan Zheroes (food waste), Gov.UK, Streetbank, WRAP, Go Green Plus, WREF grants, Love Food Hate Waste, Foodsave.org, Waste Online, Carbon Trust
Targets	Exceeding government targets where waste is concerned. Household waste fallen by 25% and no waste sent to landfill. Over one third is recycled (London Borough of Wandsworth, 2014l). In spite of this, Wandsworth ranks eighth out of the nine inner-city boroughs and 27th of the 33 London boroughs for recycling (London Borough of Wandsworth, 2014m). With a weighted score of 871, Wandsworth ranks 9th in the sample (28th out of the 32 London boroughs) in the Environment Agency’s carbon rankings for reporting year 2011/12 (2013).
Documents	2540 documents included the term “sustainability” (capped at 100): Policy/strategy: 3 Transport: 3 Energy/carbon: 3 Building regulation: 5 Pollution: 2 Waste: 1 Pledges: 4 Awards: 2 Procurement: 1 Knowledge exchange: 1 3930 documents included the term “sustainable” (capped at 90): Rivers/flood risk: 1 Transport: 16 Energy/carbon: 3 Building regulation: 4 Air quality: 1 Waste: 1 Pledges: 1 Awards: 2 Procurement: 1 19000 documents included the term “environment” (capped at 100): Policy/strategy: 6 Rivers/flood risk: 7 Energy/carbon: 1 Building regulation: 1 Air quality: 2 Waste: 10 Pledges: 1 Awards: 1 Procurement: 1 Business: 1 Finance: 1

Westminster

Controlling party	Conservative (80% majority)
Low-carbon zone	Yes
Budget per capita	£1102.71 (London Councils, 2014)
Sustainability standard	Nottingham Declaration on Climate Change
Population density	39.14728 people per acre (mid-range, 3rd highest in sample)
Business type	92.6% fewer than 20 employees; 70% with 4 or fewer. The largest sector is “professional, scientific and technical”, followed by “information and communications”, “arts and leisure”, “business administration and support” and “construction” (Federation of Small Businesses, 2010k).
Federation of Small Businesses report	10% of businesses surveyed did not believe the council was interested in their needs and 25% had not received a satisfactory response when approaching them. 10% had had a sympathetic response but none had been contacted by the council for opinions (Federation of Small Businesses, 2010k).
Strategy	Improve delivery of the banks for recycling. Improve the terms of the contract for waste disposal.

	<p>Encourage communication and engagement within estates and mansion blocks (City of Westminster, no date e).</p> <p>Policy is largely facing council activity but it does include the provision to provide businesses with advice (City of Westminster, 2007).</p>
Business-facing support	<p>Offering free recycling bags during recycle week (City of Westminster, 2014a).</p> <p>A search engine that provides advice on disposal of different waste products (City of Westminster, 2014b) and advice about recycling (City of Westminster, no date b).</p> <p>An information handbook contains contact details for electric vehicles, car clubs and recycling but does not mention sustainability or the environment (City of Westminster, 2014c).</p> <p>The business newsletter has a link to electric vehicles but no overt environmental content (City of Westminster, 2014d).</p> <p>Legislation and environmental management systems explained (City of Westminster, no date g).</p>
Activities to support business performance including educating the market	<p>Supports households with waste reduction (City of Westminster, no date h). There are 161 “micro-recycling centres” in Westminster that can be used for a wide range of products (City of Westminster, no date d).</p> <p>Householders given advice about reducing their carbon footprint (City of Westminster, no date e).</p>
Future plans	<p>Promote walking and cycling, including the provision of cycle parking facilities.</p> <p>Work with businesses to reduce travel plans.</p> <p>Promote a car club.</p> <p>Encourage low-emission vehicle usage, especially for taxis.</p> <p>Run awareness campaigns about local driving.</p> <p>Promote a “no idling” mindset, especially among coach drivers (City of Westminster, 2013).</p>
Website	<p>Support for business evident on the home page but the word “environment” was not visible. There were two links that related to recycling (City of Westminster, no date a).</p> <p>Business support includes advice for commercial waste and has a link for small businesses (City of Westminster, 2014b). The link includes information about recycling options (City of Westminster, no date b).</p> <p>“Recycle week” promotes a national drive to increase rates of recycling (City of Westminster, 2014a).</p> <p>“Support for start-ups, business growth and investment” contains little material relating to the environment (City of Westminster, no date c).</p> <p>The SME browsing for environmental support would find very little through following links.</p> <p>“Sustainable Business” page found through using the search engine. Provides advice about developing an environment policy (City of Westminster, no date g).</p> <p>“Reducing our carbon footprint” (found through the search engine) contained useful household-facing advice that could be adopted by businesses (City of Westminster, no date f).</p> <p>“Business and economics – useful links” contained nothing related to the environment and sustainability (City of Westminster, no date i).</p>
Language	<p>“Environment” not used much but appropriately used (City of Westminster, no date g).</p>
External support	<p>Carbon Trust, Energy Savings Trust, Love Food Hate Waste, Furniture Re-use Network, Freecycle, Ecomodo</p>
Targets	<p>Council activities to be carbon-neutral by 2012, if necessary this being</p>

	<p>achieved through offsets (City of Westminster, no date d).</p> <p>Westminster is 10th out of the 11 boroughs in the sample (30th of 32 boroughs) where recycling is concerned but is 6th in the sample (19th of 32 boroughs) for residual waste (London Borough of Wandsworth, 2014m).</p> <p>With a weighted score of 1456, Westminster ranks 3rd in the sample (9th out of the 32 London boroughs) in the Environment Agency's carbon rankings for reporting year 2011/12 (2013).</p>
Documents	<p>36 documents included the term “sustainable”:</p> <p>Strategy: 3 Transport: 1 Building control: 1 Air quality: 1</p> <p>The same 36 documents were revealed when searching for the term “sustainability”.</p> <p>129 documents included the term “environment”:</p> <p>Strategy: 2 Waste: 5 Transport: 1 Building control: 2 Air quality: 2 Business: 1 Rivers/water: 1 Procurement: 1</p>

Appendix 39. External Agencies Operating in London

Act on CO₂

123 Recycle for Free: An operation run by DHL that collects and recycles or reuses electrical items (Recycle for Free, 2014a). Collects from businesses in all London boroughs apart from Barking and Dagenham, Bromley, City of Westminster, Croyden, Southwark and Tower Hamlets (Recycle for Free, 2014b).

Barclays cycle hire scheme: Run in conjunction with Transport for London, this is a cycle hire scheme that allows users to collect and drop off bikes at any docking station within London (Transport for London, no date). There are over 10,000 docking stations between 300 and 500 metres apart throughout London (Transport for London, 2014).

Barnet Furniture Centre: Run in association with organisations including Barnet London Borough and London Re-use, this is a charity that restores and reuses furniture (Barnet Furniture Centre, 2014).

Bioregional: Promotes activities to support the development of sustainable businesses. Provides a footprint calculator and promotes moderation of resource use including carbon (Bioregional, 2014).

Business Link: A government-run resource providing, among more general business advice, business-facing information relating to waste management (Gov.UK, no date j).

Carbon Trust: Promotes low-carbon operations, offering advice (Carbon Trust, 2014a) and more tangible services:

- Supporting the design and installation of technologies (Carbon Trust, 2014a).
 - Assisting in finding the necessary finance (Carbon Trust, 2014b).
- Providing assistance in the measurement of carbon footprints (Carbon Trust, 2014b).
 - Certifying performance in both carbon and water management (Carbon Trust, 2014c).

Chartered Institute of Wastes Management: The institute that supports organisations operating in the area of waste management, providing advice, training and certification with a remit to promote sustainability (CIWM, 2014).

Ecomodo: A site that promotes the lending and borrowing or donating of resources, encouraging individuals and entities to set up borrowing circles (Ecomodo, no date).

Energy Saving Trust: Provides a broad range of services for businesses:

- An e-newspaper providing up-to-date information.
- Running eco-technology conferences and shows.
- Advising on sustainable transport
- Informing businesses about legislative requirements

(Energy saving trust, 2014)

Enhanced Capital Allowance: A government-initiated scheme administered by the Carbon Trust to provide tax relief when organisations invest in specific technologies that reduce the environmental burden (Carbon Trust, 2014d).

Envirowise: Offers advice and guidance with respect to effluent management (Envirowise, 2013).

European Week for Waste Reduction: A week designed to stimulate action and knowledge transfer with respect to waste management including Europe-wide awards and promoting ideas relating to the waste hierarchy. Its website includes ideas for action that could assist business (EWWR, 2009).

Evocate: a project commissioned by ERDF and the Environment Agency in conjunction with Middlesex University that provides consultancy, resources and case studies for London-based SMEs (Middlesex University, no date).

Foodsave: Launched by the Mayor of London, this scheme is designed to make SMEs more efficient in their management of food products (Sustain, 2014).

