Creating sustainability: an exploration of innovation through dialogues

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CREATING SUSTAINABILITY: AN EXPLORATION OF INNOVATION THROUGH DIALOGUES

By

MARGARIDA MONTEIRO DE BARROS

A Doctoral Thesis
Submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy of Loughborough University

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ABSTRACT

Over the next 40 years industrialised economies will need to change the way in which they use resources by a Factor of 10: this equates to a 90 per cent increase in resource productivity and will require a radical shift in our thinking and practice. This research explores what such change may mean and how it may be facilitated. Such a change resonates with the growing need for industrial systems to operate within the Earth’s natural limits and fundamentally challenges *business-as-usual* responses to sustainability.

This research addresses how people can begin to create sustainability. It is qualitative in nature, follows a constructivist grounded theory methodology and is strongly based on dialogues as a process to enable deeper understanding and a creative participatory approach. Dialogues were conducted with ten sustainability experts, three sustainability consultants and six organisations that are already shifting ways of thinking and practice towards creating sustainability. Early dialogues with sustainability experts and organisations were central in understanding mindsets and personal experiences and the research shows that individuals and their values, beliefs and motivations are essential in challenging the *business-as-usual* paradigm. Dialogues were further cultivated in three workshops conducted with a broad audience to explore the early research findings and to help refine the development of the main output of the research, SuCo. SuCo is a methodology to address innovation for sustainability that addresses both Sustainable Cultural and Operational transformations. In the latter stage of the research two organisations were approached to apply SuCo to better understand its validity and usability.

SuCo addresses innovation for sustainability from a radical perspective to promote an approach towards sustainable cultures and outputs. It is a useful beginning to an ongoing and much needed dialogue about sustainable-oriented futures.
ACKNOWLEDGEMENTS

I want to thank so many people that I prefer to create an image as a thank you note to them all, although I feel that I need to distinguish two important acknowledgements.

The first goes to my mentor and supervisor Emma Dewberry, who has been remarkable in accompanying me on this roller coaster journey. Her calm and inspired words always echo in my mind.

I also want to thank the Engineering and Physical Sciences Research Council (EPSRC) for funding my research project “Design Dialogues: An exploratory study of design narratives, methodologies and tools towards achieving Factor10 outcomes” (2005-2008). Without this grant I could not have dedicated myself to this deep investigation.

The figure below represents all the other individuals that have been so important to me in this great accomplishment – my Ph.D study. The hearts represent family and friendship love; the green star goes to those people which ideas and thoughts help me during this journey, also to those which helped this research by opening their contacts or their companies.
Publications

JOURNAL PAPER


CONFERENCE PAPER


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CHAPTER 1

Aware of the tragedy of the world, the terrifying events that may happen should some crazy person press a button; the computer taking over man's capacities, thinking much quicker and more accurately - what is going to happen to the human being? This is the vast problem we are facing (Krishnamurti, 1984).
1. INTRODUCTION

This chapter presents an overview of the thesis: the purpose, perspective, origins and nature of inquiry

The background of the research together with its aim and objectives are outlined and the overall deliverables of the research and the domains and contribution to knowledge presented. The structure of the thesis is introduced with a brief summary of the content of each chapter.

1.0. SUMMARY

This chapter presents:

— the case for a radical approach to sustainability to challenge business mindsets

— the relation of Factors 10 realities and the responsibility of design to fulfil those and business survival depends on the incorporation of factor 10 requirements

— the settings for a different role of design for sustainability

— the aim of this research to implement new ways to deliver outputs that promote sustainability;

— the difference between this research perspective and other projects and studies with similar objectives
Figure 1.1: Summary of thesis content
Chapter 1

1.1 BACKGROUND TO THE RESEARCH

The term *sustainability* it is not as widespread as the term *sustainable development* (SD) due to the promotion in 1987 of the latter by the Brundtland Commission, whose definition of SD is seeking continued economic growth without depleting the carrying capacity of the earth’s natural systems, whilst meeting good quality of life for present society and future generations (WCED, 1987).

Although this is the best known definition it can be argued that it is not the most accurate in matters involving broader issues of environment and society, because it serves the same interests as today’s economic model with its current commercial interests (Fuad-Luke, 2001b:4). Therefore sustainability it is not a new concept; all ecological systems work on principles of balance and equilibrium to exist and coexist. In this view sustainability refers to the ability of a system or process to be maintained in its ecosystem. In nature there is no waste; everything is a resource for something else, all to sustain life (Benyus, 1998) because ethics, altruism and selfishness are intrinsic in biology (Maturana et al., 1987:197).

Far from altruistic, our society is built around the idea of unlimited natural resources. We build systems which generate waste and do not provide resources for anything else. Vance Packard, in his book *The Waste Makers* (1960) was the first of many to highlight the problem of creating systems fed by the need to produce more and more ‘stuff’ and leading to increasing consumption, decreasing lifespan and increasing amounts of generated waste – creating the pattern of ‘disposability behaviour’ called the ‘throwaway society’ (Cooper, 2005).

We are quickly advancing to the limits of the resources and energy available for our use. Western societies have been responsible for consuming more than 80% of the total world’s natural resources for too long. India and China are catching up fast on economic development, still associating this with the idea of unlimited resource availability. Society continues to pursue unsustainable lifestyles, around which businesses are built and for which industry produces products.

The current business mindset uses natural resources in a non-sustainable way to pursue financial profit; decisions are made from a mental model that forms the basis of present economic thinking with free-market systems of production and distribution and competitive advantage; growth in total output (GDP) maximizes human well-being; there is unlimited use of resources; environment concern is framed according to economic benefits; and the location of natural and human resources to serve
business imperatives (Hawken et al., 2000: 6). The ‘business imperatives’ of which quantity, analytical thinking and a deductive approach are key characteristics (Capra, 1997:4;5) focus industrial capitalism on improving resource productivity per unit (Dyllick and Hockerts, 2002). Such a view reduces the potential of sustainable corporate strategies by locking sustainability into a business model with a strong economic driver focused on producing economic benefits for business and shareholders at any cost.

The historic notions that humans can displace resources through extraction and processing, consume them in manufacture and use and permanently displace them as waste throughout the whole life of material flow and specifically at the end of their useful life are no longer tenable due to earth’s capacity.

Industry has been focused on “incremental improvements which are insufficient (in isolation) as a means for achieving a sustainable future” (Lewis and Gertsakis, 2001:191), working towards efficiency without acknowledging the effectiveness of the whole reduces the potential for the creation of different solutions (McDonough and Braungart, 2002). While these strategies of material reduction, energy efficiency and production line improvement can be effective in reducing environmental impacts on a per unit basis, they do little to address the net rise in the use of materials and energy resources associated with the increasing level of global consumption (Roy, 2000).

Industry has a central responsibility to the choices we consumers make, and it has become increasingly clear that as the largest global economic player it also has a central responsibility for driving sustainable change (Fussler and James, 1996). A reactive solution like this does not offer choices of actions that are different from what we already know and trust (Senge et al., 2004).

Worldwide, legislation is generally incremental in nature when dealing with end-of-pipe/waste treatment and reduction (e.g. WEEE Legislation). More proactive approaches are starting to appear with future scenarios of waste prevention and zero waste (e.g. Cancun Summit, Mexico 2010) which focus interventions on front-end decision making rather than on tail-end clean-ups.

The future industrial context is of Factor Ten (F10). Factor Ten equates to a 10-fold increase in resource productivity within a period of 30-50 years by 2050 (Factor 10 Club, Carnoules Declaration, 1995). A number of commentators (Hawken et al, 2000; Manzini, 2001) have established the need for a step-change in behaviour to achieve such a level of improvement in Western economies, as required for global sustainable development.
This is cause for concern, the EU presidency underlines that:

**Current developments are in many respects not sustainable; limits on the carrying capacity of the earth are being exceeded and social and economic capital is under pressure. Although it has been stated repeatedly that change is necessary, results are limited. The recent progress regarding EU climate policy shows that the EU is capable of converting the necessary political will into rigorous policy interventions, which combine leadership, vision and concrete measures. (Council of the European Union, December 2009)**

Boundaries for business and industry are still defined by traditional economics and do not take into account natural limits, which are implicit within the concept of sustainability. Deeper questioning is required about how available supplies can be used more intelligently (Schmidt-Bleek, 2000:2) and how this process envisages new connections between durability and sustainability that embrace innovation in production, trade and consumption.

Such awareness makes a case for designing more radically to foster resource productivity in the long term, and requires exploration of the relationship between current design for sustainability (DfS) and the need to develop different types of business and industrial outcomes.

Designers and all who are responsible for creating products for consumption that serve industry and business need to reconceived ways to meet demand and contribute significantly to creating sustainability, rather than trying to reduce unsustainability by making what we do today less bad (Ehrenfeld, 2004: 2). Identifying opportunities and challenging barriers to action (e.g. mindsets) are needed in order to address “peoples’ real needs” (Papanek, 1971). There is a need to question problems from a systems perspective, allowing the creation of tangible solutions leading to alternative consumption choices aligned with sustainable lifestyles (Dewberry and Sherwin, 2003).

Uniquely situated between the discourses of production and consumption, design may offer a creative response to limits to growth as products are increasingly bought, used and disposed of globally, designing more efficient products is not the answer because “in recent years, innovations have increased the eco-efficiency of industry significantly. However, net resource and energy flow have increased at a faster rate, due to increasing production and consumption” (Birkeland, 2002:7).
Taking a proactive approach to sustainability at a strategic level can create a seedbed for innovation, which in return can create long term competitive advantages (Stanwick in Starik et al., 2005). Implicit in this transition is the need to question problems holistically, allowing new connections to emerge towards alternative consumption choices and the tangibility of more sustainable lifestyles (Dewberry and Sherwin, 2003).

The design community, business community and industry need a mind-shift from a dominant techno-economics view, where ecological and the human are add-ons, to a view of intervention integrating the ecology, humans and techno-economics with the ecology setting the limits to action. This framework suggests a radical shift in perceptions, thoughts and values to find different answers in which interventions are informed by an understanding of biospherical limits.

For these interventions to be effective it is important to seek out the drivers of organisational, industry and design activity and to understand how companies and individuals can mobilise themselves from a position of being seemingly independent of natural systems to one that embraces their interdependency and interconnectivity.

1.1.1. ORIGINS OF THE RESEARCH JOURNEY

This thesis is part of the Engineering and the Physical Sciences Research Council (EPSRC) funded research project Design Dialogues (2005-2008) which draws on the idea that a transformation in mindset about resource limits is required (Starkey and Crane, 2003). To change peoples’ mindsets and attitudes, the late physicist David Bohm suggested a disassociation from existing patterns of behaviour in order to envisage new, more appropriate patterns of activity (Bohm, 2000). From this point of view, this thesis seeks to realise the necessity of starting to relate inputs of a system (e.g. thought, imagination) with outputs (e.g. language, communication and activities), recognising that people (individuals, communities, organisations and government) need to start liking their own behaviour, actions and activities in order to begin to establish different relationships between natural and human capital and by doing so potentially generate outputs that encourage sustainability.
1.1.2. PERSONAL INTERESTS

The beginning of this PhD pathway was prompted by the inability felt by the author an innovation consultant to apply sustainability from a holistic view and not as an add-on. How can sustainability be applied? How do people do it? These *hows* became increasingly relevant and drove this investigation.

Although having design as academic background, the author’s industrial experience is led by relating innovation strategies for businesses to new products and services. Working with a vast portfolio of clients from different countries and sectors and with different needs, gave the author a broad knowledge about the state of industry, and the way sustainability is being applied.

Although key experts have been working on changing the perception of sustainability as a barrier to growth, industry and business continue to see as such rather than as a new *opportunity* for different growth. This contradiction between the pessimistic view of business and industry and the cautiously positive view of sustainability experts intrigued the author and interested her in investigating a positive path towards sustainability investigating ways to incorporate the ecological mindset.

Acknowledging this was found to be very relevant at the point of creating the outcome of this research: a methodology for sustainability from an innovation perspective (SuCo – Sustainable Cultures and Operations). The innovation here aims to address sustainability from the perspective of generating positive opportunities. Thus the outcome of the thesis has strong foundations on the background of the researcher.

1.2. RESEARCH AIM, GOAL, OBJECTIVES AND QUESTIONS

1.2.1. RESEARCH AIM

The research aim is to implement new ways to deliver outputs that promote sustainability by viewing design as a strategic role through its intervention in organisations’ values, strategies, structures, systems, processes and actions (e.g. beyond the traditional outputs: products and services).
1.2.2. RESEARCH GOAL, OBJECTIVES AND QUESTIONS

The goal is to understand how design thinking can be used by organisations to incorporate and implement interventions that enable transformations from an unsustainable to a sustainable business practice within the context of Factor10.

Design thinking can be seen as an approach to locating the critical within the creative act. Often thought of in terms of design deliverables such as sketches and prototypes, design thinking is perhaps more readily identified with the thought process associated with the creation of such things than with the deliverables themselves. One way to consider it is as a sense making process (Wylant, 2009:4).

Make sense of things in a context is the main cognitive device portrayed by the term design thinking (ibid:5). The challenge for design towards sustainability lies in doing this before anything actually exists; it “requires an understanding of how design decisions, and thus design manifestations, will fit within larger streams of consideration” (ibid)

On the basis of the above aim and goal there are four objectives and their corresponding research questions:

1- Identify the key aspects which enable design to influence and contribute to decision making towards sustainability.
   — How can design thinking be used to achieve sustainability; influence/inform decisions towards sustainability; and intervene to enable sustainable outcomes?

2- Understand what approaches will lead to a future context for industry/business that has been shaped by a requirement to increase an energy and resource utilisation by 90% or F10.
   — Can an intervention in decision making via design thinking achieve a radical or incremental approach to F10? Can both types of approaches be concurrent?

3- Acknowledge, adapt, design and develop new approaches, methods, processes and tools to guide organisations’ decision making towards sustainability.
   — How can approaches, methods and tools to be used in decision making towards creating sustainability be developed, helping to incorporate and implement interventions towards sustainability?
4- Understand how an intervention in guiding decision making can: introduce system thinking; help to recognise the old paradigm; establish a new paradigm; and build paths and relationships between the old and new paradigms.

— How can the perception of sustainability as seen (mainly) as an ‘environmental attribute’ be shifted and systems thinking incorporate?

—

1.2.2.1. Conclusions:
The next table presents a brief summary of what chapters contributes to answer the research questions, as well as the answers generated from this research.
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| **1- Identify the key aspects which enable design to influence and contribute to decision making towards sustainability.** How can design thinking be used to achieve sustainability; influence/inform decisions towards sustainability; and intervene to enable sustainable outcomes? | **Chapter 2** literature review determines the importance of strategic design beyond the traditional remit of product development  
**Chapter 4** describes the conclusions of the dialogues with expert sustainability practitioners and academics that specifically highlight the need for a value-led sustainability culture and its strong relationship to outputs that effectively contribute to sustainability goals  
**Chapter 9** summarises key findings of the research, namely: The definition of radical innovation towards sustainability framed around a value-led mindset. This is drawn from an understanding of ecological thinking associated with living systems, system thinking and multiple scales of intervention and how together with a dialogues approach, to explore levels and processes of intervention from an innovation perspective. | Under this thesis conclusion the role of design and the use of design thinking needs to be strategic in which design for sustainability asks for a radical innovation regarding interventions at the level of values and motivation (including the individual level) towards a paradigm change. Thereby interventions need to be made at the level of inputs (values, beliefs and motivations) and outputs (any interactions – including products services and systems) that foster design strategies for change |
| **2- Understand what approaches will lead to a future context for industry/business requirement to increase an energy and resource utilisation by 90% or F10.** Can an intervention in decision making via design thinking achieve a radical or incremental approach to F10? Can both types of approaches be concurrent? | **Chapter 2** describes the connection between Factor 10 efficiencies and the need for radical innovation to achieve a paradigm change that integrates a more qualitative view of F10 associated with how people use resources through their lifestyles  
**Chapter 4** defines key elements that need to be included in an design intervention such as values and motivations  
**Chapter 5** reveals the real connection between values and motivation and organisations’ outputs towards sustainability | The research creates paths of design interventions, in order to create sustainability. It generate a body of literature and gather data that sustain the need to approach the current paradigm radically in order to change it. It provides a finding in which embracing simultaneously an incremental change at the level of ways-of-doing (habits) but a radical change on the mindset to create new outputs. Further, this thesis underlines the need to change design focus from product and product life-cycle, to the life cycle of any system of intervention (e.g. business cycle) |
<table>
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<tr>
<th>Chapter 1</th>
<th>Chapter 2 underlines the importance of systems thinking in connecting ecology and sustainability and in establishing the need for a paradigm change.</th>
<th>This investigation presents facts that support the linkage between the system’s values-set and the system’s outputs. It underpins the need to intervene in the values system to responding to the goals of sustainability and act accordingly. It presents an approach to constructing a model for innovation for sustainability (SuCo methodology), where design interventions are used to: a) find resonance in the system of intervention (e.g. the organisation) with the values towards sustainability; b) help understand outputs beyond products and actions (i.e. as a result of any inter- or intra-action; c) create a view of opportunities at the system of relationships and d) develop indicators to act concurrently in every dimension of sustainability.</th>
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<td><strong>3-</strong> Acknowledge, adapt, design and develop new approaches, methods, processes and tools to guide organisations’ decision making towards sustainability. How can approaches, methods and tools to be used in decision making towards creating sustainability be developed, helping to incorporate and implement interventions towards sustainability?</td>
<td><strong>Chapter 4</strong> provides an understanding from the initial dialogues for the need for interventions at values and motivations levels at different scales, underlying the importance of the individual. <strong>Chapter 5</strong> discusses the existing relationship between values-led organisations and their outputs towards sustainability. <strong>Chapter 6</strong> presents the analysis of the dialogues and the literature that help the analyse, and demonstrates a different way of understanding and looking for outputs, understanding sustainability values through the eyes of an organisations; and relating the different dimensions of sustainability (which were characterised by elements that provide a framework to act. Example: dimension of People: relevant element to add value on People are – Infrastructure; Culture/habits; and Governance. <strong>Chapter 7</strong> presents a suggestion of a methodology that can intervene strategically, innovatively and radically to create sustainability.</td>
<td>The study presents ecological thinking that integrates a positive view of sustainability that challenges traditional growth parameters beyond financial behaviour, to present a series of new drivers in which design thinking plays a fundamental role by embedding sustainability in the underpinning culture to drive sustainability-value-led futures. The SuCO methodology is an output of the research where the research aim proposes a model to transfer a process of thinking about sustainability using design interventions to</td>
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<td>Chapter 4</td>
<td>Chapter 6 presents a set of positioning principles as a way to uncover individuals’ ways of thinking/valuing sustainability issues. It relates any action to a system of relationships at multiple scales, linking thoughts to actions and describes elements of scale and intervention that can guide activities and outputs for sustainability. <strong>Chapter 7</strong> elaborates a correspondence between ways of thinking, seeing and acting, and illustrates how design interventions can act in relating these three elements *(i)<em>thinking</em> as a mindset; <em>(ii)</em> seeing – as a</td>
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(mainly) as an ‘environmental attribute’ be shifted and systems thinking incorporate?

framework; (iii) acting – as a process), by doing so uncovers a different (but not alienated) culture embedding sustainability. Following the body of literature of this research, and the data gathered, one finding is: by transforming the culture, the potential to act differently increases. This proposes a revolution in the way design or any other interventional field, understands outputs, because the view is no longer focus on products or services (or the development process), but focus on the system (and the relationships of the system) to construct paths towards sustainability. create transdisciplinary, multi-scale, multi-level and transversal ways to systemically change the system inputs and outputs. The model proposes, through a participatory approach, a behavioural component (values-set: cultural transition) to a more strategic innovation approach in its operational component. – Figures on Chapter 7, from 7.3 to 7.11 present a snapshot of these components, and Chapter 8 presents how SuCO can be placed in practice.

Table 1.1. – Chapters that contributed to answer the research question
1.1.3. RESEARCH FOCUS

This research focuses on creating solutions to facilitate the integration of ecological thinking, which underpins a shift in thinking from focusing on the parts of the system to instead addressing the relations and connections of the whole.

This represents a challenge with three aspects:

— A mind-shift in the design community which generally sees sustainability as a dimension of design, sees it as an ‘add-on’ to improve performance rather than design “viewed as a dimension of sustainability” (Dewberry and Fletcher, 2001)

— A mind-shift in business culture to embrace the capabilities and potential of design thinking to operate at a strategic level to a) manage a network of actors and develop visions and scenarios for sustainable futures (Manzini, 2005), b) introduction of new values in business (Manzini, 1992b) for different choices and opportunities.

— The incorporation, understanding and manipulation of different forms of communication and language as intervention mechanisms that stimulate the imagination and influence change towards an F10 level of improvement as one of the strategic tools of DfS (Bohm, 2000)

1.1.4. RESEARCH APPROACH

To deeply understand how people currently create sustainability from a design thinking perspective in the fields of organisations, industry and design is the core to this research.

From a constructivist grounded theory approach (Charmaz, 2003) this qualitative research context aims to evolve an understanding of how people see, perceive and describe their wellbeing, welfare and ideas of desirable futures (Denzin and Lincoln, 2003) in order to be able to describe sustainability in.

To support the intention of this research a multi-method approach to data collection was used (Robson, 2002:270) in which dialogues are central to drawing out the sharing of visions to co-construct possible F10 futures (rooted in Bohm’s ideas, 2000).

The key purpose of using dialogues was to establish a conversation as one between friends, to enable the sharing of ideas and mutual understanding of the other’s perspective in an effective way.
Dialogue is not discussion, as within discussion there is a winning position in which an idea will prevail that is not compatible with coherence and truth; dialogue seeks the learning dynamics of those who are participating towards a common meaning (Senge, 1994 citing the general work of Bohm in this matter)

Dialogues were used with an open-ended format as:

— a philosophy to deeply acknowledge people’s views on specific issues and ways of intervention to influence others (Bohm, 2000)

— a method of understanding the qualitative side of sustainability capturing personal visions and knowledge (Yiannis, 2000:4)

— a process to allow the collection of personal journeys and experiences of the practice of sustainability (Brown, 2005)

— a guidance (tool) to construct a cultural framework from stories that help to illustrate cultural shifts (Yiannis, 2000) and attempt to define a transformational change (i.e. a shift in business culture) (Brown, 2005)

— an output (e.g. a guide) to support different decisions towards sustainability that communicates and explores the dimensions of sustainability and potentially allow strategic and radical reorientation through facilitating a frame-breaking (e.g. paradigm change) (Greenwood and Hinings, 1993)

1.3. KEY DELIVERABLES

This thesis presents three theoretical conceptual models from literature, and a methodology for applying sustainability – SuCo – based on all types of data interrogated in the research journey.

The three theoretical deliverables help to achieve a better awareness of the interrelationships, correlations and connectivity among different views, main concepts and achievement; it helps to identify and understand the drivers of governments, society, business, industry, etc). One concept model presents a historical summary of the key elements of sustainable development, both in a general overview and in a specific design context, in order to show their integration; the other presents the degree in which the holistic vision is integrated in each decade of design history, and the place of environmental and social factors; it helps to grasp the amplitude/length of vision and the segmentation or concentration of ideas; the last exposes the
interrelationships and influences of each decade in terms of design focus. This helps in understanding which elements have emerged in the path of design towards sustainability.

The methodology to approach sustainability from an innovation perspective is named SuCo (Sustainable Cultures and Operations), provides a complete approach for: a) developing a culture towards sustainability; b) creating different outputs across the business cycle.

1.4. DOMAINS OF THE RESEARCH

The research project focuses on how DfS seeks new narratives and tools that will enable organisations to construct a path towards F10.

To understand DfS it is fundamental first to comprehend what sustainability means and how design/design thinking can contribute to it. It is also of great value to gain understanding of F10 and the responsibility of design in business’ future performance and ability to survive.

1.4.1. SUSTAINABLE DEVELOPMENT

As stated in 1.1, the best known definition of sustainability is “a form of sustainable development which meets the needs of the present without compromising the ability of future generations to meet their own needs”, which reveals a perspective on the paradigm of current business (Fuad-Luke, 2002b:2). A previous definition, but one less well known and which, according to Capra (1997:4), underlines a more social perspective, is simple, clear and beautiful: “A sustainable society is one that satisfies its needs without diminishing the prospects of future generations” (Brown, 1981). Both definitions refer to the long term impacts of current choices and are underpinned by the importance and value of the creation of visions of the future.

To construct a path towards sustainability requires a business approach distinct from the mechanistic conception of ‘business imperatives’ of which quantity, analytical thinking and a deductive approach are key characteristics (Capra, 1997:4,5). This change involves a mind-shift that reflects system thinking to incorporate new values and is capable of apprehending the whole as dependent and related to all its parts, as in a living system (Capra, 1997:4,5; Ehrenfeld, 2004: 4,9,10).

Another important point underlined in both definitions is visualising the future. To act upon this it is necessary to welcome a complex network of actors performing as a
community by sharing goals and working towards possible and desirable scenarios (Manzini, 2005:8). Further Both embrace the notion of ‘the ecological’ which concerns the interrelationships between organisms and the pattern of those relations within the environment (Haeckel, 1866 cited in Capra, 1997: 33), which today is far from integrated in business perspectives, approaches or views.

1.4.2. DESIGN

Design has been addressed as a technical, analytical and functional tool for business-as-usual to sustain profit. Its capacities as problem solver, integrating different dimensions, being the centre of a network that crosses different disciplines, to deliver the necessary organisational outcome (Papanek, 1973; Ehrenfeld, 2004; Manzini, 2005) is been underestimated. Design has the ability “to map, plan and prepare for uncertainties of the future and, where possible, shape it towards economic, social and environmental goals” (Dewberry and Sherwin, 2002). This suggests that design can adopt a more strategic role.

Businesses have not, to date, used design or design thinking to its full potential, and the design community is point out as unable to draw out design strengths and utilise them (Fuad-Luke, 2002b:3). The design community and business community need a mind shift to embrace and take advantage of the powers embedded in design thinking which are related to a multidisciplined, cooperating and systemic approach that fosters new opportunities. To take this direction it is necessary to question the deep relation of the product, service or system with the user and the environment, in what Manzini (1992) calls a “new product culture”.

1.4.3. SUSTAINABLE PRODUCTION AND CONSUMPTION

Design has always been related to production and consumption. It is used to ‘read’ consumers’ needs and deliver outputs that attract consumers with the objective of increasing levels of consumption and profit (Birkeland, 2002). Design is a discipline that leads to the materialisation of ideas into real products and processes by means of production. The dialogue towards sustainable production and consumption (F10) requires new types of solutions to facilitate designing for sustainability (Richardson, Irwin and Sherwin, 2005).

Cooper (2004) lists three types of obsolescence: technical obsolescence, which refers to new functions in newer models and results in changes in knowledge; economic obsolescence, where no value is attributed to an existing appliance and thus there is no worth in keeping it, and is very much related to the cost of a new
purchase vs the maintenance costs and material value base of the product (e.g. wood vs plastic); and psychological obsolescence, which occurs when people are no longer attracted to a product or satisfied by it, influenced by behaviour such as peer group pressure, fashion and marketing – the so called ‘semiotic environment’ (Manzini, 1992a2) or the “conversation between the designer, object and user” as expressed by Ehrenfeld (2004). The effectiveness and performance, value and symbolism of a product, service or system is a design matter. Therefore design has a key role to play in obsolescence – which summarises the dialogue between consumption and production – to shift ‘both production (products and processes) and consumption onto a more sustainable basis’ (Richardson, Irwin and Sherwin 2005).

There is a global alert to the way production is being held, which focuses on consumers and how they can be helped to make better choices. (Richardson, Irwin and Sherwin 2005), but worldwide legislation is incrementally becoming more restrictive, majorly focus on end-of-pipe/waste treatment and reduction (e.g. WEEE Legislation)

1.4.4. FACTOR X CONCEPT

The consumption scenario is alarming: in 1996 global consumption stood at 2.85 hectares per person, 30% more than biological availability, which is 2.18 hectares (Living Planet, 2000 report).

Even if it seems a very quantitative approach, Factor X (FX) concept questions how available supplies can be used more intelligently (Schimidt-Bleek, 2000:2). The concept of FX emerged in the 1990s, aiming to reduce the impact of economic activities on energy and resources, X being a factor between 4 and 50. The range of values proposed by X are multiples of 4; the higher the number, the potential of the improvement increases (Reijinders, 1998).

It is related to a change in lifestyle, an ‘eco-restructuring’ of the world economy and technological development more in tune with a strategy for better use of resources. This requires massive innovation in production, trade and consumption (Schimidt-Bleek, 2000:2).

Hunter et al. (1994) explore Factor 4 (F4): a 75% increase in resource productivity, a fourfold increase in efficiency of non-fuel materials and transport productivity. These authors (ibid) give examples of how ‘eco-efficiency’ approaches can foster change in the system (e.g. materials applied), although acting upon a F4 improvement you do not need to challenge the system in which you operate (Reijinders, 1998), as reflects actions to diminish unsustainability (Ehrenfeld, 2004).
Chapter 1

F10, which equates to a 10-fold increase in resource productivity, expects a period of 30-50 years to be reached i.e. consuming 90% less of resources by 2050 (F10 Club, Carnoules declaration, 1995). It requires a more innovative focus in terms of technology, social innovation, the co-evolution of the economy to redirect production and consumption (Schimidt-Bleek, 2000:3). It involves a combination of technical, financial and lifestyle changes (Reijinders, 1998).

There are no concrete examples of an F10 improvement, but approaches are being made such as:

— some government initiatives in Europe, especially by the Austrian government, which aims to dematerialise its economy (Reijinders, 1998).

— the concept of Cradle-to-Cradle which proposes to design systems which operates according to two metabolisms: the natural (e.g. biodegradable) and technical (e.g. motherboards), and each metabolism is responsible for ‘digesting’ its own mass/waste (McDonough and Braungart, 2001); what the authors called eco-effectiveness (ibid).

— Industrial ecology concept, based on ecosystem properties focuses on a systems approach methodology to develop a sustainable manufacturing strategy by drawing a parallel between the process of an industrial system and those of biological systems (Cooper, 1994; Eherenfeld, 2004).

— the Natural Step approach delivers a framework to establish a new set of system rules by encourage dialogue, consensus building and systems-thinking to enable conditions for change (Robèrt, 2002).

— Natural capitalism mindset works with four basic principles: radically increase the productivity of resource use; shift to biologically inspired production with closed loops; shift the business model of making and selling ‘things’ to one of providing what the ‘thing’ delivers; reinvest in natural and human capital (Hawken et al., 1994). It posits that services based on ecosystems are generators of immense economic value (ibid).

Factor 20 (or above), is a long-term goal and requires an approach period of more than 50-years; so far little has been done towards it. There are several tools to indicate performance towards FX such as: the eco-efficiency indicator based on life cycle analysis (LCA); although is being underline that the higher the Factor of approach the higher challenge it represents for the economic system (Reijinders, 1998:18; Schimidt-Bleek, 2000:1)
Design, which addresses consumption has a central role in achieving a FX performance, as the F10 manifesto states: "for reaching F10, massive technological and social innovation as well as redirection of consumption is unavoidable" (Schimidt-Bleek, 2000:7). Further a shift in innovation goals is needed to address the dematerialisation concept: "Dematerialised products are high quality products by definition, since they need to be long-lived and robust, they must be easy to operate, to maintain, to up-date and to repair which requires the design of eco-intelligent products" (Schimidt-Bleek, 2000:8).

If the future context of business, industry and society need to insure reduced and different use of energy and resources towards FX, DfS should help and provide tools for such a journey.

### 1.5 RESEARCH FRAMEWORK

Currently the word ‘sustainability’ is used in many areas and for many different as well as similar reasons. Different reasons because they have different drivers, some more driven by environmental degradation (e.g. ecodesign); others to find new value creation opportunities to economically sustain business (e.g. the triple bottom line); and yet others that are more related to social subjects (e.g. corporate social responsibility (CSR)). The similarity across them all is that they work towards sustainability and contribute to a sustainable development process.

The literature is not limited in quantity, but because it is becoming mainstream due to the use of the word ‘sustainability’ there has been a an explosion in publications in the area. It is hard to find relevant literature because sustainability is not generally treated as a subject in its own right but is mixed with different areas and issues, such as for instance management, marketing and branding prefixed by the word ‘sustainability’, e.g. sustainable management.