Freecycle: An exchange website that enables goods to change hands with no costs beyond the movement of the goods concerned. The aim is to reduce landfill (Freecycle, 2006).

Furniture Re-use Network: An umbrella organisation supporting charities that accept donated furniture and electrical goods and pass them on to recipients in the poverty bracket with a remit to both improve societal wellbeing and reduce landfill (Furniture Re-use Network, 2014).

Green Light North London: Part ERDF funded in collaboration with the London boroughs of Islington and Haringey. Offers a broad range of free support: waste management, carbon control, EMS. Available for medium and micro-businesses (Green Light North London, 2012).

Greening Business: addressing environmental performance including waste and energy management (Merton Chamber of Commerce, 2015).

Go Green Plus: An arm of the Institute for Sustainable Business offering education and awards (Institute for Sustainable Business, 2013).

Groundwork: A charity that helps businesses of all sizes develop or join local CSR projects focussed on societal and environmental need (Groundwork, 2014).

London Remade: An organisation promoting sustainable London, providing threads for discussion highlighting the issues it faces (London Remade, no date).

London Re-use Network: Supports charities in collecting and delivering household items and business furniture or equipment that are donated for reuse (London Re-use, 2014a). It will also repair goods (London Re-use, 2014b).

London Sustainability Exchange: Seeks to support the development of sustainable practice with a focus on both the environmental footprint and air quality (London Sustainability Exchange, no date a). Provides toolkits and checklists designed to support SME environmental management (London Sustainability Exchange, no date b).

Love Food Hate Waste: Largely household-facing but also advises businesses on how to minimise food waste (WRAP, no date a).

Manufacturing Advisory Service: Supported by the Department for Business, Innovation and Skills, MAS offers tailored support for operations within SMEs involved in manufacturing. Among the skill sets covered are those of lean manufacture, waste reduction and resource efficiency (MAS, no date).

MCC business solutions: Merton Chamber of Commerce's business arm MCC provides support for SMEs seeking to manage their environmental impact by offering a review of their premises and operations and developing an action plan tailored for the business (MCC, 2014).

National Energy Foundation: Supports businesses in the manner in which they use their premises in order to attain efficient use of energy (National Energy Foundation, no date).

Netregs: Assists in ensuring that businesses understand environmental legislation and obligations, focussing on all aspects of environmental management (Netregs, no date a).

North London Waste Authority: Provides information and resources offering business-centred advice on waste reduction (NLWA, 2010; NLWA, no date).

Plan Zheroes: An organisation seeking to link food-oriented businesses with charities in order to ensure that excess food and food near its sell-by date does not go to waste (Plan Zheroes, 2013)

Recycle for London: Household-facing but highly useful website covering "reduce, reuse and recycle" (Recycle for London, 2013a). Its pages are full of links to associated organisations (Recycle for London, 2013b) including a link to 123 Recycle for Free, for businesses' electrical materials (Recycle for London, 2013c).

Recycling.co.uk: Informative for both households and businesses (Recycling.co.uk, 2014).

ReEnergise SmartEnergy Finance: Commercial loans targeted at specific sectors of SME.

ReStore Community Projects: Collects unwanted furniture and white goods and sells on at a low price (ReStore Community Projects, no date)

Streetbank: A website offering the facility to share or pass unwanted goods on to others in the same vicinity (Streetbank, 2014).

Students' Union University of Greenwich Sustainability Hub: Designed to engage students in the issues surrounding sustainability by involving them in developing training workshops and running forums covering a range of issues

including transport, waste management and ethical investments (University of Greenwich, 2013).

TFL: Free cycle stands: Transport for London is encouraging the use of bicycles for commuting by providing workplaces with more than five employees with cycle stands to facilitate storage (Transport for London, 2013).

The Environmental Services Association: Focusses on resource and waste management, providing advice and information about regulation (ESA, 2014).

The Prince's May Day network: Instigated by the Prince of Wales, this is a network of over 3,800 companies that have pledged to work towards mitigating and minimising climate change. The aim is to stimulate more businesses into action (Business in the Community, no date).

Tomorrow's Company: A London-based think tank that promotes TBL action, informing policy makers and advising business (Tomorrow's Company, no date).

Valpak: Assists businesses in waste and carbon management. Offers free seminars and workshops relating to specific waste management issues and compliance with legislation (Valpak, no date a, no date b).

Waste Online: A database providing online access to documents relating to resource management. It has the advantage of accessibility but the drawback of potentially including dated material (Waste Online, 2011).

WRAP: Established to facilitate change to a recycling culture, WRAP has broadened its remit to support many aspects of resource efficiency (WRAP, 2014a). It targets support to the SME (WRAP, 2014b) and provides online tools that assist in water and waste management (WRAP, 2014c).

WREF grants: Western Riverside Waste Authority provides grants within the boroughs of Hammersmith and Fulham, Lambeth, Wandsworth and the Royal Borough of Kensington and Chelsea focussed on improving the environment, such as by converting a concreted area to a green space (WREF, no date).

Zipcar: A car sharing scheme that caters for business use as well as private (Zipcar, 2014).

Appendix 42. Sensitivity Testing, the Provision of a Supportive Infrastructure

Base

Yes: in hand	1.2	100	100	5	5	2.5	2.5
Promoting it but it's not us	1.1	1.1	65	1.1	3.65	1.1	1.95
Talking about it	1	1	1	1	1	1	1

Quartile

Barking and Dagenham	1	1	1	1	1	1	1
Barnet	4	4	4	4	4	4	4
Bromley	4	3	3	3	3	3	3
Greenwich	1	2	2	2	2	2	2
Hackney	2	2	2	2	2	2	2
Kensington and Chelsea	3	3	3	3	3	3	3
Kingston upon Thames	2	3	3	3	3	3	3
Newham	2	2	2	2	2	2	2
Sutton	1	1	1	1	1	1	1
Wandsworth	2	2	2	2	2	2	2
Westminster	3	3	3	3	3	3	3

Appendix 43. Sensitivity Testing, Trust

no trust	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
no contact	-5	-5	-5	-5	-5	-5	0	0	0	0	0	0
poor contact	-8	-9	-10	-7	-6	-5	-5	-8	-10	-6	-4	-2
good contact	10	10	10	10	10	10	10	10	10	10	10	10
contacted	0	0	0	0	0	0	0	0	0	0	0	0

Quartile													Average
Barking and Dagenham	3	3	3	3	3	3	4	4	3	4	4	4	3
Barnet	3	3	3	3	3	3	4	3	3	4	4	4	3
Bromley	2	2	2	2	2	2	1	2	2	1	1	1	2
Greenwich	4	4	4	4	4	4	4	4	4	4	4	4	4
Hackney	2	2	3	2	1	1	3	3	3	3	2	2	2
Kensington and Chelsea	1	1	1	1	1	1	2	1	1	2	2	2	1
Kingston upon Thames	1	1	1	1	1	1	1	1	1	1	1	1	1
Newham	3	3	3	3	3	3	4	3	3	4	4	4	3
Sutton	2	2	2	2	2	2	1	1	1	1	1	1	2
Wandsworth	1	1	1	1	1	1	1	1	1	1	1	1	1
Westminster	2	2	2	2	2	1	1	2	2	1	1	1	2

Appendix 44. A Comparison of Performance Measures Across the Four Nations

Energy production and usage

Environmental impact can be reduced through the creation of a greater percentage of energy using renewable sources, and increasing the efficiency with which the energy is used. Figure A44.1 shows the extent to which a country produces its power using renewable sources as a percentage of the electricity it produces. Whilst the production of renewable energy as a percentage of total energy supply (TPES) is a different curve, the peaks and troughs occur at similar points.

The impact of Sweden's development of energy production from as wide a range of sources as possible, including sludge and manure, is in stark contrast to Japan's struggle to cope with its terrain. Neither country has significantly increased the proportion of renewable electricity production over the 22 years covered by the statistics.

In adopting wind generation, Denmark has increased its percentage of electricity production by over four times that of the United Kingdom, which by 2012 had only just managed to equal the percentage of Japan.