This research aims to focus on literature across discipline boundaries to build an understanding of visions of sustainability and ways of thinking and acting to interrelate and connect some of the diversity of such usage and practice. Fundamentally, its purpose is to help explore, exploit and achieve the aims and objectives of the research as presented above.

Therefore this investigation has three major areas of interest; design, organisation (sustainable development) and industry (Figure 1.2). These areas are interlinked and interdependent: all focus on products, services or systems; the relationship between
two of them affects the third (e.g. a relationship between design and industry incites a
dialogue between consumption and production, which, ultimately, creates an output
aiming to address sustainable development premises). They all centre their attention
on one driver more than another: sustainable development focuses on the economy
and the market; design focuses more on the social and environmental dimensions;
and industry in turn focuses on technological and market demand.

The design field of this research focuses on literature about practices that lead
towards a more sustainable outcome. It tries to comprehend the design process at a
general level (e.g. product development), and at a deeper level the relationship
between design and organisational strategic thinking.

Sustainable development literature in the field of organisations aims to provide a
background to businesses’ journey towards sustainability, uncover key drivers
between current business practices and businesses that embed natural limits; and
explores organisational ethics and ideas of change.

The field of industry is looked to gain a general understanding of: innovations in
production and technology; different approaches to production systems; how industry
deals with end-of-pipe waste activities; and their approach to selecting materials.
Figure 1.2: The three main fields of study

- ORGANISATIONS
  - Natural Step
  - Performance measures
  - Government strategies
  - Policies
  - Innovations
  - Knowledge management
  - Corporate social responsibility

- DESIGN
  - Green design
  - Ecological design
  - Slow design
  - Sustainable design
  - Design for the environment
  - Design for sustainability

- INDUSTRY
  - Energy & technology efficiency
  - Environment management
  - Cradle to cradle
  - Factor X
  - Natural Step
  - Industrial ecology
These three areas are the foundations of the research. Their interrelations allow three important subjects to emerge: production and consumption, which deal with both design and industry and have been discussed as an area of great importance to achieve sustainability; legislation and policies, which affect both industry and sustainable development in the field of organisations, not only because they mark limits but also because they set rules and goals for future performance; and finally business strategy and learning organisations. A focus on business strategy provides an opportunity to explore and gain knowledge of and about strategic thinking, tools and approaches related to strategic decision making together with an understanding of possibilities of influencing and guiding motivations, process and strategic decision making.

According to the above, other areas need to be taken into account to fully comprehend the three main areas of this research, such as: education: learning and teaching; communication: language; science of thought. Their importance is due to their ability to challenge existing behaviour (Bohm, 2000):

— Education will help to understand the best approach to establishing a dialogue with individuals (or organisations): dialogue being a way to explore individual and collective presuppositions, ideas, beliefs and feelings (Bohm et al., 1992);

— Communication and language provide an avenue to explore and influence the mechanism of thoughts and imagination which leads to a set of visualisations which, themselves, can lead to new decisions;

— The science of thought helps us to acknowledge and understand the current paradigm and how to provoke a mind-shift towards sustainability.

Education, communication and science of thought provide a foundation from which to uncover, understand and modify the mechanisms of interventions; these lead to the next subject of the research framework, which creates a border around all these areas: a shift of mind or paradigm change.

Figure 1.3 maps the overall framework of the research, and figure 1.4 identifies the opportunity area of this research to contribute to knowledge.
Figure 1.3: Overall research framework

- Communication Language
- Science of thought
- Literacy Dialogues
- Mind shift
- Paradigm change

- Business strategy
- Learning organisations

- Organisations
- Industry
- Legislation Policies

- Production Consumption
Figure 1.4: Opportunity for action within the research framework
1.6. CONTRIBUTION TO KNOWLEDGE

While steps towards DfS started with Papanek (1973) back in the 1970s, in the last two decades such practice has became more common and focuses on ecodesign approaches and practices (Ryan, 1998:3), addressing the environmental impact of products and processes (Dewberry and Goggin, 1996).

In recent years it has been important to differentiate design practices according to their impact and level of approach (Dewberry and Goggin, 1996) in order to differentiate DfS approaches from other design strategies linked to environmental and market advantages (Dewberry and Fletcher, 2001:3;4). It has been useful to clarify what the most recent studies try to reflect: the incremental approach, which does not challenge the system in which it operates; and the radical approach, which tries to establish new visions, parameters and lenses for a new system (McDonough and Braungart, 2002; Ehrenfeld, 2004; Manzini, 2005).

The current context of DfS starts to elevate the discussion in the business arena, involving three key aspects: dematerialisation; service products; and product-life extension (Manzini, 1997; Ryan, 1998:3; Schimidt-Bleek, 2000) that potentially challenge the system.

There are some projects with similar premises to those of this research, such as SusHouse, a European research project concerned with developing and evaluating scenarios for transitions to sustainable households (www.sushouse.tudelft.nl 1998-2000); HiCS, standing for highly customerised solutions, which aims to define the technological and organisational architecture of a HiCS design; the production and delivery system (Manzini et al., 2004); Demi: Linking Design with Sustainability, which is a web resource bringing together wide ranging information on DfS (www.demi.org.uk,1998-2001); D4S, a DfS project that joined several universities and companies across Europe, financed by the company InWEnt; Capacity Building International, Germany, presents three practical, step-by-step approaches to executing a D4S project in a company (Crul, et al, 2009); and Sustainable Futures 09, which focuses on creating benefits for companies that engage in a progressive change towards sustainability, translating sustainability endeavours into sustainable brand value (www.sustainablefutures09.com, 2009).

Although each project has a different starting point and different objectives, they all focus on some of the following: a) product or service development (e.g. D4S, Hics); or b) pursue incremental transformation towards sustainability scenarios (e.g.
SusHouse; Sustainable Futures 09). Only a few look at information that challenges the current mind-set (e.g. Demi; D4S). The Demi project, attempts to present a novel and holistic view suggesting systemic thinking and an ecological view presented through a complex series of interconnections. While D4S incorporates a view of product innovation in the arena of sustainability, bringing adding-value issues to business to the discussion.

None of the above projects inform their aim to challenge the system in which business and government operate; neither is it clear on those that focus on product development. These projects do not refer explicitly to a new role for designers. The project D4S utilises the design thinking capabilities, and while Hics incorporates it when dealing with a more or less systemic approach through its multi-disciplinary team, they refer to sustainability not as a different mindset for business and industry, but as an avenue of opportunity for business.

In conclusion:

— A radical approach towards sustainability is still to materialise;

— Existing projects do not relate explicitly outputs with inputs (nor do they approach both).

Projects that share some of the ambitions of this research reveal four gaps:

— Supported by current requirements (e.g. the UK Government’s sustainable development agenda, WEEE legislation), businesses are called to act upon goals of sustainable development and to comply with more complex social and environmental demands which challenge current economic goals, and yet solutions available that provide long-term thinking are difficult to identify. What does exist is a ‘cause and effect’ approach which provides short to medium term evidence and vision.

— visioning future scenarios of wellbeing and introducing new thinking and models for organisations related to “breaking out of the cage of dominant thought and behaviour” (Manzini, 2005) becomes difficult without tools, process and approaches capable of helping this transition.

— As seen in the Sushouse, HiCS and D4S projects, the decision making process that traditional design operates focuses on product development. Companies incorporate the design view of sustainability as a response to the need for improvement in their environmental performance, trusting in the Ecodesign product development approach (Ryan, 2003: 11,12),
intervening mainly in the “strategic’ definition of the product” (Manzini, 1992a:1). Even if design/design thinking has the potential to fulfil a strategic role in organisations, visualisation and planning for future uncertainties that respects social, economic and environmental dimensions, the business use of design as a tool, and the design community view of design, do not explore such perspectives (Dewberry and Sherwin, 2002). The capability of a radical approach to design for a creative intervention embedded in ecological thinking has not been explored. D4S starts to explore this, but under an incremental approach and not in connection with the integration of a new business mindset.

— F10 represents a quantitative measurement of impacts and deals with qualitative issues such as lifestyles (Schimidt-Bleek, 2000). However, in practice only quantitative tools have been developed to measure performance towards F10 (Reijinders, 1998; Schimidt-Bleek, 2000:3). Although D4S makes reference to F10, it seems not to address it from a qualitative side together with a quantitative perspective. This uncovers another gap: as F10 as a mindset to vision the future.

A new role for design is proposed by Manzini (2005; Manzini and Jegou, 2003), acknowledged in the Sushouse and HiCS projects and partly by the Demi project, and D4S.

This new role of design/design thinking suggests a position for design that reflects a more radical approach as pointed out, for example, by McDonough and Braungart (2001) and Ehrenfeld (2004), although current practices and real examples of products, services and systems can be labelled incremental approaches (Bhamra, 2004; Fuad-Luke, 2002; Lewis and Gertsakis, 2001). Not only is there a gap between the theory and the practice of design towards sustainability; but also there is a need to generate, create and develop concrete approaches, methodologies, methods and tools for this new designer’s role as “process facilitator who acts with design tools” (Manzini, 2005) together with the ability to challenge business imperatives from a radical perspective.

The scope of this research is novel: it aims to break the boundaries of disciplines as well as mindset in business, industry and design.

This research aspires to contribute to knowledge by presenting observations, findings, conceptual models and tools to fill the above gaps while seeking to fulfil the research aim, goal and objectives.
1.7. ORGANISATION OF THE THESIS

The research comprises five stages of development. The first considers the existing gaps in the literature and practices around sustainability and design, setting the tone for the whole of the research; the second stage reports dialogues with experts and organisations; the third analyses the qualitative data gathered from the dialogues; the fourth describes the innovative development of the methodology for sustainability (i.e. SuCo), which employed extensive the findings from the validation and evaluation stage of the research that, together with the overall conclusion, represent the fifth stage of this research.

This thesis can be perceived as a document that portrays the development of SuCo methodology, but the research did not have the objective of constructing SuCo at any of the three early stages. It was an investigation built by following the different research findings. These research findings illustrate the process and outcomes of a dialogues based methodology under a constructive paradigm, which led to the development of an approach to innovation for sustainability: SuCO methodology.

This document portrays the research in nine chapters:

Chapter 1 – Introduction

This chapter gives an overview of the thesis: presents the purpose, perspective, origins and nature of inquiry. The background of the research, its aim and objectives are outlined. The overall deliverables and the domains and contribution to knowledge of the research are also presented. Finally the structure of the thesis is introduced.

Chapter 2 – Literature review

This chapter presents two main bodies of knowledge, the first describing the ecological, systems, complexity and sustainability foundations of the research, the second focus on design, manufacturing and organisational’ elements relevant to this research. It positions the research in the context of the literature and outlines significant issues framing the research.

Chapter 3 – Research methodology

The broad scope of the research methodology is described and justified. The paradigm chosen, constructivist grounded theory, is presented. The research is both
exploratory and explanatory in nature. It is a qualitative study following a grounded theory strategy using dialogues to collect data and evaluate and validate the results

Chapter 4 – Exploratory dialogues
This chapter presents the first stage of data collection in the exploratory phase of this research using dialogues. It outlines the method, process and tools used as well as key findings from the analysis of the dialogues.

Chapter 5 – Dialogues with organisations
This chapter presents the second stage of data collection through dialogues from organisations that create sustainability. Again, it outlines the method, process and tools used, and presents key findings from the dialogues.

Chapter 6 - Making sense of the dialogues data
The maps and process used to analyse the data are presented together with the key findings that started shaping the methodology for the innovative creation of sustainability.

Chapter 7 - Development of a methodology for sustainability
The SuCo methodology is fully described, highlighting its components and how they relate with each other; the contexts of its use; and key expected results.

Chapter 8 - Evaluation and validation
An overview of the philosophical approach, the method followed and every key decision is reported in this chapter, followed by the results that helped to form the methodology for the innovative creation of Sustainability (SuCo). The final part of the chapter discusses how this methodology was applied in organisations to evaluate its usefulness and scope for encouraging innovation to create sustainability.

Chapter 9 - Discussion and conclusion
This concluding chapter highlights clear contributions to knowledge and potential paths for further research after presenting the research foundations, achievements, and limits as a synthesis of this study.

Figure 1.5 gives an overview of how the chapters interrelate. It is important to underline the following:

— Chapters 4 and 5 are closely related as their content is responsible for portraying the data gathered, first from experts in sustainable
development, eco-design and ecological economics, together with consultants in the field of sustainability; and secondly from organisations already addressing sustainability from the inside out in different sectors. Both feed Chapter 6 with deep qualitative data.

Chapter 6 is a key chapter, as it is responsible for generating meaning and relevance from the data gathered. This chapter provides the foundations of the outcome of this research: SuCo, as Chapter 7 illustrates. Both chapters are dependent on the validation and evaluation process discussed in Chapter 8. The feedback provided by presenting the early results of different stages of SuCo’s development to different interest groups contributed greatly to the definition of SuCo, supported by a more thorough data analysis.

Figure 1.5: Chapter dynamics
1.8. CHAPTER CONCLUSION

The context of the thesis is set, underlining the relevance of this research in the current body of literature and the fields of design and sustainability.

The constructivist grounded theory interpretative paradigm approach allows creating the building blocks of this study by uncovering directions from the data. The findings under a dialogues base methodology, led to the development of an output (SuCo) – Chapter 7 reports its development. It is important to underline this issue, as this document reports an investigation journey grounded form the findings, and not an investigation to support a pre-determine output.

The next chapters present how the aim, goal, objectives and research questions of this thesis were attained. Chapter 2 presents a journey inside the literature in relation to the research framework.
What is essential for man, whether young or old, is to live fully, integrally, and that is why our major problem is the cultivation of that intelligence which brings integration. Undue emphasis on any part of our total make-up gives a partial and therefore distorted view of life, and it is this distortion which is causing most of our difficulties (Krishnamurti, 1953).
2. LITERATURE REVIEW

An overview of current and relevant issues in the literature is reported together with the theoretical foundations of this research.

A synopsis and analysis of the literature is given within the context of this research, grounded in different areas of knowledge – ecology, and how it can be related to systems thinking and its relation to sustainability. Views of sustainability in the fields of organisational development and product development (design and manufacturing) are presented. Gaps in existing knowledge are shown. Key avenues to pursue novelty regarding contributions to the existing body of knowledge are emphasised.

2.0. SUMMARY

This chapter presents two major parts of literature: the first describing the ecological, systems, complexity and sustainability foundations of this thesis and the second part refers to sustainability from a design, manufacturing and organisational perspectives, thereby:

— Chapter 2 part A: Ecology, Systems and Sustainability;
— Chapter 2 part B: Sustainability within design, manufacturing and organisations
2.1. INTRODUCTION

The literature review covers extensive bodies of knowledge, some of which lie outside the sustainability, design and product development arenas, because they contribute to a better understanding of key topics in the development of this thesis.

In order to understand the sustainability body of knowledge, it is important to apprehend views of sustainability over time as they portrayed what informs the view of sustainability today and its different schools of thought and practical paths. There are other bodies of knowledge in this thesis whose contribution is very specific, in which the objective in looking at them was to understand key findings that inform this thesis development; for example notions of key living systems theory, not from the biological viewpoint but aiming to comprehend, in this case, key features of living systems. Another is the theory of values and motivations, in which the essential requirement of this thesis was access to leading knowledge to be able to understand the relationship of values and motivation to culture, paradigm change and overall sustainability. Another area that is important but not central to this thesis is organisational and management literature, for which the objective was to comprehend the relationship of organisation and management with sustainability and not to produce an extensive literature review.

To apprehend state of the art knowledge from perspectives that inform this thesis from subjects that are not central (as explained above), was important to use papers and other researchers’ thesis that gave an overview about these less central bodies of knowledge. This explains why some references, mainly in this chapter, are authors citing other authors.

During this thesis journey there were other contributions, as the literature was continually revisited to help the decision making, such as: the dialogues with sustainability experts, and the organisations dialogues which were essential to delineate the focus of the literature and other paths that emerged during the development of this thesis, as well as the validation and evaluation workshops which contributed greatly to the outcome of this thesis.
PART A

2a.1. ECOLOGY

References to the need to challenge current mindsets that do not acknowledge ecologic limits suggest a strong connection between ecology thinking and sustainability (Capra, 1997, Hawken et al., 2000, Fuad-Luke, 2001b). The above also reflects the aim and objectives of this research which aspires to change the popular perception of sustainability as an environmental attribute and deliver approaches to guide the creation of sustainability.