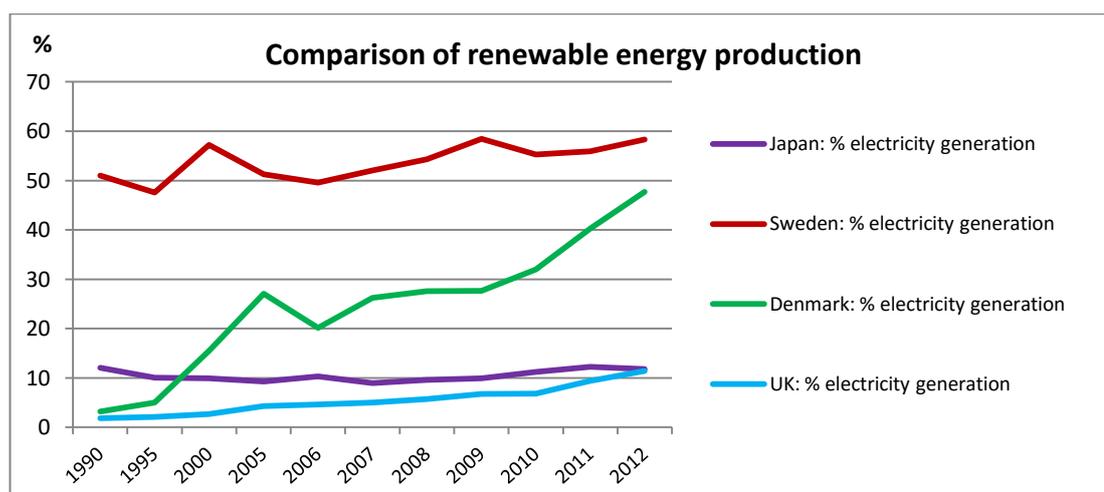


Figure A44.1: A comparison of renewable electricity production (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

Whereas Sweden produces a significantly higher percentage of renewable electricity than the other three nations, it does not appear to use it as efficiently. Figure A44.2 shows that the Swedes only achieve 60% of British and Danish

levels of productivity in terms of US\$ per unit of fuel. Of these two countries, the United Kingdom showed slightly greater improvement over the period in question and by 2012 achieved the highest level of productivity of the four nations. The Japanese only achieve 80% of the return of Denmark or the United Kingdom.

Figure A44.2 also charts the usage of fuel per head in each of the four nations, with all nations showing a decline over the 21 years since 1990. Little separates the performance of Denmark and the United Kingdom, the two countries with the lowest per capita usage, and the Japanese nearly equal them. The Swedes, however, use 50% more fuel per head than the British and Danes, and whilst not dramatic, the British have made the most progress in reducing per capita demand over the period in question.

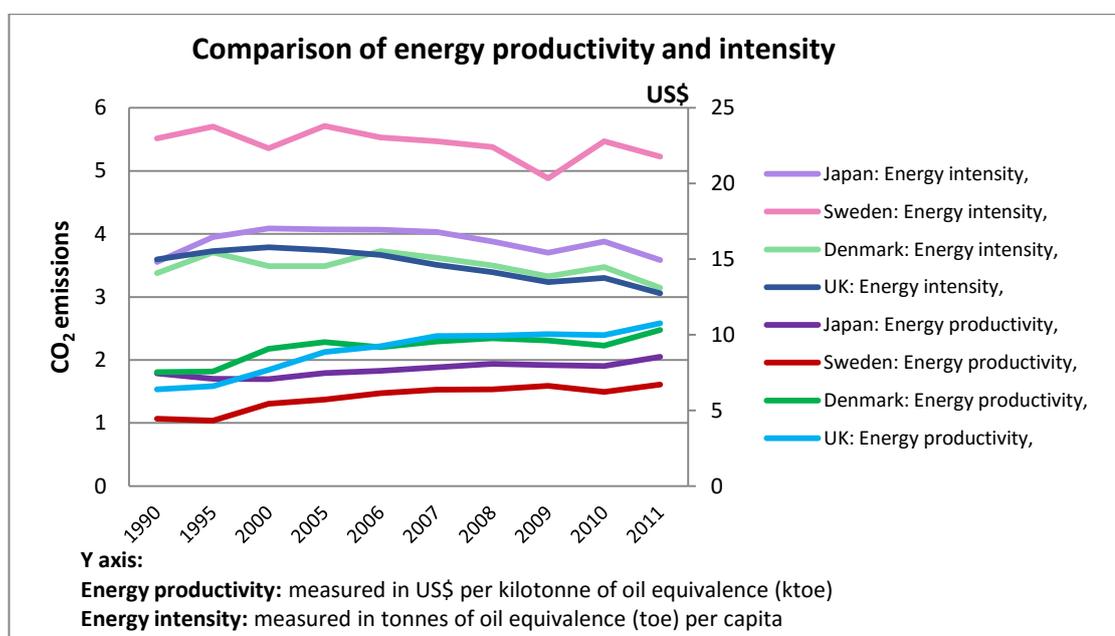


Figure A44.2: Comparison of energy usage (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

In summary, with over half their electricity generated from renewable resources, the Swedes outperform the other three nations in renewable energy production, and show some further improvement between 1990 and 2012. However, the Swedes are not as efficient in their use of electricity, using significantly more per head of the population than the other nations.

Throughout the period, the Danes made notable gains in the percentage of renewable energy produced to the point that they were producing nearly half of their energy from renewable resources. However, the British achieve the

highest energy productivity and have the lowest energy intensity per head out of the four countries.

The United Kingdom has been much slower to embrace renewable energy sources, ending the period producing just over 10% of its energy requirement from renewable resources, matching that of Japan. Interestingly, Japan, the country that is recognised for adopting technical solutions for environmental problems, is not as efficient as Denmark or the United Kingdom.

Greenhouse gas emissions

Figure A44.3 compares the carbon equivalence of greenhouse gas emissions for the four countries, indexed, with 1990 equalling 100. A chart to compare carbon emissions alone provides a very similar picture (figure A44.4). The index would suggest that the United Kingdom made the most progress in reducing its emissions levels over the 21-year period from 1990, but this could have been because the other countries had already made the easier reductions.

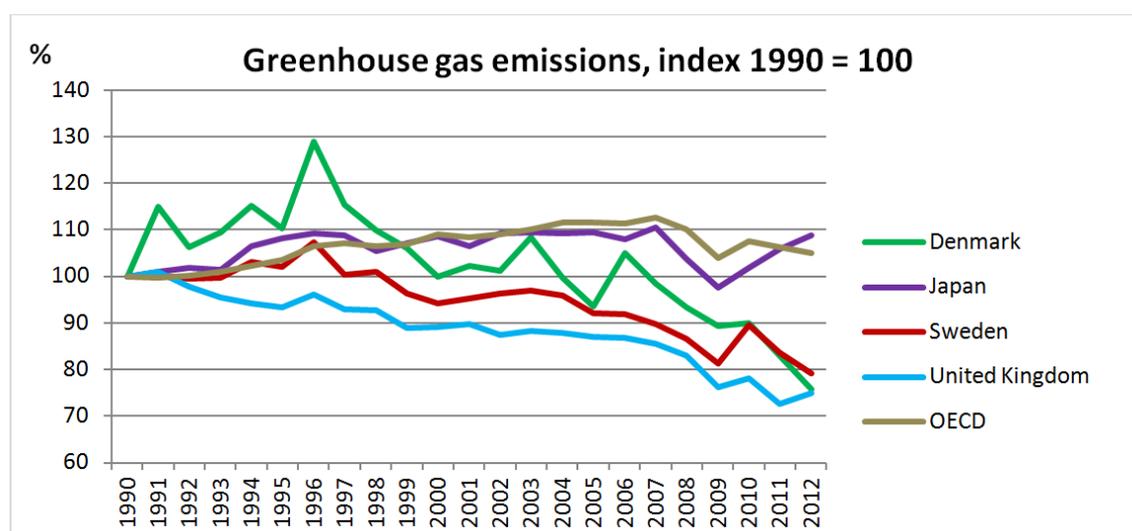


Figure A44.3: A comparison of greenhouse gas emissions (CO₂ equivalence), indexed (Data: OECD, 2014c. Dataset: greenhouse gases)

The emissions of Japan equated to the average for the OECD countries and whilst all countries demonstrated a drop in emissions during the early recession years of 2008 to 2009, a subsequent rise in Japan's emissions was due in part to the Fukushima earthquake of 2011, and in part to the manner in which Japan's geography impedes the production of wind power.

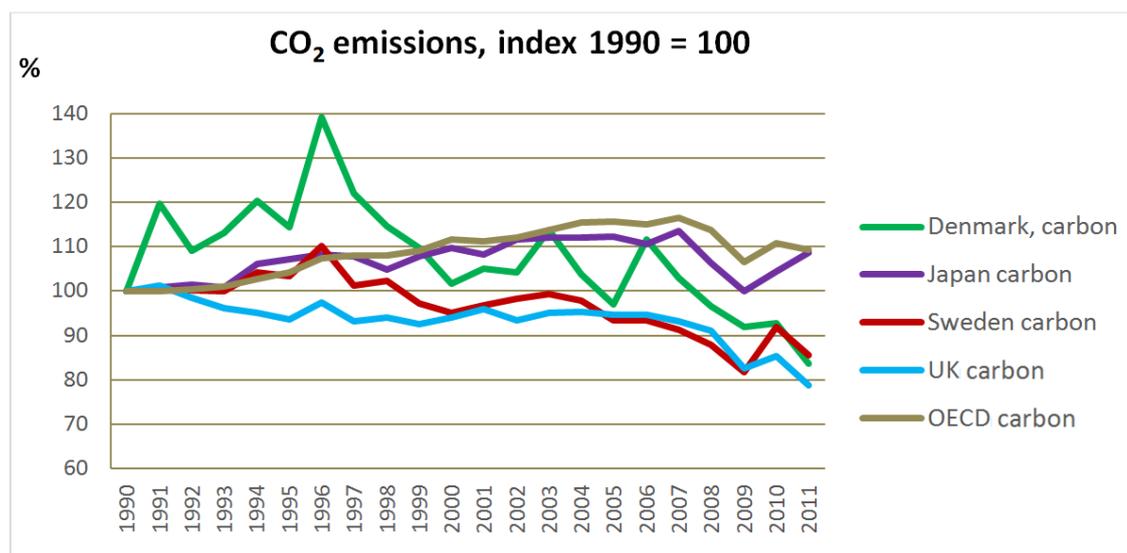


Figure A44.4: A comparison of CO₂ emissions, indexed (Data: OECD, 2014c. Dataset: greenhouse gases)

Investigation into the comparative performance of individual elements contributing to the total emissions of greenhouse gases also demonstrates that the United Kingdom has achieved greater cuts than the other four countries.

Over a 20-year period following 1991, the United Kingdom has halved its emissions of methane, a gas that is four times as potent as CO₂ where global warming is concerned, whereas Denmark has managed a 10% reduction, Sweden 30% and Japan nearly 40% (figure A44.5). Where methane is concerned, Scandinavia and Japan face greater challenges in reducing their emissions because it is a natural by-product of animal husbandry and rice production. It is beyond the remit of this thesis to assess whether this is the cause of this disparity.

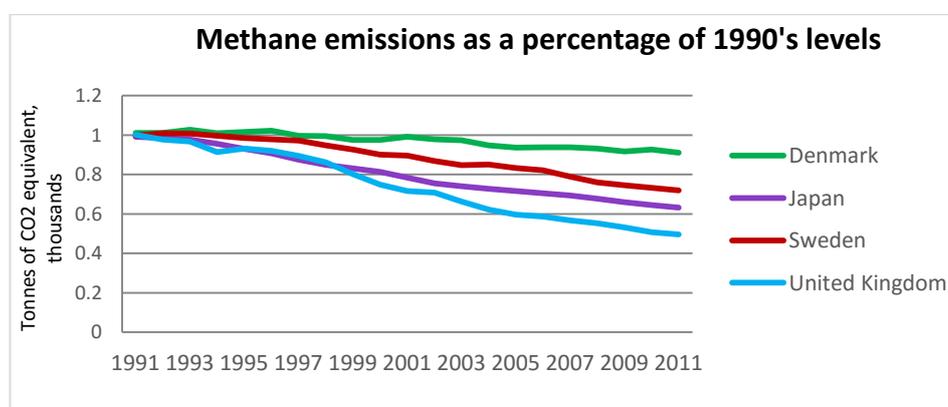


Figure A44.5: A comparison of methane emissions, indexed (Data: OECD, 2014c. Dataset: greenhouse gases)

The United Kingdom also appears to have made great progress in the reduction of CO₂ emissions resulting from transport (figure A44.6). In this instance, the

comparison is per capita and, although Denmark and Sweden have apparently provided greater amenity with the alternatives for their population, the United Kingdom has had a steeper reduction than either of the Scandinavian countries and is now the best performer of the three.

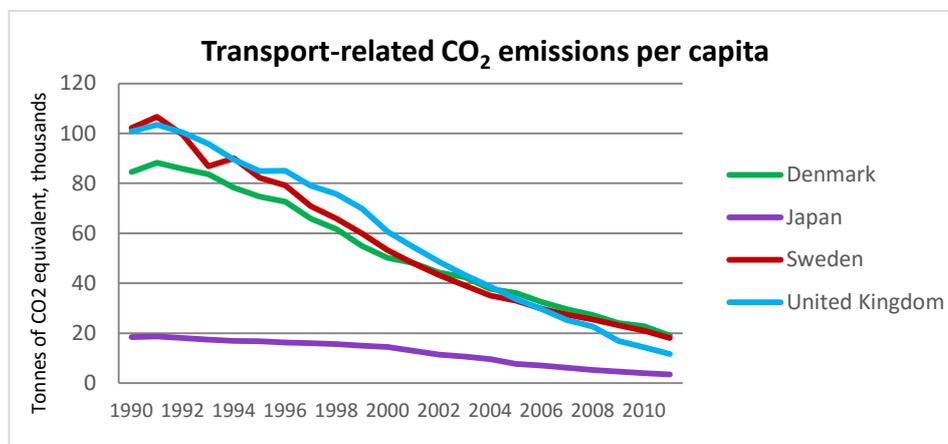


Figure A44.6: A comparison of transport-related CO₂ emissions per capita (Data: OECD, 2014c. Dataset: greenhouse gases)

Japan's people had a significantly lower level of emissions per head at the outset, but since the turn of the century have brought the level down considerably.

The total emissions for the UK in 1990 were 778,000 kilotonnes, more than ten times those of Denmark and Sweden (70,000 and 72,000 kilotonnes respectively) and over half those of Japan (1,234,000 kilotonnes) (OECD, 2014c, dataset: greenhouse gases), but direct comparison would also need to take population size into account (figure A44.7).

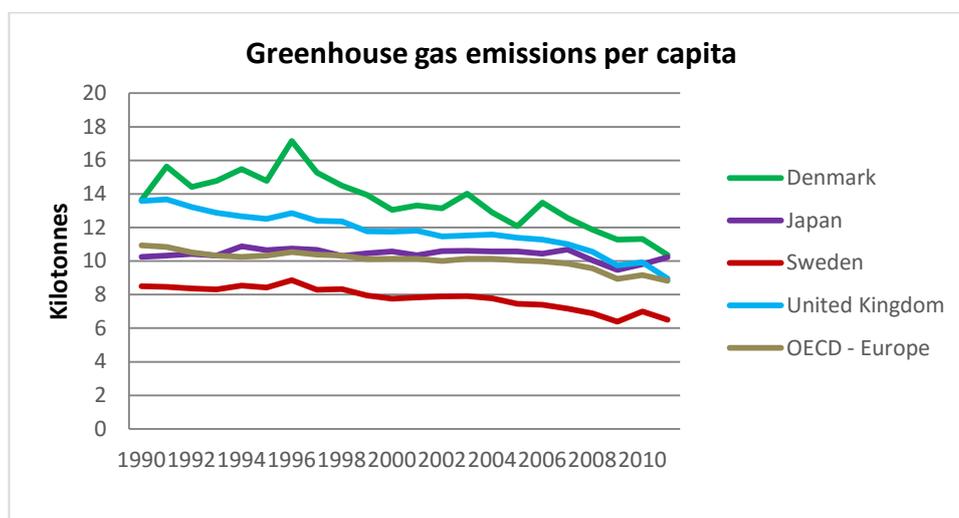


Figure A44.7: A comparison of greenhouse gas emissions per capita (Data: OECD, 2014c. Dataset: greenhouse gases)

Considering their environmental strategy, the performance of the Danes represented in figure A44.7 is surprising. Their objective of Copenhagen achieving carbon neutrality by 2025 and their high level of wind power generation belie the high level of emissions. The performance of Sweden is more to be expected. It also has higher targets where carbon emissions are concerned and is pioneering waste management and district heating and cooling. These activities, along with Sweden's record of producing power from renewable resources, have resulted in its emissions per head being 20% lower than the other three countries.

Having started the period with the reputation of being "the dirty old man of Europe", the United Kingdom's emissions were equal at that time to those of Denmark. The United Kingdom's rate of progress in reducing emissions has been marginally better than that of Sweden, although at the end of the period in question the United Kingdom's performance is not yet equal to Sweden's in 1990.

There is clearly a disparity between Denmark's claims where the carbon footprint of Copenhagen is concerned and the data published by the OECD for the entire nation. It should be noted that Danes do not consider the carbon footprint of imports when assessing that of Copenhagen. However, this measure is included in the OECD calculations (OECD, 2011b). This large carbon footprint is a product of affluence, and could in part be accounted for by Denmark achieving the highest GDP per capita in the sample (section 8).

Comparison of emissions with productivity and GDP also reveals differences. The performance indicators of interest are production-based CO₂ emissions and production-based CO₂ productivity in comparison with GDP. These indicators relate to the actions that can be controlled by the people and the government in question, namely activities that occur within the country concerned. For that reason, demand-based CO₂ emissions were considered inappropriate, because they relate to the emissions that are directly related to the internal demand and include net imports (OECD, 2014c). Whilst this is a useful measure for other purposes, it includes the result of actions that are subject to another nation's regulation and therefore obfuscate findings.

Section 2.3.1 explained the concept of the triple bottom line and referred to the perceived need for balancing the demands of the environment and the economy, and with them the basis of social welfare. The aim is to increase profits, which contribute to economic growth measured through changes in the GDP over time, and minimising harmful environmental effects by reducing emissions and resource use. The ideal position is to decouple growth from environmental impact.