The importance of understanding ecology makes it essential to comprehend the connotations of this word with the paradigm related to it, but most significant of all is how it is viewed in this thesis from the arena of sustainability.

The ‘ecological’ concerns the interrelationships between organisms and the pattern of these relationships with the environment (Haeckel 1866, underlined by Capra, 1997: 33); ‘ecology’ is about the interaction of systems at different levels.

Ecology is recognised as paradigm as it involves a mind-shift that reflects system thinking incorporating new values, capable of apprehending the whole as dependent and related to all its parts, as in a living system (Capra, 1997:4, 5; Ehrenfeld 2004: 4, 9, 10).

Although the notions of ecology and ecology thinkers have been around for long time, our thinking and acting as a society is far from embedding and demonstrating ecological thinking, and as David Bohm mentioned in an interview at the Nils Bohr Institute in Copenhagen (1989): "Our future depends on whether we feel like part of this one whole or whether we feel we're separate" (www.inplicity.org), suggesting that a holistic approach is part of the ecological paradigm.

As Pickett and Cadenasso (2002:7) from the Institute of Ecosystems Studies (Cary) mention, there are four metaphorical origins with which we associate ecology:

— competition: the act of seeking or endeavouring to gain that for which another is also striving; rivalry; striving for superiority; as in the competition of two candidates for office. From Latin, competetre, to strive together.
— evolution: the act of unfolding or unrolling; a process of development, formation, or growth. From Latin, *evolution(-onis)*, an unrolling or opening; *e-*, out, and *volvere*, to roll.

— landscape: a picture representing a section of natural, inland scenery, as of pasture, woodland, mountains, etc. From Dutch, *land*, land, and *schap*, ship.

— succession: the act of succeeding or coming after another in order or sequence or to an office, estate, etc. From Old French, thence Latin, *successio (-onis)*, a coming into the place of another.

### 2a.1.1. ECOLOGY AND ECOSYSTEMS

The notion of ecosystems is normally related to ecology because they encompass a “biotic complex, an abiotic complex, the interaction between them, and a physical space” (Pickett and Cadenasso, 2002:3). This intersection of organismic biology and various physical sciences relates ecosystems study with ecology (ibid).

The notion of ecosystems is also related to different types of associations: the “ecosystem as a machine, the ecosystem as an organism, and the ecosystem as an algorithm. Behavioural metaphors include ecosystems as resilient structures or ecosystems as fragile structure” (Cronon, 1995 cited in ibid:5). They are also associated with holistic perception and systems thinking (ibid).

It can be said that ecology and everything that it stands for is the mindset in which ecosystems operate, although not even all ecosystems come under the ecological paradigm: there are some manmade ecosystems. Ecosystems which promote dynamic resilience are most appropriate for human ecosystems (e.g. manmade products) and the assessment of sustainability (ibid:5).

Over the last two decades some fields such as economics have adopted ecosystem models under the ecological paradigm, in order to embraces ecological approach.

Ecological economics is an example of how ecosystems model "exposes the nature and environmental role of economic instruments and economic work" (ibid:3). Ecological economics see the different flows of money and energy and considers models that take into account human and social capital. Holling (1994, in Pickett and Cadenasso, 2000:3) defines human capital as individual knowledge and skill, and social capital as community, political, formal, and informal institutions.

Other disciplines have also been adopting this type of approach using ecosystem models to promote solutions towards sustainability as sustainable design (ibid:5)
Ecological economics and sustainable design are examples of how ecology can be adopted as a paradigm by using ecosystem models.

2a.1.2. ECOLOGY AND HOLISM

Capra (1997) defines ‘holistic’ as a view that acknowledges the whole system to understand the interdependence of its parts and an ‘ecological’ view as one that considers what a ‘holistic’ view does and adds the perception of how the whole system is embedded in its natural and social environment.

Therefore a holistic approach does not have to embed the ecology paradigm, although this becomes difficult to distinguish when talking about living systems because "the connections with the environment are much more vital" (Capra, 1997:7) than a non-holistic approach.

The traditional approach to reality comes from Descartes and Newton’s perspectives, characterised by a mechanistic frame of thought that is considered the opposite of a holistic, ecological view, which integrates a system approach (Capra, 1997:5; Birkeland, 2002).

The traditional approach to reality comes from Descartes and Newton’s perspectives, characterised by a mechanistic frame of thought that is considered the opposite of a holistic, ecological view, which integrates a system approach (Capra, 1997:5; Birkeland, 2002).

The mechanical conceptual view of life sees nature as a machine, where all the parts can be detached and studied separately until they cannot be analysed further unless they can be reduced to even smaller parts. Reductionism is also a characteristic of the mechanistic frame of thought (Capra, 1997; Stacey, 2003:26) in a closed system with stability as a general characteristic. Pepper (1996:41), inspired by Merchant (1992) summarises the mechanistic frame of thought:

- matter is composed of atomic parts;
- the whole is equal to the sum of the parts (law of identity);
- knowledge is context-independent;
- change occurs by the rearrangement of parts;
- dualism of mind and body, matter and spirit.

The mechanistic frame of thought is a key characteristic of *business imperatives* of which quantity, analytical thinking and a deductive approach are key characteristics (Capra, 1997:4, 5). Therefore ‘business-as-usual’ involves a thought that relies mainly on analytic thinking and approaches phenomena with a scientific view, aiming to study their qualities-functionalities (function is essentially a mechanic concept) by measuring and quantifying processes. The scientific view referred to by Capra (1997) is not a view that characterises a scientific method which enables the scientist to
observe, formulate and test causal hypotheses on the governing laws of nature, but one that trusts only the "existing external reality that can be reliably observed as truth" (Webb, 2005:29).

**2a.1.3. ECOLOGY AND SYSTEM THINKING**

Holism, in contrast to the mechanistic view, is related to systems thinking and not linear thinking.

In a systemic frame of thought (i.e. systems thinking), the view of nature is from a living system perspective with self-reproducing and self-organising wholes that acknowledges the coevolution of living organisms. ‘Systems thinking’ relates to understanding a phenomenon by positioning it in the context of a larger whole (Segen, 2001:90; Stacey, 2003:26): “To understand things systemically literally means to put them into a context, to establish the nature of their relationships” (Capra, 1997:27). Systems are normally open and characterised by dynamism, diversity and emergent properties (Sherwood, 2002:15), "instead of thinking of a system moving towards an equilibrium state, it is thought of as following a small number of typical patterns or archetypes" (Stacey, 2003:28).

There are schools of thought that consider a system theory from the reductionism perspective, “where the focus [is] on the nature of the part rather than on the interactions between them” (Webb, 2005:29 citing to Stacey, 2003); this continues to characterise the way businesses have used this perspective in organisational management over the 20th century (ibid).

When systems thinking is associated with holism and ecology it proposes a view from a whole system perspective which understands the whole as more than the sum of the parts; where the focus is on the interaction of subsystems which form systems; and on understanding how the interaction of systems forms suprasystems (Webb, 2005).

Sterling (2003) sets the case for differentiating systems thinking from ecological thinking. Although systems thinking can lead to ecological thinking, it is not always the case: even if systems thinking has foundations in holism, its use under the premises of problem-solving in the domain cultural paradigm is not usual, as it is generally applied through a *hard systems* approach from an engineering perspective (Sterling, 2003:42). Sterling (2003) suggests the term *whole systems thinking* to distinguish one that integrates an ecological worldview with systems thinking as a discipline, therefore whole systems thinking embraces systems thinking as a worldview itself which challenges the dominant paradigm and helps in building a
bridge between the current paradigm and a paradigm with foundations in ecological thought (Sterling, 2003:43).

In an attempt to acknowledge the whole, systems interaction can start forming complicated systems by involving a large number of elements that must be taken into account. These have been identified as complex adaptive systems, commonly accepted in complexity science (Webb, 2005)

Complex adaptive systems originated in the natural sciences and are characterised by a system of interactions in which the different agents co-evolve according to a set of rules, producing a novel and emergent order in a creative and spontaneous way. The emergent properties of complex adaptive systems are explained through analogies from the natural sciences (Webb, 2005: 31 - 32). Bodin and Wiman (2004), citing Ashby and Gardner (1970), state that "the complexity of a system, in mathematical terms, refers not only to the number of components in the system but to the combination of component-numbers and the strength with which the components are linked together (connectance)" (ibid:34). Bodin and Wiman (ibid) also highlight key properties of ecologic systems: diversity; stability (as in resilience); robustness and fragility; space and density; time-scale; scale dependency; non-linearity; and the ability to adapt, to mention just some (ibid).

In this view, ecology is explained as "a network of vast numbers of species relating to each other" (Stacey, 2003 cited in Webb, 2005:33) which reflects notions of living systems and living beings.

Living beings are "characterized by their autopoietic organization. They differ from each other in their structure, but they are alike in their organization" (Maturana and Varela, 1987:47). Autopoiesis is a system of self-creation which it pulls itself up by its own bootstraps and becomes distinct from its environment through its own dynamics in such a way that creator and the creation are inseparable. Organisation refers to the hierarchy of the components/elements that compose a living being (Miller and Miller, 1995). "Every autopoietic system is a unit of many interdependencies; when one dimension in the system is changed, the whole organism undergoes correlative changes in many dimensions at the same time" (Maturana and Varela,1987:116). "When two or more organisms interact recurrently, they generate a social coupling. In that coupling they are reciprocally involved in attaining their respective poieses. Behaviours that take place in these domains of social coupling, as we said, are communicative and they can be inborn or acquired" (ibid:206). It is in this social coupling between organisms (e.g. living beings) that living systems theory is based.
2a.1.4. ECOLOGY AND LIVING SYSTEMS THEORY

Living systems theory is defined according to Miller and Miller (1995) as the theory of open systems, self-organised, which interact with their environment by means of information and material/energy exchange with characteristics of life (i.e. living beings); reporting the hierarchy in the concrete part of a system: the eight levels and grades of complexity (ibid):

- **cells**: a principle component of multi-cellular systems
- **organs**: formed by groups of cells
- **organisms**: of three types: fungi, plants and animals
- **organisations**: involving different groups with a purpose.
- **communities**: aggregations of organisations (also includes individuals)
- **societies**: constituted of associations of communities,
- **supranational**: systems that are organisations of societies.

Miller and Miller’s (1995) living systems theory is an approach that explains how living systems function, develop, maintain themselves, change, relate and interact. It is a theory that refers to the physical part of a system and being which can be applied even to the nonliving.

Bailye (1995) acknowledges an abstract side of living systems to the behaviours of the systems, in terms not of their physical interaction but of their evolution in space and time. Richerson and Boyd (2000) relate this abstract side of a system to culture (referring to space and time), involving numerous subsystems and variants (i.e. complex cognitive systems). Richardson and Boyd (2000) continue and relate this aspect to the evolution of human cognition and social learning: that is the sociology of space which involves climate and the influences of its deterioration (ibid). Here the abstract side is strongly related to the cultural side of a system, this being behaviour in space and time and the influence of climate.

In conclusion, a living system is composed not only of its physical elements (e.g. cells) but also of the internal and external variables that trigger a certain behaviour which allows evolution, as underlined by Maturana and Varela,(1997): "We have used the expression “to trigger” an effect. In this way we refer to the fact that the changes that result from the interaction between the living being and the environment are brought about by the disturbing agent but determined by the structure of the distributed system."(ibid)
These views offer a broad perspective of living systems, suggesting that living systems’ behaviour as well as their organisation (i.e. hierarchy) can be used to understand people’s interaction. Studies of interactions in different systems have already been showed by the living systems theory, as in ‘learning organisation’ (Senge, 1990), the organisations in this case being companies or enterprises.

2a.1.4. RESEARCH PERSPECTIVE ON ECOLOGY

As pointed out in the arguments of the different authors, the ecology is the whole in which systems operate. Although the whole is difficult to grasp and describe, by understanding the internal organisation (i.e. hierarchy) and the interactions, interdependencies and relationships between elements of the whole (i.e. systems and supra systems) it becomes easier to comprehend the ecology of a system.

This research reflects a view of ecology that encompasses the understanding of:

— systems thinking, in order to understand the interdependencies, relationships and interactions – ecology implies an interaction of systems and its different levels;

— living systems theory, to comprehend the internal organisation (hierarchy) as well as external organisation, to further understand the key characteristics of behaviour – different levels of systems characterise the hierarchy (order) of the system.

The above is important due to the need to comprehend what are the characteristics of ecology that relate to approaches towards sustainability in order to respond more holistically to the challenges presented by F10 realities.

2a.2 SUSTAINABILITY

Sustainability can be defined differently depending on perspective; it aims to incorporate different dimensions in order to have harmonic conjugations of interests

2a.2.1. KEY VIEWS OF SUSTAINABILITY

John Elkington (1998) frames the most commonly used sustainability approach- triple bottom line (TLB) - which rather than pursuing a definition, Elkington (1998) objectively describes a way to achieve sustainability by characterising the latter as a triangle of forces between economic, social and environmental gains in order for sustainability to be achieved (ibid). An environmental concern that does not
acknowledge the market and economical side together with the social context is not a solution to achieving sustainability. The TLB view follows a technological driver. The term ‘technology’ is used here in terms not of technological appliances but of manmade solutions; it seeks hands-on, implementing solutions in order to give answers to concrete problems.

The human scale standpoint has a hands-on approach with a social driver (Fuad Luke, dialogues 2005) in which the human scale is related to individual physical, mental and spiritual wellbeing, which are central to achieving socio-cultural wellbeing, the wellbeing of the environment and economic wellbeing.

Brundtland Report (1987) follows a perspective that is strongly related with the economical driver by defending development with sustainability in mind (i.e. sustainable development), ‘development’ being associated with financial growth. The above treats sustainability as an area of interest to be added onto to the current business and industrial mindset (i.e. sustainable development). What is offered in the Brundtland Report (1987) is a view of sustainability as the next new issue that businesses should have in mind, without challenging their current practices. This definition has spawned branches of sustainability, such as corporative social responsibility (CSR).

In the early years of CSR the aim was to highlight what benefits business can bring to society in general (a focus on the creation of employment or health and safety measurements, for example), driving several philanthropic initiatives like the sponsoring of key projects for the most needy, thus “being a good corporate citizen” (Carrol, 1991:229) can bring societal wellbeing, but tend not to address the environment wellbeing. Furthermore, the Brundtland Report (1987) instigates a measurable and quantifiable view of sustainability as the basis of organisations' sustainability reports following indexes such as the Dow Jones Sustainability Index. Indexes such as Dow Jones tend to focus on accountability, which is responsible for collecting the data that goes into business reports. Although some of these approaches are changing to a more integrated view of sustainability (e.g. beyond reporting), in practice what can be seen is the instigation of sustainability as a checklist, as highlighted in the SustainAbility and Global Scan report Survey of Accountability: The Millennium Development Goals – Advancing Progress & Accountability (September 2010). This report identifies: “most rating schemes are still not well trusted by experts to gauge corporate sustainability performance, though some leaders exist” (ibid:13). Sustainability becomes strong when it is used as an aim and not as an adjective to classify other activities, as in sustainable...
development, which centres the discussion on development and not on its aim of being sustainable, which is about resilience and enduring development. When the discussion is centred on development, the achievement of sustainability become secondary and is dominated by development, thus it does not challenge business as usual and the current economic paradigm as discussed earlier in section 2a.2.

The danger of the human centric view in approaching sustainability is placing human wants above ecological needs, because when attending to the latter human needs are also attended to because ecology is an overall system which covers human needs (Sterling, 2003).

2a.2.2. SUSTAINABILITY: RESEARCH PROJECT PERSPECTIVE

Sustainability is about resilience and endurance, which is underlined by all the above perspectives and approaches. All agree on emphasising human activities as responsible for unsustainability. All try to introduce a different requirement into such Human activities – environmental concerns.

These three common points are essential to sustainability and are further explored in this thesis:

— The first relies on the two key attributes of sustainability: resilience and endurance, characteristics of ecological systems related to system robustness or fragility and the "ability of a system to return to equilibrium after a disturbance" (Bodin and Wiman, 2004:36);

— The second searches for a way to redirect human activities through a different approach – a focus on human social, cultural and organisational systems (e.g. businesses and other activities);

— The third relates to environmental concerns (environmental impacts, depletion, resources etc).

When sustainability is taken out of the equation the above three points can be seen as being address since the industrial revolution for example by building industrial systems resilience to produce massive amount of items without question their impacts.