Figure A44.8 illustrates how the relationship between GDP and resource use can be interpreted. When resource use grows at a slower rate than the increase in GDP, decoupling can be said to be relative. It is only absolute when resource use falls whilst GDP grows.

Aligning the performance of the four nations demonstrates notable difference. Over the period between 1990 and 2012, the GDP of Japan has grown by 20%, in contrast with the United Kingdom and Sweden, where it has grown by 60%, and Denmark, where growth was 40%. In spite of their ethos of minimisation and mottainai, the Japanese have barely achieved relative decoupling, but this should be viewed in the light of their resource economy at the outset.

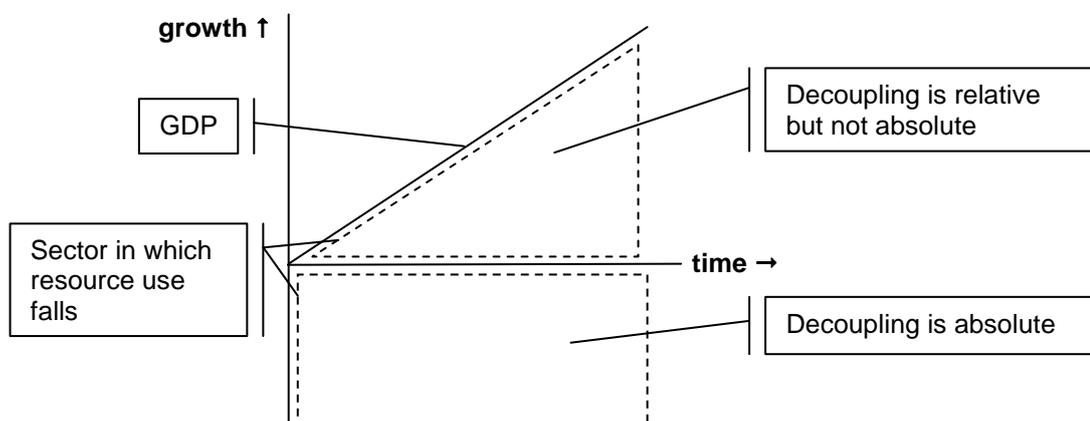


Figure A44.8: Template for determining the relationship between resource use and GDP (OECD, 2014c)

Figure A44.2 demonstrated the comparatively high energy intensity and low level of energy productivity of the Swedes, but figure A44.1 charted the extent to which their energy is produced through sustainable means. The impact of their renewable energy production is clearly demonstrated in figure A44.9 where it is evident that Sweden is the only nation within the four being studied where the financial yield per unit of carbon emissions has increased faster than the rise in GDP for the entire period, growing 25% more than GDP. The United

Kingdom and Denmark have just begun to demonstrate similar gains since the recession.

The western nations, however, have all achieved absolute decoupling of the total emissions created in the production process and the GDP, with all three countries showing a 20% drop in emissions associated with the productivity. This success is the most marked for the United Kingdom and Sweden because of their greater increase in GDP.

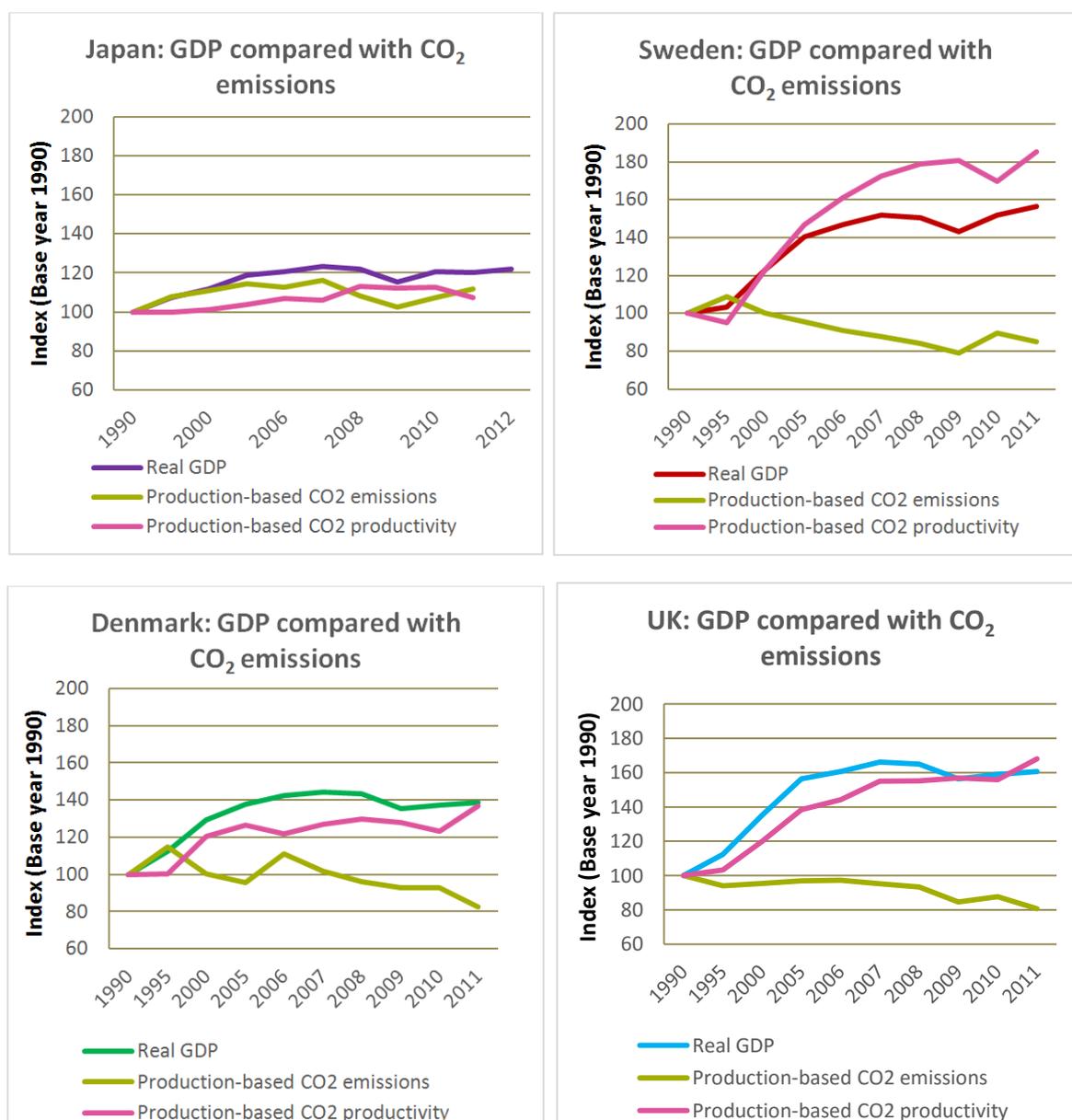


Figure A44.9: A comparison of CO₂ productivity (Data: OECD, 2014c. Dataset: green growth indicators)

To summarise emissions management, Japan has clearly experienced the most problems because of its geography. The United Kingdom has achieved the highest rate of reduction since 1990, but its emissions per capita equate with

the OECD. The surprising finding is the disparity between Denmark and Sweden where, in spite of their more northerly location and associated climate, the average Swede emits 80% of the carbon of the average Dane.

Materials management

A comparison of materials consumption (figure A44.10) reveals further points of interest. It has already been established that all four nations achieved a growth in GDP, with that of Sweden and the United Kingdom being 60% between 1990 and 2012, and that of Denmark being 40%. Denmark and Sweden have barely demonstrated relative decoupling of materials consumption over the same period, with the Swedes ending the period with 30% more consumption than the outset and the Danes, after reductions that started in 2007, just managing to equal consumption of 1990.

In contrast, the United Kingdom and Japan have achieved absolute decoupling, with the United Kingdom's materials consumption dropping by 30% and Japan's by 40%. Japan's consumption fell dramatically in the period between 2000 and 2005, which coincides with their introduction of the waste hierarchy in 2003.