Below is a historical overview of these three elements to illustrate the baggage that sustainability carries along with it, and a discussion of their influence in the fields of design, production and consumption and manufacturing.
2a.3. SUSTAINABILITY PARADIGM

Paradigm, according to the definition of Sterling (2003), is a cultural worldview, “a story about the way the world works. It is both a projection and a reflection of how the world is seen, and it is a characteristic of any society from history to the present” (ibid:33).

Sterling (2003) defines three components of the paradigm: eidos, which has to do with cognitive levels; ethos, regarding affective levels – values and norms; and praxis, which is related to behaviour (theory in action). Ethos is often ignored. Sterling (2003) suggests, among others, that the dominant western paradigm has reflected the values, believes, assumptions, ideas and actions thus the knowledge system for more than three hundred years. The current knowledge system is unsustainable itself and creates unsustainable patterns in human activity systems (ibid). Our worldview is therefore based on an epistemological error as it is anchored within the perception and belief of separateness (Bateson, 1972 cited in Sterling, 2003:33).

2a.3.1. MAIN PARADIGMS

As pointed out, the current mindset and the existing environmental and social problematic (and recently the economic crises) illustrate the separation between what business and society want and the capacity of nature (limits to growth).

The worldview can be generally divided in three main paradigms: the ecocentric; the humancentric (or anthropocentric), and the technocentric (Pepper, 1996). It is very difficult to give pure examples of each of these, with the exception of the deep ecology view which describes and is a clear personification of ecocentrism. It is also difficult to draw boundaries between and categorise shades of each of the paradigms (Vincent, 1993 cited in Pepper 1996:34), which makes trying to place key persons and ideas in a single paradigm challenging. But also, why is it important to think about things as a ‘in a certain paradigm’ – why does it help us in this quest to deliver sustainable innovation for example?

It is necessary to understand the domains, proprieties, essence, characteristics, approaches and views of each of the paradigms.
2a.3.1.1. Ecocentric paradigm

The ecocentric paradigm sees everything as belonging to the natural environment, viewing the world “not as a collection of isolated objects but as a network of phenomena that are fundamentally interconnected and interdependent” (Capra 1997:7). Ecocentricism is an Earth-centred perspective which acknowledges the intrinsic importance of non-human life, leaving space for a system of values (eco-ethics, or bioethics) based on the perception of a unique living network that bonds all beings through their interdependency. This paradigm follows inner values which “identify Man as part of a whole, i.e. nature, submissive to all natural laws in the same way as whatever entity on earth” (Kaufman and Franz, 1993 cited in Mustafa, 2010:131). This approach presupposes respect for nature and suggests that human being has to learn to live in harmony with the environment (ibid). In this system, humans are just another component (Capra, 1997:11; Pepper, 1996:329). Furthermore: “Ecocentrics lack faith in modern large-scale technology and society, and technical, bureaucratic, economic and political elites” (Pepper, 1996:329).

Ecocentricism is not against technology but it does not support the used and the ownership of technology, which is see as controlled by an elite. It defends alternative technology’ as ‘appropriate, soft and intermediate’ due to its democratic potential and environmental respect (ibid:38).

2a.3.1.2. Technocentric paradigm

The technocentric paradigm recognises environmental problems and believes that they can be solved from the existing social system through economic and environmental management negotiation to achieve unlimited growth; what O’Riordan (1981:38) calls the ‘cornucopian view’. It has tremendous faith in the application of science, market forces and managerial ingenuity, and demands more responsibility and accountability in political, regulatory, planning and educational institutions (O’Riordan, 1989 cited in Pepper, 1996:37), in which acts from and towards.

2a.3.1.3. Humancentric paradigm

Also known as shallow ecology, the humancentric paradigm “views humans as above or outside of nature, as the source of all value, and describes only instrumental or ‘use’ value to nature’ (Capra, 1997:7). Relates not technological or natural but human intervention in the ecosystem, as it considers humans the source of value, since the concept of value is itself a human creation. The humancentric paradigm, at its extreme, uses the metaphor of nature as a machine and is faithful to the higher position of humanity in relation to nature (Pepper, 1996:35).
Pepper (ibid) expresses the intermediary positions between ecocentric and humancentric paradigms as weak anthropocentrism and eco-socialism. Weak anthropocentrism incorporates human moral attitudes to the rest of nature, which relates to the condition that any attitudes toward nature are human-derived. It understands nature as a constantly evolving and self-organising system which makes it a more systemic perspective of nature than the pure humancentric paradigm.

Ecosocialism fundamentally believes that ecological problems are activated by social problems. It is neither biocentric (or ecocentric) nor anthropocentric, but an alternative state in which “prevailing attitudes and values would fully acknowledge how nature capture and shapes human economic, social and cultural activity” (ibid:31). It is in favour of local and regional autonomy and decentralized power, with small-scale and self-sufficient development as far as possible, and appreciates cultural diversity, community living and cooperation; “but eco-socialism’s position is unashamed humanist, rather than ecocentric, looking particularly to the structural features of capitalism to explain why there are ecological problems today” (ibid:33).

Table 2.4 summarises the paradigms presented above and illustrates the homocentric paradigm from the ecosocialist perspective.

<table>
<thead>
<tr>
<th></th>
<th>Ecocentric</th>
<th>Humancentric (eco-socialism)</th>
<th>Technocentric</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Unique Living System – everything belongs to the natural environment</td>
<td>Human Centre Network – Humans above or outside nature</td>
<td>Cornucopian view – current system will solve environmental problems and continue the unlimited growth</td>
</tr>
<tr>
<td><strong>Key properties</strong></td>
<td>Interconnectivity and interdependency</td>
<td>Democratic, spontaneous and social justice</td>
<td>Analytic, dualistic and accountable</td>
</tr>
<tr>
<td><strong>Essence</strong></td>
<td>Deeply questioning the system to apprehend the problem’s roots</td>
<td>Marxist and anarchist conceptual framework to understand patterns of social dominations</td>
<td>Envisage no radical alteration to social, economic and political structures (stability)</td>
</tr>
<tr>
<td><strong>Characteristics</strong></td>
<td>Organicism – ecologic view, sees the whole and interdependencies of its parts and how this relates to and is embedded in the natural and social environment</td>
<td>Both mechanical (considers nature as a machine) and holistic (sees the whole and understands the interdependency of its parts)</td>
<td>Mechanical analytic view – breaks down the problems into small parts – conventional economic reasoning</td>
</tr>
<tr>
<td><strong>Outputs</strong></td>
<td>Philosophical and spiritual – base for ecological thinking</td>
<td>Cultural and social – understanding to frame actions</td>
<td>Economic and technical management – driven by material outputs</td>
</tr>
<tr>
<td><strong>Phobias</strong></td>
<td>Separateness</td>
<td>Domination</td>
<td>Uncertainty</td>
</tr>
<tr>
<td><strong>Commonalities</strong></td>
<td>All acknowledge environmental problems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2.1: Summary of main paradigms
In this research the humancentric paradigm, rather than a pure humancentric approach, pursues ecosocialism position. Within the premises of this research, it is the paradigm with greater potential for arriving at a solution to sustainability due to its characteristic of challenging lifestyles by introducing values that embrace a view of nature as an element responsible for framing the economic, social and cultural dimensions. “Socio-economic systems must be regarded as subsystems of the encompassing biophysical or ecospheric system, and the fact that the economic system is often seen as independent of or encompassing the biophysical system is partly the root cause of our current crises” (Sterling, 2003:207).

2a.3.2. BUSINESS PARADIGM

Sterling (2003:47-48) describes in a simple and comprehensible way what goes on today in the arena of sustainability practices. Although he is concerned with the field of education, in essence the same is true for business: “debate tends to be about or largely at the level of subparadigms jostling largely within framework of the large modern-mechanist-reductionist cultural paradigm whose assumptions and values still tend to shape and colour thinking and debate” (ibid).

The integration of sustainability in any business field is a limited response, it is necessary to adopt a systemic and ecological view of sustainability (following Sterling’s (2003:48) ideas). We need to start changing the view of sustainable development as an ‘agent of change’ to see it as a subject of change, as Sterling (ibid) argues in relation to education.

There is a failure on the part of the economic system because it tries to fit the larger biospheric meta-system within its premises, which is similar to trying to fit the African continent into the geographic frontiers of the United Kingdom (Meadows, 1992 cited in Sterling, 2003:165).

2a.3.2.1. Reductionism and quantification

Business paradigm is expresses by business models which represent how a business unit can sustain itself; i.e. create and appropriate value and ensure its future (Klein, 2008:66). According to Morris et al. (2005, cited in Klein 2008:62) there are three categories of business model: a) economic (revenue model – profit generation); b) operational (infrastructure design and internal processes – create value); and c) strategic (market position, inter and intra relationships and growth opportunities), all embracing a quantitative line of thought. None of these business models entail value creation for sustainability, although externalities (e.g. materials,
resources, energy – natural capital) are pointed out as the key to the creation of business models and therefore value (Klein, 2008).

Sustainability is considered a competitive advantage for businesses that embed it because it bestows robustness and fitness to the business (ibid), and although this is recognised, the business focus has been on profit and growth, with the profit motive insufficient to ensure environmental safe-keeping (ibid:127) or, therefore, sustainability pathways.

Currently ideas, thoughts and actions around resource use are informed by reductionism (Capra, 1997:5; Birkeland, 2002) where environmental problems are seen as being solved through economic and management negotiations whilst promoting unlimited growth (O’Riordan, 1981). Joining this with the perception of man’s dominion over nature, seeing nature as having instrumental or use value (Capra, F. 1997:7), uncovers the inability of society to impose natural limits on economic growth (Lovins et al., 1994). Businesses are encapsulated in a technocentric view of the world, as business imperatives do not acknowledge limits to growth (ibid:4-5). People expect governments and enterprises to be responsible for environmental protection (Mustafa, 2010)

Meadows (1997/99) describes the inability of the corporate world to think beyond numbers (subsidies, taxes, standards); flows of stocks and buffers; and the structure of material stocks and flows. These three elements are part of the twelve leverage points of a system, which are presented below (from the least to the most effective leverage point to create sustainability):

12. numbers (subsidies, taxes, standards);
11. flows of stocks and buffers;
10. the structure of material stocks and flows;
9. delays relative to the rate of system change;
8. negative feedback loops;
7. positive feedback loops;
6. information flow;
5. rules of the system;
4. power to self-organise;
3. the goals;
2. the mindset or paradigm;
1. transcending the paradigm.
The three least effective leverage points proliferate in businesses and in business actions in a belief that we are advancing towards sustainability but in reality we are simply doing the same things a little better – improving unsustainability (ibid; Eherenfeld, 2004). Businesses focus on outputs, analysing their impacts by life cycle analysis (LCA), forgetting that they are composed of systems with inputs, processes, and We tend to forget that inputs, processes and outputs are related in a sequential manner (Porter, 1991 cited in Klein, 2008:70).

2a.3.2.2. Technocratic business mental model

The *modus operandi* depends on the way a situations, event or phenomenon is perceived, highly influence the outcome (Werhane, 2007:3). Businesses operate in a mental model that set up parameters which filter reality (ibid) these parameters belong to the technocratic paradigm (Pepper, 1996). The framework through which they process information, conduct experiences, formulate theories and construct outputs are points of view or mental models “socially learned, they are incomplete, sometimes distorted, narrow, single-framed. Since they are learned they are changeable, revisable, etc.” (ibid:3).

By simply changing values (ethos) without changing concepts, one can arrive at very different conclusions (De Bono, 1971:6).

A cultural transformation reflecting resource limits is required for both industrial and social outputs to move toward a more sustainable footing (Starkey and Crane, 2003). This shift in perspective is more likely to be evolutionary than revolutionary, as changing peoples’ mindsets and attitudes requires the incorporation, understanding and manipulation of different forms of communication and language as mechanisms of intervention to stimulate the imagination and influence change towards a Factor 10 level of improvement (Bohm, 2000).

2a.3.2.3. Transforming the business mental model

Changing perceptions are needed to engage in a whole systems thinking approach that incorporates new values capable of apprehending the whole as dependent on and related to all of its parts (Capra, 1997:4, 5; Ehrenfeld, 2004:4, 9, 10).

Sterling (2003) underlines the necessity for the cultivation of intuition, spontaneity, creativity and transformative learning in order to change the current paradigm. Creativity has been difficult to develop because it is contrary to traditional habits of logical thinking, as it involves breaking out of established patterns to see from a different viewpoint (De Bono, 1971:1). Bohm (2000) suggests that disassociation
from existing mindsets and attitudes is required in order to envisage new, more appropriate patterns of activity.

Value creation and appropriation occur within an entire ecosystem of actors, and value exchange is a fundamental part of value creation and value appropriation. These are what give business models robustness and uniqueness: “The more components act together and reinforce each other, the stronger and more effective the business model” (Klein, 2008: 113). A collaborative business model brings value creation to organisations and potentially promotes greater levels of sustainability by acknowledging business actors and stakeholders beyond the internal organisational structures (ibid; Werhane, 2007)

To embrace a paradigm transformation and recreate the true ethos of the organisation, the focus needs to change from exclusively being on outputs to all that makes up the organisation’s life cycle (startup, growth, maturity, and decline) (Klein, 2008) which can be seen as the business life cycle.

2a.3.3. DESIGN AND MANUFACTURE PARADIGM

Birkeland (2002:117) distinguishes two design and manufacture paradigms: a pyramidal approach of design values: linear, hierarchical, mechanistic, quantitative, objective and reductionist, and a pyramidal approach to design devalues: cyclical, lateral, organic, qualitative, subjective, and holistic. Birkeland (ibid) also refers to balancing these two values systems as a move towards sustainability.

2a.3.3.1. Mechanical framework

The incorporation of DfS, ecodesign or SI views in current business systems needs tools and approaches that respond to the business paradigm (already point out as mechanic and analytic). According to Bhamra (2004:557), organisations implement ecodesign for seven reasons: 1) cost saving (e.g. use less raw material); 2) legislative regulations; 3) competition; 4) market pressure approaches; 5) industrial customer requirements; 6) innovation; 7) employee motivation. Bhamra (ibid) also refers to the main models of action employed in the design and manufacturing field in seeking sustainability:

- hierarchy of waste management, which is mainly end-of-pipe focus.
- innovation, with its four-stage model for product development in which eco-efficiency improves over time;
— environmental and temporal scales of impact reduction approaches, which consider the life cycle and lifespan including single or grouped product life-cycles together with the human, societal and economic dimensions;

— prevention strategies for environment management closely focusing on product development, involving the conceptualisation of early stages, seeing the economic dimension as providers of service rather than singular products;

— The life-cycle design strategies, which provides an overview of the different options for environmental improvement of a product throughout the different stages of its life cycle (ibid:559-62).

This reveals a contradiction between the philosophical approach of DfS, ecodesign or SI, which recognises the interactions and interdependency of the several elements, and the practical interventions they tend to adopt or respond to business systems need, which are very mechanical.

General practice does not challenge the typical mechanical frame of business, which uses tools to measure and quantify results to satisfy business imperatives such as the LCA. Even if theoretical, the approach to product life cycle requires a more open view, in practical, it respond to the mechanical mindset of business. For example, Dewberry and Goggin (1996) describe ecodesign as a life-cycle approach that considers the environmental impacts of the product’s life cycle; on the other hand, they view sustainable design with a broader and more holistic approach which can and should include best ecodesign practice.

The shift in thinking in business, design and manufacturing should not exclude current practices but should include a more holistic view which will enable a more radical approach rather than an incremental one.

This need for a paradigm shift is widely accepted in the design community (Lewis and Gertsakis, 2001) as the major approaches embed a frame of thought to minimize negative impacts, leading to (common) practices that address the environment or the social dimension through an end-of-pipe focus – that is, outputs – leaving aside the system inputs – the ethos (e.g. values and beliefs).

This is mainly the result of a response to a business need to satisfy self-imposed social pressures and financial forecasts. If design and manufacturing operate within the ‘business wants’, tools and methods to make things environmentally and socially more acceptable “always come up with the same answer” (Ehrenfeld, 2004). For
example, when the eco-efficiency concept is applied to a system with a problem, reducing resource consumption, energy use, emissions and waste with a beneficial effect on the environment does not offer a solution; it merely slows down the problem’s effects (McDonough and Braungart, 2002).

2a.3.4. PARADIGM SHIFT

The process of achieving sustainability, Ehrenfeld (2004) argues, "requires radical solutions, not quick fixes", which involves "a dialogic conversation involving all the partners' integrated systems thinking reflecting a journey towards symbiosis and evokes a multidisciplinary approach which interlinks all the elements and creates synergies between business, design and manufacture" (ibid). A systems approach may be utilised to develop and construct a processes to integrate the ecological dimension (Birkeland, 2002; Henderson, 2002).

Although design and manufacture are economic activities dominated by the business and political mindsets, design thinking, which is not solely linked with the design profession, can help to provoke a mind-shift in current views due to its ability to deal with different elements in a complex system to arrive at solutions leading to sustainable-oriented futures (Manzini, 2005; Dewberry and Fletcher, 2001).

2a.3.4.1. Dialogues for paradigm Shift

The essence of dialogue is learning, is an unfolding process of creative participation between peers. "It is not a technique for problem solving or conflict resolution, although problems may well be resolved during the course of a dialogue, or perhaps later, as a result of increased understanding and fellowship that occurs among the participants. It is, as we have emphasized, primarily a means of exploring the field of thought" (Bohm et al., 1991).

Key characteristics of dialogue are as follows (Senge, 1994; Bohm et al., 1991):

- common meaning
- constant development and change
- insights gained that could not be achieved individually
- uncovers a collective mind set
- explores complex issues from different points of view
- free communication of assumptions
- suspension of individual assumptions
- brings the full depth of people’s experience and thought to the surface
- participatory
— enables the observation of own thoughts
— creates an opportunity for each participant to examine her/his own preconceptions and prejudices
— collective learning
— vulnerability as between friends – transparency, openness, honesty, spontaneity
— ignores hierarchy – no leaders
— many views are presented to discover a new one
— divergent, not seeking agreement
— can lead to new course of action
— promotes richer understanding of the uniqueness of each person’s point of view
— increases trust between participants
— allows greater creativity and insight
— arrives at a sense of community.

The above characteristics of dialogue can be seen as components of a paradigm-shift as dialogue reveal and change assumptions (ethos); uncover and nourish new thought (endo); and can lead to a new course of action to solve problems (praxis). Bohm (1983, cited in Bohm et al., 1994) suggests that “a pervasive incoherence in the process of human thought is the essential cause of the endless crises affecting mankind”. Dialogues uncover assumptions and have the ability to promote change if one puts aside prejudices, bias and preconceptions, suggesting dialogues may be a way to shift paradigms.

To change our assumptions we need to know them; thereby to shift paradigms there is a need to acknowledge the paradigm we are in and the one we aim for. Dialogue can help in this task. The purpose of a dialogue is to reveal incoherence in the thought, not thinking, though is “intellect but also our feelings, emotions, intentions and desires” (Bohm et al., 1991), underlying the potential for paradigm shift. As Bohm et al. (ibid) stress, dialogue “brings together individuals from a variety of backgrounds rather than from existing organizations. But its value may also be perceived by members of an organization as a way of increasing and enriching their own corporate creativity.”

Although dialogue calls for no ending, and has no goal or objective other than the dialogue itself (according to Bohm et al., 1991), in the practical world there is a need for a consensus. Senge (1994) points out two types of consensus: focusing down to seek the common denominator in multiple individual views that are a collection of
commonalities; and opening up to seek a picture bigger than any one person’s point of view, revealing a different collective idea. “The spirit of dialogue is one of free play, a sort of collective dance of the mind that, nevertheless, has immense power and reveals coherent purpose. Once begun, it becomes a continuing adventure that can open the way to significant and creative change” (Bohm et al., 1991).

The above view of dialogues is the view this research tries to follow across the whole research journey, with the objective of draw a bigger picture of what is ‘creating sustainability’ and how can be achieved, and challenge the view of sustainability and design (Chapter 3, 4, 5 and 8 report the methodological view of dialogues but also dialogues to collect data and validate findings).

2a.3.5. SECTION CONCLUSION

To be able to achieve greater levels of sustainability a paradigm shift is needed, which is not an easy task.

As Bohm et al. (1991) points out:

"If we look carefully at what we generally take to be reality we begin to see that it includes a collection of concepts, memories and reflexes colored by our personal needs, fears, and desires, all of which are limited and distorted by the boundaries of language and the habits of our history, sex and culture. It is extremely difficult to disassemble this mixture or to ever be certain whether what we are perceiving – or what we may think about those perceptions – is at all accurate’ because we tend to believe that the way we interpret ‘the world is the only sensible way in which it can be interpreted” (ibid).

These authors consider that in this process of attachment we do not notice how hidden values and intentions can control our behaviour: we are unaware of our paradigm and how it frames our thought and therefore our actions (ibid).

Assumptions form the background of the collectively-acquired cultural acceptances which frame our thought when solving problems: “The room in which we sit, the language in which these words are written, our national boundaries, our systems of value, and even that which we take to be our direct perception of reality are essentially manifestations of the way that human beings think and have thought” (ibid).
As pointed out earlier, Bohm (2000) suggests that new interventions are needed in order to create different thoughts and ideas and therefore actions. The suggestion is dialogue. Through dialogue, new interventions have greater potential to be achieved (Bohm et al., 1991; 2000; Senge, 1991). Further, dialogues offer ways to understand the view points of people, and the capacity of dialogues to flourish new thoughts suggest dialogues ability to shift paradigms (Bohm et al., 1991).

**PART B**

**2b.1. HISTORICAL VIEW OF SUSTAINABILITY**

This section outlines key achievements over time, portraying the sustainability arena in order to understand the several schools of thoughts and how sustainability connects with the design, industrial and organisational fields.

This historical view shows how different concerns about sustainability have been integrated at different levels: social, cultural, political, design, industrial and business.

**2b.1.1. SIXTIES: ENVIRONMENTAL AWARENESS**

Humans’ impact on the environment supported by scientific data (Rachel Carson, 1962; Paul Ehrlich, 1968). In the field of design there was a general move towards this awareness at the industry level, and products that reflected environmental concerns start to appear (Madge, 1993:149, 151). The need for change in the design community was felt essentially by Papanek in 1971 and Bonsiepe (1976, 1979). They influenced the design field to start to take a more holistic approach, exploring different values and incorporating elements like ethics and responsibility

Design community felt signs of segmentation with the influence of Schumacher’s Human Scale Development approach in his book *Small is Beautiful: Economics as if People Mattered* (1973). Human Scale Development is defined as the friendly use of Earth and technology to match the scale of community life, the scale of the community defining the size of the economic development – better known as *Buddhist Economics*. Schumacher’s position moved the design community towards ‘soft’ technologies as a “rejection of post-war industrial society and enshrined a whole
set of alternative values” (Madge, 1993:157) in two paths: a) Design for Need driven by a vision of change in society through an ethical approach to technology, and b) Alternative Design which accepts that societal values are responsible for the technological profile follow and design should embrace it (Madge 1993, Amir 2004). This opened up segmentation in design terminology and approaches.

2b.1.2. SEVENTIES: AWARENESS OF LIMITS OF GROWTH

Earth’s capacity is highlighted regarding ecological and social issues are supported by evidence base. The most significant evidence are: The Limits of Growth (Meadows et al., 1972), which asks deep questions about economic growth and environmental consequences, and Gaia Hypothesis with the ‘Daisyworld’ perspective (Lovelock et al., 1979), describes a theoretical model to represent the system (planetary thermostat). Both, Limits of Growth and Gaia Hypothesis embrace into discussion the Earth’s limits although the latest adopts an ecocentric view which goes beyond human limits.

2b.1.3. EIGHTIES: PRODUCTION AND CONSUMPTION DEBATE

Industry is point out as responsible for creating artificial needs fed by artefacts that satisfy human wants (Heskeett, 1980). The act of consumption is underlined as a search for human satisfaction through products and possessions (Campbell, 1987). This debate is a reaction to ownership as way to satisfy needs which places design community in the narrative: The Green Consumer Guide, launched in (Design Council, 1988), settled down the era of ‘green consumerism’ (Dewberry and Goggin, 1996).

Max-Neef (1981, 1991) underlines that satisfying a need is not necessarily dependent on the economical power of acquisition; only two of the nine fundamental human needs expressed by Max-Neef (ibid) could be met through material ends (shelter and subsistence) all the others can be satisfied in non-material ways (Max-Neef, 1981, 1991).

Industry and manufacture enter in the debate and propose the concept of the industrial ecosystem leading to what is known as Industrial Ecology (Frosch and Gallopoulos, 1989). The objective of the Industrial Ecology (IE) concept is to develop a sustainable manufacturing strategy by drawing a parallel between the processes in industrial systems and those of biological systems (Cooper, 2005). This new way of looking to base production on ecosystems properties and dynamics, approaches
materials and energy as part of the industrial metabolism (Ehrenfeld, 2004). This concept highly influence the design field.

**Criticism about the incorrect usage of the term green** began (Irvine, 1989) and tough criticism of the consumer society came (Christensen, 1989) suggests designers as responsible to create new ways of satisfaction beyond ownership.

There is proliferation and **segmentation of approaches towards sustainability**. Dewberry refers to the appearance of environmental issues in political and government agendas (1996). In *Our Common Future*, the Bruntland Report (1987) points out that equity, growth and environmental caring, protection and preservation depend on recognising that economic development cannot be achieved without endangering the natural system, as economic development depends on natural resources to maintain its development. (Bruntland Report, 1987).

It was not until well into this decade that the UK government **acknowledged the importance of design in business** as a competitor factor into business strategy. Following businesses’ drivers to generate seductive design products to encourage consumerism *Design for Profit* is supported by the strategic development of the UK under the Thatcher government (Madge, 1993; Dewberry, 1996). These design approaches, together with social demand, left space for ‘false’ green products to emerge and be used as marketing tools (Dewberry, 1996).

To counterpoint the choices of mainstream design to fulfil business drivers, *Design for Human Scale* (Papanek, 1995) takes design from the market oriented view, and places it back to the hands of people (communities) that can understand their needs better with no requirement to import expertise, offering connections between ecology and design (Madge, 1993).

**Green Design movement proliferates** as a more shallow response to support industry and business in resolving environmental problems, social demands and new legislation opening way for *Ecodesign* practices focus on incremental approach to environmental improvement (Madge, 1993).

**2b.1.4. NINETIES: DIVERSITY IN THE DESIGN FIELD**

**Debates on ethics and responsibility in the design community** are opened with three drivers: a) dialogues about obsolescence and durability (Cooper, 2004) to create awareness of the problematic of recycling which in itself is a source of pollution, generating environmental impacts (Cooper, 1994); b) dialogue of production and consumption problematic relates durability with obsolescence through
LifeSpan concept (Cooper, 2004); and c) ethics in consuming and the responsibility of design (Whiteley, 1993).

LifeSpan concept is more holistic than Life Cycle Assessment (LCA) approaches which focus on production, as includes the conceptualisation of the product, passes through all the elements and actors involved in production, and even studies consumer behaviour and use of the product until its disposal (Cooper 2004).

Design for Society (Whiteley, 1993) is a tough and direct critic of the role of designers and of consumers and society in general (American society), not from an anti-consumerism or an anti-design perspective but highlights the importance of responsible design and ethical consumption (Whiteley, 1993).

New concepts emerged in the design field as response to the challenges expressed above. Several tools and approaches were emerging which contributed to and indicated the mature state of ecodesign implementation (Ryan, 2003). “By the end of the 90s it was recognized that, to be most effective, ecodesign should also be considered early in the product development process during design. It had been recognised that waste generation occurs as a direct consequence of design decisions” (Bhamra, 2004). Bhamra (2004) indicates that attention in this period moved from end-of-pipe, which deals mainly with the amount of waste produced, to include early stages of product development to help to prevent eventual waste and pollution. The integration into the product development process of a more environmentally-friendly approach gained recognition and ecodesign tools; methods and strategies such as waste management tools (Cooper, 1994); a four-stage model for ecodesign innovation (Brezet, 1997); environmental and temporal scale reduction approaches (Bras, 1997); and structure of service system for environmental management strategies spread (Jackson, 1996). Further, the incorporation of Living Systems Process into product development by integrating nature’s processes in a simple and effective manner in design is set as a challenge (van der Ryn et al., 1996).

The basic concept of selling performance (referring to services) and not products was outlined at the end of the 1980s contributing to waste reduction. But only in 1991 did Product Service System (PSS) start to engage with sustainability and the problematic of consumption as part of a tradition of understanding economics not only by regarding its financial aspects but also by acknowledging its physical aspects, like material flows (Van der Voet et al., 2005). Later on, Dematerialisation concept (selling performance not goods) was included as a strategy to achieve sustainable development (Weisacker et al., 1997). PSS is based on ecological systems and can
address the Factor X concept through dematerialisation (Schimidt-Bleek, 2000). PSS challenged designers and opened up opportunities for conceptualising systems to deliver lifestyles (Manzini, 1992a).

**Change of the role of design** mainly by Manzini (1992) and Papanek (1995). Manzini (1992) defended that redesigning what exists stifles the opportunity for new solutions to emerge, stating: “Faced with the evidence of the connection among the environmental, economic and socio-cultural crises, it becomes increasingly clear that the scenario of the **re-design of what exists** is not sufficient for the discovery of true solutions” (Manzini 1992a).

Papanek (1995) pointed out the need for a conduct ethic in the design profession and in social, economic and environmental systems (ibid). The latest view embraces the idea of challenge the system, criticising large-scale productions systems and coming closer to Schumacher’s (1973) suggestion of small-scale decentralised alternatives (Madge, 1993), and outlines *Design for Disassembly* as one approach towards ecologically respectful products (Papanek 1995).

In the general context of sustainability there are still reactive approaches in industrial environmental legislation in the UK (Dewberry, 1996) as result of external pressure and the degradation of the environment becoming more and more evident.

Parallel to this, challenging approaches to business, industry, and economic systems appeared which initiated several strategies for sustainable development (e.g. Agenda 21, 1992; the Rio Declaration, 1992; the Kyoto protocol, 1997) to set boundaries, limits, and future objectives. New institutes and organisations focusing on SD emerged as the *Forum for the Future* (1996).

**The notion of economic growth is challenged:** Ayres (1998) relates economic growth to the environment, wealth and societal well-being, arriving at the conclusion that traditional measures of wealth are no longer valid as we stand in what he calls the ‘spinning wheel’ which moves faster and faster while staying in the same place, like a hamster’s exercise wheel. (ibid)

**The notion of capital is challenged** by looking at the economy and distinguishing between land and capital to achieve economical health, considering natural resources and ecosystems as capital (Hawken et al., 1994).

The *Carnoules Declaration* signed in 1994, comes to support the above by recognising material usage as one of the major problems, and by doing so sets the aim of a reduction on material consumption of at least a 50% on a worldwide basis, which leads with a Factor four resources efficiency (Von Weizsäcker et al., 1998)
Proliferation of perspectives and targets towards sustainability started to increase in 1990's but at the same time became more fragmented in the way that sustainability is addressed in different fields with their own individual objectives, sometimes not acknowledging sustainability as a whole “so that diversity itself provides the fuel for further diversity” (Cowan et al., 1994:67), which carries the danger of losing the main aim of sustainability as a whole.

In response to the climate change debate (for example Kyoto Protocol, 1997), the wealth debate (for example Lisbon Strategy, 2000), and the wellbeing debate (such as Johannesburg submit, 2002), the UK government recognised its dependence on non-renewable resources and that the environmental limits are being reached by creating a Sustainable Development Strategy: Securing the Future (March 2005), where the UK government started to involve the design community in solving the problematic of production and consumption which suggest a need for a a strategic position of design

In the context of the design field: proliferates frameworks to guide Design for Sustainability (DfS) into: a) path that conducts design into systemic thinking involving new dimensions and increasing awareness of system thinking importance in achieving sustainability, such as the Demi Project (Dewberry and Fletcher, 2001), and; b) offer ways to build context wise answer by offering a collection of different approaches, information, tools and case studies, such as Information and Inspiration web-based tool for the design community (Lofthouse, 2004).

Movements to change design community perception such as: a) Slow Design as the backbone of a regenerative economy as response to the need of balancing socio-cultural and individual needs with environmental well-being and suggests a new design paradigm (Fuad-Luke, 2002b); b) “The Next Industrial Revolution” (McDonough and Braungart, 2001) which proposes a more radical approach in response to cradle-to-grave design approaches by introducing a new closed cycle approach called cradle-to–cradle and eliminating the concept of waste (ibid); c) Manzini (2005) challenges the role of designers by viewing designers as a central piece of a multidisciplinary network can be pillars in the construction of new social systems that can achieve sustainability, rather than trying to operate in the current system in which the role of the designer is to make things better (ibid).