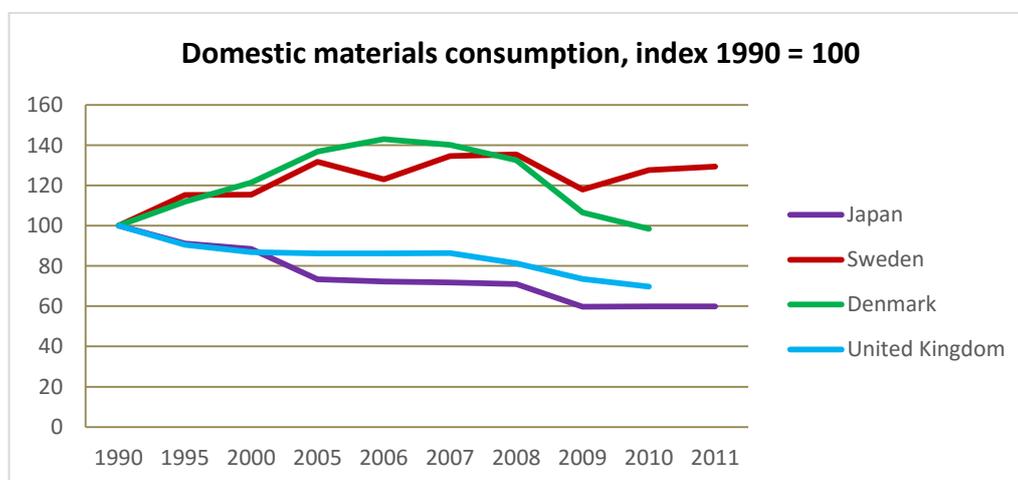


Figure A44.10: A comparison of resource use (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

The pattern of domestic materials consumption is maintained when reviewing per capita usage, although the total consumption of the Swedes was about 80% of that of the Danes until 2008, and was closer to the OECD average until 2004. In 2007 the OECD average started to fall, and that of the Danes more dramatically so. In contrast the Swedes have not reduced their consumption and in 2010 matched the Danes (figure A44.11).

As with the indexed figures, the per capita domestic consumption of the British and Japanese is very similar. Domestic materials consumption of the Japanese fell slightly faster than that of the British over the period between 1990 and 2010, and by 2010 the per capita domestic consumption of both of these countries was half that of the Swedes or Danes.

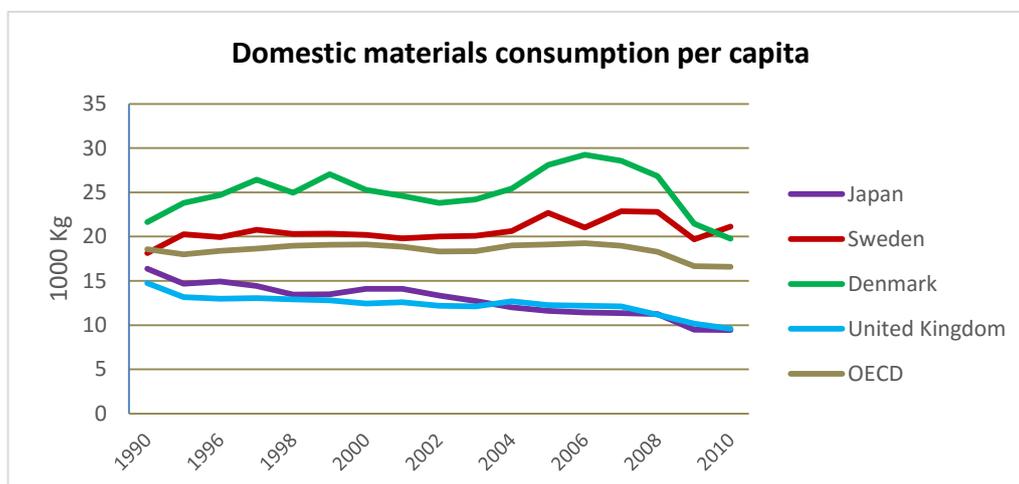


Figure A44.11: Comparison of domestic materials consumption per capita (Data: OECD, 2014c. Datasets: green growth indicators and material resources)

Waste management

This comparative performance of consumption is echoed in the production of municipal waste (figure A44.12), where Scandinavia does not manage its reduction as well as Japan and the United Kingdom. In this instance, it is clear that the British and Danes had a very similar performance until 2006 when the United Kingdom started to reduce its waste production at a similar rate to the Japanese.

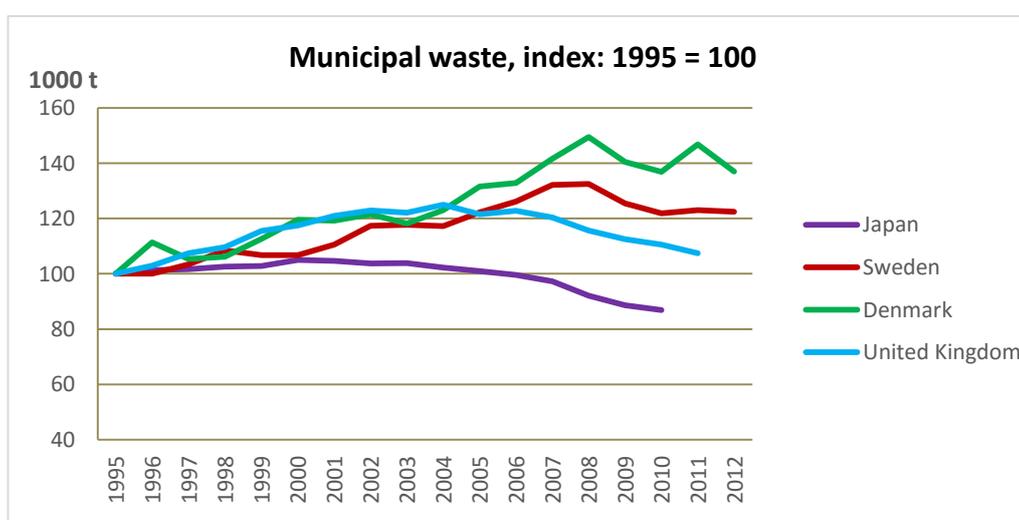


Figure A44.12: A comparison of municipal waste (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

By 2012, the Danes were producing 40% more municipal waste than they were in 1995, and the Swedes were producing 20% more. By 2011 the United Kingdom produced 10% more than it had in 1995, and Japan, for which figures beyond 2010 were not available, was at that time producing 15% less.

As noted previously, indexed figures do not relate performance to the actual levels of waste. For this it is necessary to compare the quantities generated per capita (figure A44.13), which introduces a notable difference. The relationship between Denmark and the United Kingdom is virtually the same as in figure A44.12, but the per capita consumption of Sweden and Japan was 20% lower than these two countries at the outset, meaning that, although Sweden's municipal waste production increased throughout the period, by 2012 it was still not producing as much as the United Kingdom.

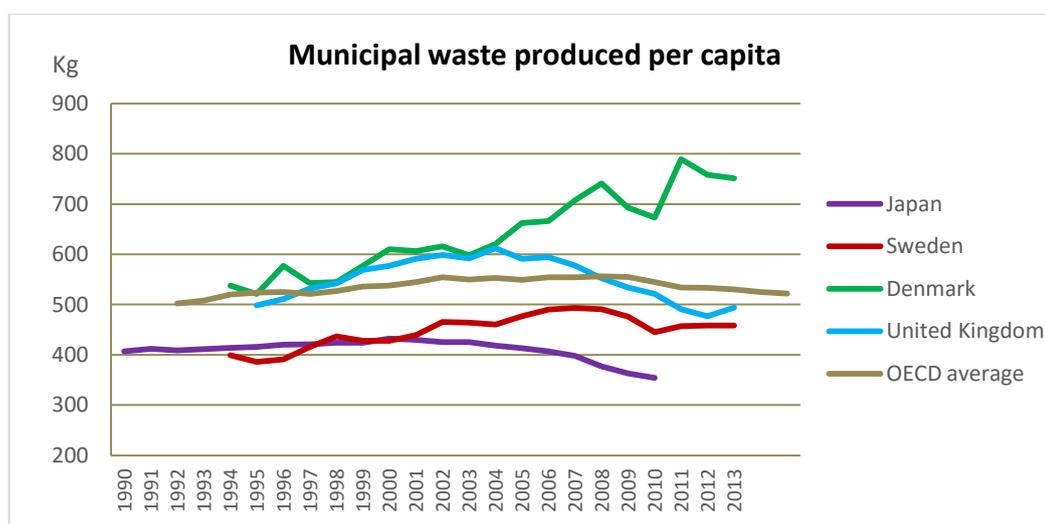


Figure A44.13: A comparison of waste production per capita (Data: OECD, 2014c. Dataset: municipal waste, generation and treatment)

To summarise materials management, consumption per head in both Japan and the United Kingdom is very similar, and has fallen steadily through the years. In contrast, both Denmark and Sweden consume more materials per head than the OECD average, and twice the amount of Japan and the United Kingdom.

Waste management also appears to have been addressed more rigorously by both the British and the Japanese, especially after 2004. Neither the Danes nor the Swedes appear to have checked their waste production much over the years, the Danes more markedly so, ending the period producing twice the waste of Sweden.

Wealth and taxation

Comparison of taxation within the countries identifies further difference. The purpose of assessing taxation is to establish the extent to which finance is used as a tool to influence behaviour, and assess the spending power of the nation, at both governmental and individual level.

Denmark's reported use of environmental taxation is evident when comparing the performance of the four countries (figure A44.14) and dropped to 4% of GDP at its lowest. Japan in contrast remained the most stable at between 1.5 and 1.7%. Sweden decreased from 3% to 2.5% over the course of the period. Environmental taxation fell between 2000 and 2005 in the UK, coinciding with the removal of the escalator on the fuel tax, and more steadily in the case of the Swedes.