2b.1.5. TWENTY FIRST CENTURY: INNOVATION FOR SUSTAINABILITY

In the last few years attention has been given to the strategic capacity of design when seen for an innovation perspective. The same has happened in the
sustainability arena, in which a convergence of key fields in the debate on sustainability (e.g. design, engineering, and management) has moved the discussion to another level, triggering sustainable innovation (SI). Charter (2008) defines SI as “a process where sustainability considerations (environmental, social, financial) are integrated into company systems from idea generation through research and development and commercialisation. This applies to products, services and technologies, as well as new businesses and organisational models (Charter and Clark, 2007 in Charter, 2008:17). This definition brings together design and business strategies, as pointed out previously. Others view SI as a way that “helps to achieve sustainability” (Paluszkiwicz, 2009:10).

There is a proliferation of views about SI in the engineering, design, business, and political fields, to mention just some, in section 2b.4 is presented a deeper review on this subject. Chapter 6 gives an overview of some of the positions that support the development of SuCo.

2b.1.4. Section conclusion

Understanding sustainability perceptions, ideas, and actions overtime, together with understanding design journey towards sustainability overtime, helped broadening the view of this research in relation to the historical baggage that each carries and the ideas and perceptions associated to each (individually or together). Also helped to understand the potential left out regarding sustainability and design to tackle the different challenges associated with targets that need to be achieved (e.g. F10). This historical perspective also paints an overall picture of the historical issues that still remain important and are poorly address (e.g. consumerism, limits to growth, population bomb), helping to identify paths that were already addressed in order to respond to the challenges that these issues represent, and path that were left out.

A summary of this chronological approach can be seen in Figure 2.3, which presents the increased cooperation, integration and shared values and vision of the general path of sustainable development in the global context, and of DfS, and how these two paths are becoming closer overtime (in relation to common interests).
Figure 2.2: Conceptual model 1 - Summary of perspective of sustainability over time

- **General context**
  - Human actions impacts in Environmental awareness supported by scientific facts
  - Bringing ‘down to earth’ the awareness - New Concepts emerging
  - Starting awareness about consumption
  - Proliferation and segmentation of approaches towards Sustainability
  - Reactive approach of legislation and measures
  - Challenges approaches for business values, industry resources usage, and economic system
  - Proliferation of different perspectives towards sustainability
  - Actions towards Sustainable Development
  - Integration of Design community in SD agenda
  - More radical and proactive actions emerging marking future goals

- **Design context**
  - Innovation for sustainability
  - Design for Sustainability distinguishes itself
  - Diversity of approaches incremental or radical
  - Debates of Ethics and responsibility
  - New Concepts emerging
  - Challenging the designer role

- **Timeframe**
  - 60s
  - 70s
  - 80s
  - 90s
  - 00s

- **Acknowledgement of the environmental problematic in Industry**
  - Different (but not contradictory) Design approaches
  - Segmentation in design’s terminology and approaches
  - Acknowledge the importance of Design as competitive weapon
The second conceptual model (Figure 2.3) based on the literature review regarding the historical overview presented previous, expresses the different approaches of design over time, which allows understanding the increasing scale of design intervention regarding incorporating and responding to issues around sustainability.

As Findeli (2001) points out, design’s basic problem is that it is solution driven, agnostic, and comes from a dualistic point of view. The journey of design through time shows a more proactive approach with a framework inspired by systems science. DfS encourages a reflective relationship. Findeli (ibid) points out that a reflective relationship is an element crucial for the future of design and the paradigm change that SI brings to the dialogue between DfS and business.

The next conceptual model (Figure 2.4) shows an interpretation of the history of design and its relationship with the environmental (mainly), social and political problematic. The spiral represents not change but improvement, enclosing the past. As Madge (1993) emphasises, “changes in terminology, for example, can sometimes indicate changing values and priorities, although they can also disguise continuities.”. Such changes occur due to social, economical and/or political influences and external pressures. W. Murray (cited in Fuad-Luke, 2002b) suggests several economic perspectives that are closely related to design perspectives, practices and product approaches: “For the last 200 years design has been successfully converting financial, technical, human and natural capital into materialised, and more recently de-materialised, products and services; which makes design an economy enabler. This is now called sustainable innovation, in which sustainability is seen as an enabler of new opportunities” (ibid).
Figure 2.3: Conceptual model 2 - Perspectives through time of design increasing scale of action
Figure 2.4: Conceptual model 3 - Sustainability issues embedded by design over time

2000’
Design for Sustainability
Integrates all design approaches towards sustainability:
- a) different perspectives
- b) different drivers
- c) different approaches
- d) ethic and equity
- e) system thinking

2010’
Diversity increases
- Global framework - holistic perception
- More elements integrated - raise complexity
- Multidisciplinary approach
- Sense of convergence of different fields
- Sustainable innovation
  (W. Murray, 2000)

70’
Alternative or “radical”
- a) alternative technology; technocentric
- b) design for a need; ends approach and exo approach

60’
New era of thinking, approaching and doing
- a) critical industrial time
- b) critical social time
- c) critical political time

90’
Product Service System (PSS)
- a) dematerialisation
- b) design for disassembling
  Design for Factor K - reduction resource and energy
  Design for Society - implementing new socio-political values
  Ecological Design: inspiring in living processes and organisms

80’
Light and dark Green
- a) Light green: recycle
- b) Dark green: impacts Life Cycle

50’
Mass market

Consumer economy

Industrial economy

Knowledge economy

70’
Alternative or “radical”

60’
New era of thinking, approaching and doing

2000’
Design for Sustainability

2010’
Diversity increases

Sustainable innovation

(?)
The previous section concludes that SI is the converging point between the interests of business, design and government (politics and legislation).

Business activity interprets DfS as a largely technological challenge and focuses effort on incremental change to existing products. The environmental impacts of business have been considered, mainly regarding products’ different lifecycle stages. However, whatever the products, decisions around their environmental impacts are defined and ‘locked-in’ at a very early stage of the design development cycle (Cooper, 2004). It is therefore imperative that strategies for sustainability target early decision-making (Graedel & Allenby, 1995), but instead the following actions have prevailed: reacting to potential impact once the strategic scope and subsequently, the environmental impact of the output has been defined and focusing on maximising resource productivity and minimising waste and emissions (Simon et al., 1998).

Alongside this there has been some innovation in product-to-service solutions but little exploration of non-technical approaches that employ the power of design to stimulate demand for more sustainable consumption and lifestyle choices. (Richardson et al. 2005). Creativity will be a key required quality in conceiving new ways to meet needs and the new businesses that will emerge as a result of understanding the alternative opportunities for resource utilisation and waste reuse and elimination. This suggests a need to (re)connect the social fabric of organisations (their human capital) to the outputs of organisations under limits of growth (natural capital).

### 2b.2.1. CURRENT GAPS IN CORPORATE RESPONSIBILITY

There has been an attempt to imbed sustainability practices in businesses and other activities. The problematic starts when sustainability is treated as an add-on (Dewberry and Fletcher, 2001). The imposition of traditional views of each field becomes a barrier to embracing the potential of sustainability fully. The left side of Figure 2.5, showing where different disciplines use sustainability to reduce what they do today to make it less unsustainable, illustrates this view (Ehrenfeld, 2004: 2). This context is relatively fixed in our minds with the well-established expectations and boundaries of these disciplines – e.g. the way ‘the environment’ is considered an external issue incorporated in normal practice for environmental improvement. The other side of Figure 2.5 shows a different way of considering sustainability: by
approaching it through systemic thinking, enabling interconnections across diverse disciplines, cultures and practice and thus providing new insights and interpretations seeking solutions to today’s complex problems. This Figure (2.5) inspired in Dewberry and Fletcher (2001) illustrates an approach, that challenges the boundaries of disciplines, allowing an opportunity to reinterpret the provision of alternative solutions to unsustainability through reconnecting the fragmentation of specialisations embedded in current disciplines and opening up opportunities for ‘creating sustainability’ (ibid: 5).

Figure 2.5: Challenging the context of sustainability

If market demand alone governs each discipline’s outcomes, then the potential to create sustainability will be limited to what people know, want and desire today. Innovation, as suggested by De Bono (1995), should challenge the known (ibid) and explore the different dimensions of performance at the organisational level (Drucker 1988).

Also under such perspective of market demands, is the early stages of corporate social responsibility (CSR) focused on managing external organisational image (Morrell and Anderson, 2006) by the: “identification and management of relationships with stakeholders beyond the traditional confines of shareholders and employees” (ibid), helping to avoid damaging publicity and potentially increasing firms’ social capital.

To illustrate this focus on externality, business with a mechanistic mindset tries to measure corporate responsibility (CR) though indicators of social and environmental
performance in order to, according to Spitzeck (2010), respond to different mechanisms of evaluation and public exposure such as: the Global Reporting initiative; the Dow Jones Sustainability Index; the FTSE4Good Index series; the Business in the Community Corporate Responsibility Index.

This author also points out a change towards a CR focus on performances measurement started to be comparable to financial reporting (Spitzeck, 2010). The SustainAbility consultancy and GlobalScan recently released a survey: ‘Accountability: The Millennium Development Goals – Advancing Progress & Accountability’ (September, 2010) based on worldwide global experts’ insights on the matter, pointing out that there is a need for different ways to report CR and therefore valorise different issues. Most rating schemes are still not trusted by experts to gauge corporate sustainability performance, with only 42% of sustainability experts trusting ratings/ranking organisations, such as the above, to judge a company’s sustainability performance (The Sustainability Survey Research Program - Project: 4710, GlobeScan; September, 2010)

Table 2.1 presents a summary of types of CR interventions. It shows different focuses of CR, and illustrates key characteristics such as: managing decision making; managing contextualise conduct of actions; managing hierarchical power and human capital; managing human resources; managing organisational image and mode of existence.
Table 2.2: Summary of main corporate responsibility activities

<table>
<thead>
<tr>
<th>Scale of action (not exhaustive)</th>
<th>Key characteristics (not exhaustive)</th>
</tr>
</thead>
</table>
| Managing decision making         | - Beyond traditional leadership involving learning (Morrell and Anderson, 2006)  
- Complex problem solving (Burchelland and Cook, 2006) with external stakeholder participation – e.g. managing stakeholders |
| Managing contextualise conduct of actions | - The relationship between organisational and its social fabric (Smith and Hume, 2005) |
| Managing hierarchical power and human capital | - Individual motivation and involvement in organisational responsibility (Card, 2005) |
| Managing human resources management | - The relationships between business targets and employees well-being (Vuontisjärvi, 2006) |
| Managing organisational image and mode of existence | - Social and organisational identification beyond marketing, public relations and communication (Morsing, 2006) |
| Managing organisational structure | Quality of leadership and stakeholder relationships (Spitzeck, 2010) |

To complement this overview on CR diversity of focus, Spitzeck’s (2010) exposes different foci on CR over time:

- performance – the behavioural perspective;
- structure – the importance of organisational structures “displayed motivation of the corporate actor to integrate CR aspects in its management practices” (ibid 2010:3);
- moral-cognitive perspective or mind-set: “Organizational ethos is defined as the moral consciousness and principles which guide collective decision-making and rationalization within the organization” (ibid 2010:4).

2b.2.2. REDEFINING THE SCOPE OF CORPORATE RESPONSIBILITY

The organisational ethos becomes part of the CR narrative, showing the potential of CR to challenge the ethics in place (Morrell and Anderson, 2006) by understanding the place of individuals’ values, beliefs, motivations and ideas in the social fabric of organisations (Brown et al., 2005:83). This suggests Corporate Responsibility as part of sustainability due to the close dependency between the incorporation of different values in relation to natural capital, and the need for organisational cultural change.
Traditionally, the values followed by organisations serve industrial capitalism and use natural resources in an unsustainable way to pursue financial profit (Birkeland, 2002) (see Figure 2.6). Decisions are made from a mental model that forms the basis of present economic thinking: e.g. the location of resources (natural and human) to serve business imperatives (Hawken et al., 2000:6).

To implement and follow values that understand nature as capital requires interventions in the different elements that constitute organisations: conduct of action; strategy; systems; process; and results, all of which are closely dependent on their social mechanisms – individuals (Greenwood and Hinings, 1993). Blau and Mckinley (1979) suggests beliefs and values as action drivers – ‘work motives’ (ibid in Greenwood and Hinings, 1993) which are responsible by framing the above elements that constitute and organisations (Greenwood and Hinings, 1993).

This supports the importance of understanding sustainability values and of human capital in changing organisational culture from one which is unsustainable to embracing large improvements in resource productivity:

"Sustainability and unsustainability are not just two sides of the same coin. They are categorically different. Unsustainability is measurable; it can be managed and incrementally reduced. But sustainability - the possibility of flourishing in the future - is aspirational (...) creating sustainability is not the same as reducing unsustainability." (Ehrenfeld, 2004:2)

In summary, CR seems to be related to internal organisational aspects, but the literature suggests that it focuses largely on externalities, although a true commitment to CR has been felt lately, one commitment that aims to start putting aside external pressures and be driven by how organisations thinks and acts (Morrell and Anderson, 2006; Spitzeck, 2010). In the past the majority of approaches used issues related to sustainability as a way of promoting a good image of companies to the consumers, but as some authors suggest (e.g. Morrell and Anderson, 2006:125), such approaches can fall into incoherent behaviour between the external speech of an organisation and the organisation internal behaviour (ibid). The above is related with organisations constant look for short-term answers to long-term sustainability challenges, affecting brand identification and loyalty (ibid).

In the last few years there has also been compartmentalised practice of CR. Spitzeck (2010:4) underlines how the evidence points to a shift from looking at CR from a whole organisational perspective to looking at specific CR issues in order to respond to their corporate responsibility reporting demands. This suggests the lack of ability to
fully utilise CR interventions to their full potential by connecting the different elements of an organisation which are currently addressed separately: conduct of action; strategy; systems; process; and results, elements referred to organisational's archetype (Greenwood and Hinings, 1993).

2b.2.3. MIND-SHIFTING IN CORPORATE RESPONSIBILITY

As mentioned earlier, in business there is a gap between current practice of sustainability rooted in economic efficiencies allowing relative improvements in ecological and social well-being, and the need to emphasise a more radical position integrating the societal (i.e. social and cultural) case and the natural case (operating within the Earth's carrying capacity – Factor X). As illustrated in Figure 2.6, it is this transition in corporate activity from efficiency to effectiveness – effectiveness representing long-term prosperity embracing renewable and wholly sustaining solutions (McDonough and Braungart, 2001) – that offers the greatest potential for Factor10 outcomes and the desirable achievement of the Millennium Development Goals by 2015.

Figure 2.6: Expanding scope of Corporate Responsibility (adapted from Dyllick & Hockerts, 2002)

However, it is likely that this more comprehensive approach to sustainability is limited by our understanding of and relationship with nature (Orr, 1994). The current
business culture and language about nature promotes it as a marketing tool to be exploited which, in itself, validates the status quo and limits opportunities for different responses in this debate.

CR should be strongly linked with organisational values, ethical codes and principles of action (Vountisjärvi, 2006:274), as well as questioning the traditional role of leadership by understanding accountability and engagement (Morrell and Anderson, 2006:118) together with current behaviour and outcomes (Vountisjärvi, 2006:271, 277, 283).

In order to go a step further, the ethos of organisations needs to be challenged. The major challenge for business is to create a different mindset, because although several paths engage with new ways of approaching sustainability, some with far from traditional ways of doing and thinking, general thinking is governed by well-known routines and habits that embrace the established. SI, as previously pointed out, should try to move beyond reaction to open up opportunities beyond what we already know and trust (Senge et al., 2004).

This is related to the need for a mind shift to embrace and take advantage of the opportunities embedded in sustainability parameters, moving from the domination of techno-economic activities in which nature and the human are add-ons to a view in which the intervention integrates nature, human and techno-economic activities, with nature setting the limits to growth (Figure 2.7). It is within this proposed framework that SI can flourish, and along with it, a coherent approach towards CR that addresses all the organisations elements.
Figure 2.7: From an economics-dominant framework to an integrated framework
2b.3. DESIGN AND MANUFACTURING FOR SUSTAINABILITY

This section presents diverse perspectives that connect design and manufacturing as partners in the move towards sustainability. Such views were expressed in a conference paper by the researcher presented at a Design for Durability seminar held at the UK Design Council in the early stages of the doctoral research (Monteiro de Barros and Dewberry, 2006).