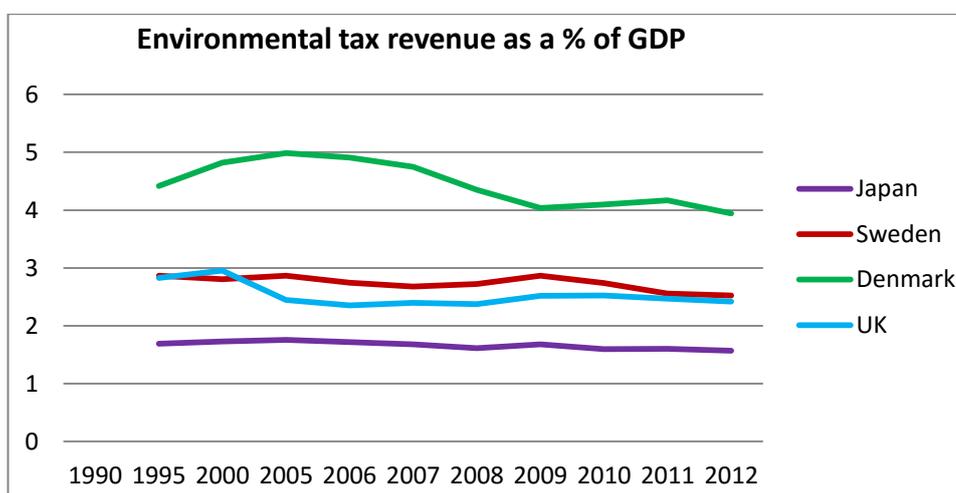


Figure A44.14: Environmental taxation as a percentage of GDP (Data: OECD, 2014c. Dataset: green growth indicators)

It should not be assumed that environmental taxation is indicative of the expenditure on environment-facing activities. Governments do not always ring-fence their revenues in this way. It is therefore of interest to compare the total taxation revenue because it signifies the total revenue available to the government that can be drawn on to support both society and the environment.

Section 8.5.3 revealed that labour taxes in Denmark were low in comparison to the other countries in the study, compensating for its high environmental taxation. However, figure A44.15 reveals that, at between 47 and 50%, Denmark's total taxation in terms of percentage of GDP was the highest of the four countries, marginally higher than that of Sweden. At 37% of GDP, British

taxation equated to that of the average OECD country, and Japan's remained at 7% lower throughout the period.

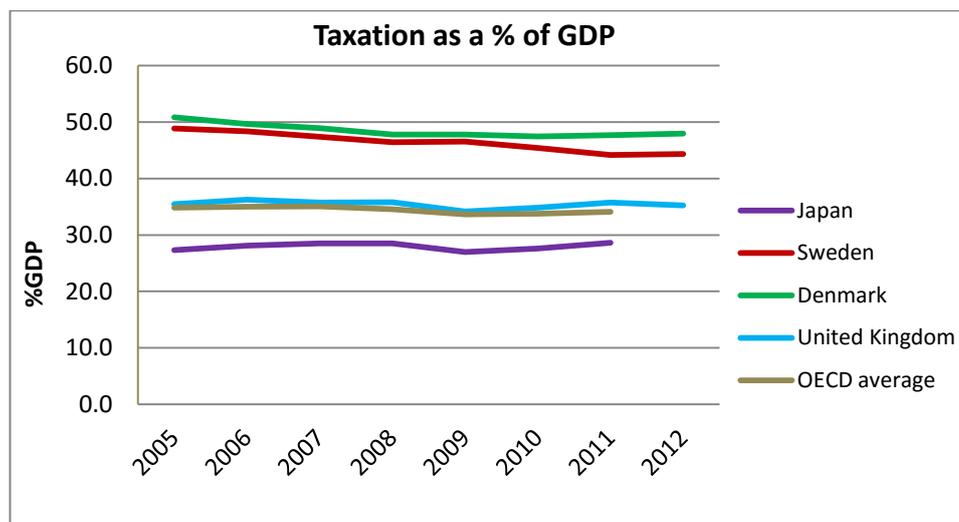


Figure A44.15: Taxation as a percentage of GDP (Data: OECD, 2013)

It has been established that the GDP of Denmark has not grown at the same rate as that of Sweden and the UK. However, figure A44.16 demonstrates that the total tax revenue per capita was the highest for the Danes, being double that of the British and Japanese. Thus the Danish government had access to the greatest level of funding per head of population to deliver support including action to support the environment.

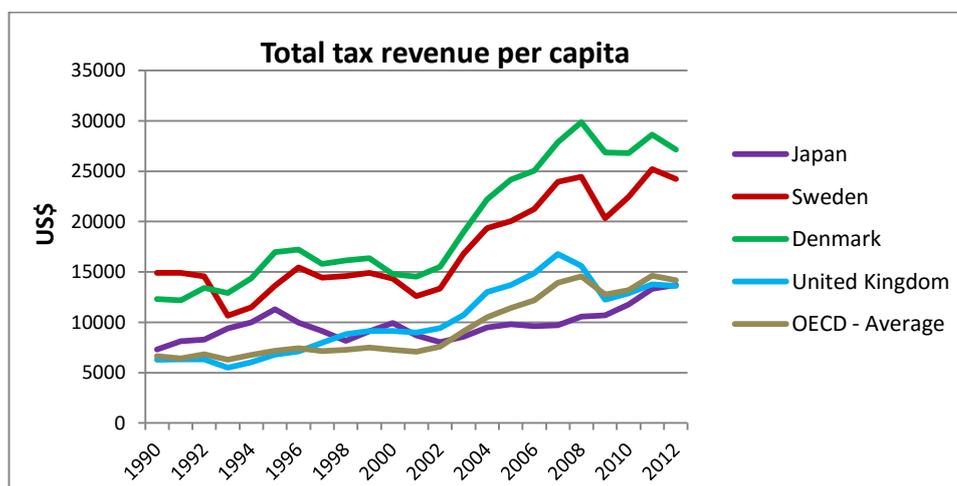


Figure A44.16: Total tax revenue per capita (Data: OECD, 2014c. Dataset: revenue statistics)

The level of comparative wealth of the average Dane is also of significance because of the association of environmental demand with affluence established in section 2.2.1. Figure A44.17 shows that average wages in the western countries rose at a steady rate throughout the period from 1990 to 2012, with those of Sweden remaining an average of US\$9,000 below those of Denmark.

In contrast, the average wages of the Japanese remained the same throughout the period, ending US\$5,000 lower than Sweden.

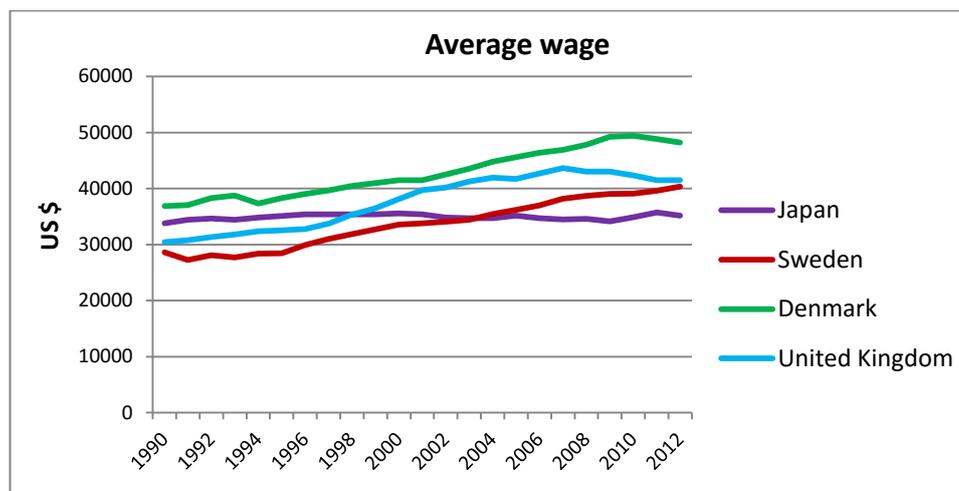


Figure A44.17: Average wages (Data: OECD, 2015)

To get a true picture of the wealth of the populace it is necessary to compare wages to the cost of living. For this, purchasing power parity is used, being a figure that indexes purchasing power to a reference point, enabling comparisons to be drawn.

Purchasing power parity

The OECD provides purchasing power parity indexed to the average for the OECD countries. Any comparative chart of this nature should be read with caution because of the underlying premise that the reference point is stable. This is not necessarily the case. Hence the data are presented as a bar chart and only relationships within each cluster can be compared (figure A44.18).

The conclusions that can be drawn are that over the period in question all four nations have enjoyed a purchasing power that equalled or bettered the OECD average. Purchasing power has varied by as much as 54%, with Japan having significantly greater purchasing power than the western countries at the outset, but becoming the most expensive nation between 2006 and 2008, appearing to bear an inverse relationship to that of Denmark, which enjoyed greater purchasing power from 2003 onwards. Apart from three years, the United Kingdom was the most expensive place within the sample to live over this period.

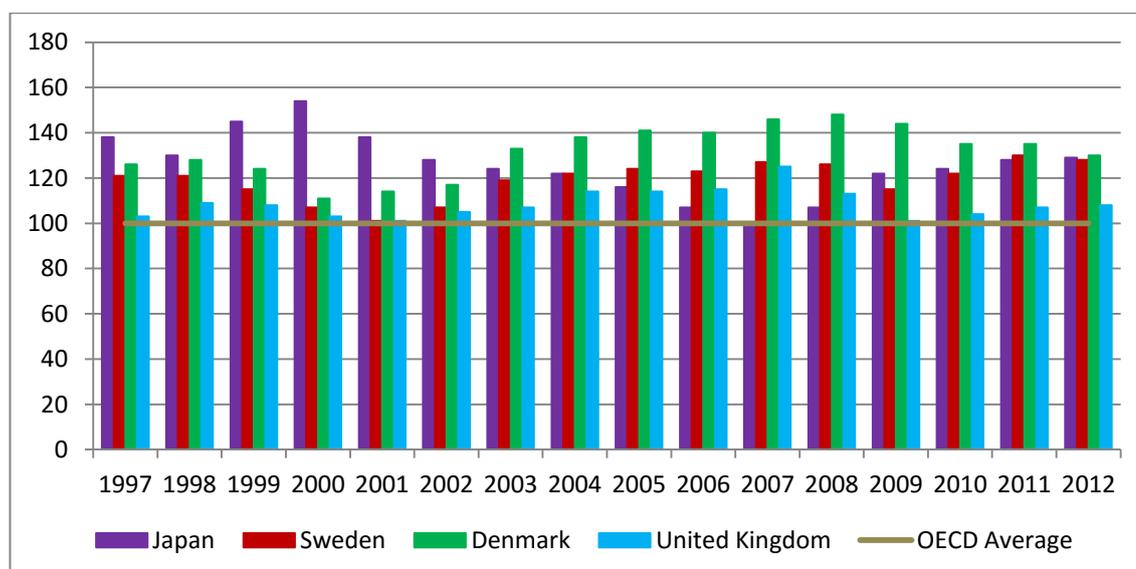


Figure A44.18: Comparison of purchasing power parity, indexed: OECD = 100 (Data: OECD, 2014b. Dataset: prices and purchasing power parities)

Assessing figures A44.17 and A44.18 in conjunction, it becomes clearer that not only do the Danes have the highest average wage, but for much of the period their cost of living was lower than that of the other nations, augmenting their spending power. In contrast, the Japanese, who in 2007 had wages that were 73% of the Danes', had a spending power that was 46% lower than the Danes. Similarly, in 2009 the spending power of the British was 43% lower than the Danes, whose average pay was 13% higher.

This discussion of the financial wealth of the four nations has revealed certain trends. It would be reasonable to conclude that of the four, the Danes enjoy the greatest spending power, and the Japanese, the greatest stability. Whereas the British followed by the Swedes have seen the greatest rises in their GDP, it has not translated to higher wages or a lower cost of living. When assessing the finance the governments had to draw on, the revenue of the Danes per head, followed by that of the Swedes, was significantly higher than that enjoyed by the British or the Japanese.

It could be argued that these characteristics are potentially self-balancing. Whilst the Danish government has greater funding and could potentially invest in an infrastructure that lessens the impact of human activity on the environment, the populace has a greater spending power with which to use resources. In contrast, the British government has a lower level of revenue and the people less spending power, suggesting that the government might not

have the resources for significant investment in the infrastructure, but the ability of the people to consume resources is also constrained.

Innovation

When comparing expenditure on environmental research and development, yet a further trend is continued (figure A44.19). The performance of Japan and the UK is a stark contrast to that of Denmark and Sweden. The late arrival of the United Kingdom to the realisation that steps should be taken to improve performance is evident in that spending lagged behind that of Japan at the outset, and only really increased dramatically in 2007. Although they had witnessed greater gains in their GDP, both the Danes and the Swedes have cut the percentage that they invest in environmental research and development. The British, on the other hand, significantly increased their investment and the associated percentage of their GDP.

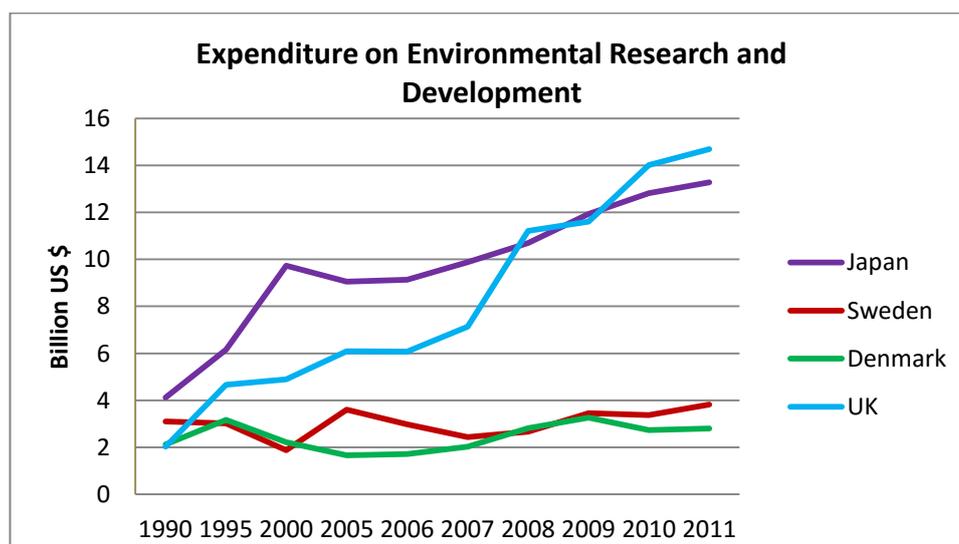


Figure A44.19: A comparison of environmental research and development expenditure

The technological expertise of the Japanese is evident when assessing the return they have achieved on their investment in research and development. Their conversion rate is nearly ten times that of the western nations (figure A44.20). The British, on the other hand, have not increased their patents as significantly as the Scandinavians, although it should be noted that indexed statistics do not reflect the initial position and any of these three countries could be producing the most patents.

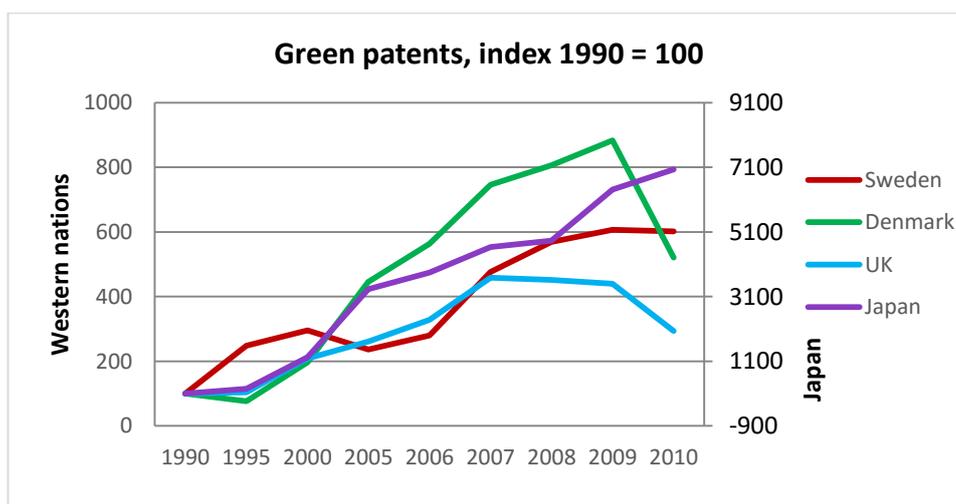


Figure A44.20: Green patents, indexed: 1990 = 100 (Data: OECD, 2014c. Dataset: green growth indicators)

In conjunction with the WWF, Pared (2014) ranked the performance of OECD countries where clean technology innovation is concerned using a broader basis than just the statistics published by OECD.

All four countries are ranked very closely together, and are near the top of the index. They are all seen to have different strengths. Thus, whilst Japan and Sweden have not commercialised many of their innovations and the United Kingdom has not as many patents, they are all mitigated by a high score for emerging innovations, and Sweden benefits from an entrepreneurial culture. Japan's principal strength is its number of cleantech patents, it being a country that does not support entrepreneurial activity, and clean technologies are not prioritised where investment is concerned.

Denmark was noted for the extent to which clean technologies have become commercialised and for supportive government structures. At the time of preparing the report, the United Kingdom was seen to have an infrastructure that supported entrepreneurs, but there was concern about a perceived lack of political will, with uncertainty revolving around the direction of policy after 2020.