This section will be focusing on subjects related with the response of design to problematic of sustainability, and the section 2B.3.1. related with Product Durability, Manufacturing and their responsibility to create sustainability

The New Economics Foundation report ‘Beyond Recycling’ (Cooper, 1994) sought to create awareness of the problem of waste generation and the lack of resource recycling in industry and the design community. Cooper (ibid) sees the durability concept as a response to the waste problem: “An increase in the lifespan of consumer durables would likewise reduce the throughput of resources” (ibid).

The connection of design to the concept and nature of product ownership provided a foundation from which to explore mechanisms with which to begin responding to the ‘throwaway society’ (Lee, 1990). Durability in design is therefore closely related to manufacturing and design working together to respond to the debate about levels of consumption and rates of product obsolescence.

Campbell (1987) describes the act of consumption as the search for human satisfaction through products and possessions. Design needs to present alternative suggestions which could be adapted to current market mechanisms.

There has been a growing awareness in the design community of sustainability priorities and a more conscious mapping of the links between product, durability and environmental impacts has been explored to promote sustainability (Cooper & Evans, 2000; Richardson et al., 2005).

Design intervention in sustainability from the point of view of durability can be seen from different perspectives:

— **product obsolescence**: technical obsolescence, economic obsolescence and psychological obsolescence (Cooper, 2004), relates to product development as a whole to the nature of obsolescence and indicates that both design and manufacturing are responsible for providing answers. Design has an important role in shifting "both
production (products and processes) and consumption onto a more sustainable basis” (Richardson et al., 2005).

— **slowness consumption**: can be interpreted as a more durable economical system around slow consumption and slow obsolescence (increasing product durability) through the idea of “regenerating” the economy (Fuad-Luke, 2002)

— **ethics and responsibility**: Design for sustainability involves ethics in the design community (Whiteley, 1993), focusing on the social responsibility of design and designers (Papanek 1973), and/or instigating a stronger relationship between design and development that addresses the social and economic aspects of industrial design (Bonsiepe 1976, 1979)

— **ecodesign**: The integration of a more environmentally-friendly global approach of ecodesign tools, methods and strategies such as: waste management tools; environmental and temporal scale reduction approaches; service system structures; the timing of environmental management strategies (Bhamra, 2004 which produced a review of ecodesign approaches and tools); a four stage model for ecodesign innovation (Brezet, 1997); and Sustainable Systems Triangle methodology (Brezet et al., 2001).

### 2b.3.1. MANUFACTURING AND SUSTAINABILITY

*Industrial ecology* (IE) seeks to develop a sustainable manufacturing strategy by drawing a parallel between the process in an industrial system and those of biological systems (Cooper, 2005). The IE concept helps to orientate manufacturing activity towards greatest levels of sustainability. IE seeks sustainability through acknowledging how the properties of an ecosystem configure in the production system and by closing resource loops. At its heart, IE views cyclic resource use as a central, defining element of the industrial metabolism (Ehrenfeld, 2004).

Three main concepts link design and manufacturing in the sustainability framework:

The first is **Dematerialisation** (as Weisacker et al., 1997) define: selling performance not goods), which provides a foundation for the *Product Service System* (PSS) concept (Schmidt-Bleek, 2000; Van der Voet et al., 2005). Likewise, the *Sustainable Systems Triangle* (SST) methodology triggers PSS defending that product and services are two categories which are “merely different modes of delivering
satisfaction and that the dichotomy established in much of the current literature clouds the basic design issues involved in the more important goal of finding more sustainable ways to satisfy demand” (Brezet et al., 2001:24). The SST focuses on three aspects of eco-efficiency: the device, the institutional or infrastructural context, and on user practices (ibid).

The second is the *Factor 10 approach* (Schmidt-Bleek, 2000; Factor 10 Club, Carnoules Declaration, 1995) already discussed in this thesis (Chapter 1 under Factor X section title), which drives the debate about eco-efficiency (Hunter et al., 1994; Reijnders, 1998). Factor 10 reflects a tenfold reduction in 30-50 years of levels of resource use (Factor10 Club, Carnoules Declaration, 1995).

The third is *Cradle-to-Cradle* concept took the basic ideas of *Industrial Ecology*, placing the focus point not on the industrial process but on the process of product development. It aims to implement the notion of dividing the components (materials) of products into biological nutrients (organic materials) and technical nutrients (synthetic materials which should be reused in an attempt to eliminate technical waste) (McDonough and Braungart, 2001). From a critical view, the *Cradle-to-Cradle* does not offer a new perspective; neither achieves to present a hands-on-approach integrative process, indeed offers a view on product attributes. There are other approaches, like The Natural Step, that achieve a are more strategic implementation of ecological elements into business practices.

These various approaches towards sustainability from design and manufacturing, when placed in practice, focus mainly at the level of the product development process – the outputs. Table 2.2 presents a summary and positions each design and manufacturing approach in the different phases of product development. This section sets the relation between manufacturing main concepts towards sustainability - the industrial processes (Production) - and the relation of these with product design (Consumption).
<table>
<thead>
<tr>
<th>Ethics</th>
<th>Strategy</th>
<th>Conceptualisation</th>
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<td>Cradle-to-cradle and Eco-effectiveness (McDonough and Braungart, 2001, 2002)</td>
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<td>Industrial Ecology - sustainable manufacturing strategy (Frosch and Gallopoulos, 1989) Live Cycle Assessment (standard approach used by EcoDesign, which can be traced back in 1993) Environmental and temporal scales reduction approaches (Bras, 1997)</td>
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<td>Sustainable Systems Triangle methodology (Brezet et al., 2001)</td>
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*Table 2.3: Position of the main concepts in product development fields of action (Dewberry and Monteiro de Barros, 2008)*
2b.3.2. DESIGN AND MANUFACTURING IN BUSINESS INTERVENTIONS

It is important to acknowledge the need to challenge the traditional role of design and manufacturing and to amplify their level of intervention to achieve sustainability because, to intrinsically relate the environmental, economic and socio-cultural crises, redesigning what exist is not path for discovering true solutions (Manzini, 1992).

Hence the new role of design and manufacturing should understand and challenge the current boundaries of business decision-making and its limitations, to create solutions that can meet the future context of business and industry: e.g. Factor 10 reality.

Without challenging the characteristics of incremental improvements in business, manufacturing and design, effective outcomes for the long term cannot be achieved – “incremental improvements [which] are insufficient [in isolation] as a means for achieving a sustainable future” (Lewis and Gertsakis, 2001:191) – as they are locked into a financial decision-making system which does not consider limits to growth a priority parameter (Hawken et al., 2000).

The links between design, manufacturing, durability and sustainability is increasingly evident, and such strong links suggest the need to start using design beyond translating human wants into material goods (Birkland, 2002).

*Design thinking*, as referred in Chapter 1, is the cognitive side of creative approaches (e.g. decisions) which deals with visualising scenarios of solution priory to their existence (Wylant, 2009). *Design thinking* embraces design’s full potential of multidisciplinary and transdisciplinary characteristics, together with the capacity of systems thinking and future visioning; as the ability to challenge the typical mechanical, quantitative business, industry and design decision process (Manzini, 2005).

With sustainability at centre stage, the boundaries for business, manufacturing and design cannot continue to be defined by traditional economics but must rather be represented by natural capital and the limits of this. What is required is deeper questioning about how available supplies can be used more intelligently (Schmidt-Bleek 2000:2), and how this process will bring about new connections between durability and sustainability that embrace innovation in production, trade and consumption.
2b.3.3. CURRENT GAP IN DESIGN AND MANUFACTURING

The *Triple Bottom Line* (Elkington, 1998) describes sustainability as having three components: environment; social; and economic. Understanding the position in the elements of the *triple bottom line* (TLB) of the different views, concepts and activities of design and manufacturing towards sustainability according to their driver; allows to draw an overall picture that helps on identifying areas in the TLB poorly explored (Figure 2.8).

**Figure 2.8: Mapping design and manufacturing concepts into the TLB**

The mapping presented in Figure 2.8 shows the gap existing between the views, concepts and activities for sustainability in the three dimensions of TLB. Views, concepts and activities tend to be or associate to production or consumption.

Production is mainly seen quantitatively, led by a techno-economic driver informed by the concepts that populate the map area. Production can be seen as align with ‘business imperatives’ and quantitative ways of measuring success. According to Mustafa (2010:129, citing Jongen and Meerdink, 1998): “Half of the human effect on the environment has to do, directly or indirectly, with production and consumption”; although some views, concepts and activities of design and manufacturing address the natural limits, only few address the consumption problematic.
Consumption embraces a social and behaviourist approach, which is informed by concepts driven by a more human-scale focus on needs, responsibility and social systems.

If the human (consumption) and the techno-economic driver (production) are linked, the potential for generating outputs (products, processes, services, systems) informed by the limits of growth is greater because a different world-view is likely to be achieved through the different narratives formed (Brown et al., 2005).

This suggests a new role for design and manufacturing towards sustainability: connecting and look to interrelate production and consumption under the premises of sustainability as shown in Figure 2.9.

**Figure 2.9: Proposed integration of production and consumption**
Figure 2.9 introduces a change in the design and manufacturing field by promoting a production and consumption dialogue. It is important to bring together the concepts of production and consumption, which have been theoretically disconnected over time (Aldridge, 2003). This requires collaboration between different disciplines to create a more holistic approach to sustainability. It is crucial to challenge the society based on production, which has given birth to a society dependent on consumption (ibid:39).

This new narrative challenges the current system of measuring success, and for this, design and manufacturing need to start interfering in the system of values by acknowledging two things: the relation of sustainability to production and consumption; and the importance of the individual in informing a value-system that can achieve sustainability (Meadows, 1997/99). This is related with Innovation for Sustainability as it challenges mindstes.

2b.4. INNOVATION FOR SUSTAINABILITY

The objective of innovation for sustainability (largely know as sustainable innovation (SI)) is to move beyond the ‘reduce, reuse, recycle’ approach, which Ehrenfeld (2004) calls ‘improving unsustainability’. Although SI can be seen as a concept with interchangeable characteristics of DfS (such strategic thinking), SI focuses seems to be broader, beyond product development. But if SI does not embrace different ways of acting its approach is not sufficient for achieving effective sustainability: “Innovations have increased the eco-efficiency of industry significantly; however, net resource and energy flows have increased at a faster rate, due to increasing production and consumption” (Birkeland, 2002:7). Taking a proactive approach towards sustainability at a strategic level can create a seedbed for innovation, which in return can create long-term competitive advantages (Starik et al., 2005).

2b.4.1. CHARACTERISTICS OF SUSTAINABLE INNOVATION

Paluszkiewicz (2009) recognizes SI in her master thesis as a path that plays along with the economic growth so desired by organisations and governments goals, as in the case of China’s intention to achieve 9% economic growth by 2011. Thereby she makes the case for SI that promotes “clean technology in economic activities such as energy supply” (ibid:10), and sees SI as an approach that minimises the sacrifice of economic growth (ibid 2009). Although this focus seems feasible according to the current business mindset, it does not challenge the values-systems of organisations
Thereby, under this research perspective, not radical enough to challenge current businesses response to sustainability oriented-futures.

In Europe the UN Summit 2012 is focused on implementing *Agenda 21* together with the UN *Green Economy Initiative* of which the goals are: a) ending extreme poverty by 2015, and b) reducing carbon dependency and ecosystem degradation (EU Trade for Development Think Tank Meeting 2010). These scenarios instigate innovation, seen by the EU as evolving and appearing in new business models to meet its established goals, as SI is a way of “developing synergies to accelerate the implementation of the EU Objectives 2020 (climate change; renewable energy; energy and resource efficiency) by leveraging their market forces” (ibid:6). Further, the EU sees three major avenues for SI: “a) innovation conceived in emerging economies and commercialized globally; b) innovation as a result of a global sharing of knowledge; c) innovation to develop products and services affordable by the very poor” (EU Trade for Development Think Tank Meeting 2010:2).

There is an atmosphere of optimism about meeting these goals, although dependent of government decisions. Some countries are heading these changes; others are not even acknowledging the need for them. Stanwick (2009) points out four major factors that explain the difficulty in moving towards reaching the Millennium Development Goals (MDG) by 2015:

- poor governance: corruption, human exploitation, lack of knowledge, expertise and infrastructure
- poverty trap: poor countries do not “have the resources to implement the investments needed to reduce the level of hunger, disease and the ability to improve the country’s infrastructure” (ibid:5)
- Poor countries: with poor social education and family services have higher fertility rates and less access to information as a result: increased population growth and environmental degradation due to the lack of resources to implement infrastructure to satisfy higher number of citizens, thus, it is installed a perpetual circle of poverty difficult to break free
- Policy neglect: explained by the gap between decisions made and their consequences.

Such factors underline the urge for an interchange between several spheres of action towards sustainability, involving more than what we consume as individuals, what we produce and how we produce; it should integrate the ways we live, think and govern
our societies, as Stanwick (2009) explains: “savings, investment and innovation that lead to development, are largely based on the actions of private individuals, corporations, and communities” (ibid:5).

2b.4.2. SUSTAINABLE INNOVATION APPROACHES

This section looks for SI approaches from a DfS perspective. In the design field this has started to be felt through views that integrate a more strategic perspective of DfS: one which integrates the cycle of actors involved in the whole product development process, (conceptualisation, production, distribution and sales, and the life cycle analysis of its obsolescence). DfS no longer focuses solely on products alone, as it has started to embrace services and all that is involved in the business of producing outputs.

*D4S – Design for Sustainability: A Practical Approach for Developing Economies* (a project sponsored by UNEP and Delft University of Technology) offers an approach to DfS in which product innovation is the central focus of small and medium companies (SMEs) to achieve sustainability (Crul et al, 2009). D4S broadening the spectrum of DfS although have a strong market perspective.

Another approach towards SI with DfS at its heart involving a view of business strategy is the *Design Diamond Model* (Hallenga-Brink and Brezet, 2005). One key objective of this model is to pursue both intuitive and rational choices. It is based on different steps of decision making and discusses important issues in the organisational, process and design under the umbrella of sustainability. The main feature of this model is its focus on the creative process of idea generation (ibid).

What can be seen in the majority of positions regarding SI (e.g. Charter and Clark, 2007; Hallenga-Brink and Brezet, 2005; Paluszkiewicz, 2009) is a view of radical innovation. All of these authors seem to understand SI as radical, as it looks for business opportunities within (mainly environmentally responsible) parameters of sustainability, producing new outcomes more respectfully for the environment.

A radical approach to SI within the boundaries of this thesis follows the above indications and, as briefly stated previously, looks for a change of mindset in which the new paradigm embraces a new hierarchy of relationships between techno-economics (what we produce as society); the human (the way we relate and behave as society and individuals); and nature (what we depend on – resources, materials, energy). And it is strongly related with different thinking and doing, in order to set business strategies towards sustainability (Tukker et al., 2008).
The next section presents an overview of tools, methods and methodologies for improving sustainability performance. The collection presented is extensive but not exhaustive; it presents those tools most referred by key literature and business reports.

To gather exiting tools, methods and methodologies to assist on the journey to sustainability it is essential as this research aim is, in part, to implement new ways to deliver outputs that promote sustainability helping in interventions at different levels (Chapter 1). Therefore, to know what type of tools, methods and methodologies exit with similar or the same requirement provides a solid base to accomplish the research’s aim in an innovative way. Moreover, by acknowledge existing approaches to sustainability, allows identifying existing gaps that can be fulfilled by this research outcome.

Seven different drivers’ groups of tools, methods and methodologies were identify: a) environmentally-driven; b) socially-driven; c) economics-driven; d) socio-environmentally-driven; e) socio-economically-driven; f) environmental and socio-economically-driven; g) ethical-driven

**Environmentally-driven tools for sustainability:**

- *The Ecodesign Principles* (Van der Ryn and Cowen, 1995) addresses deep values inspired by nature and inspires principles based on nature.

- *Natural Step* system conditions: Principles, metaphor, system conditions – provides a framework for working towards sustainable development (Robért, 2002).

- *Eco-points* is a system of scoring for quick analysis of overall environmental effects and helps in prioritising practical action (aggregain.wrap.org.uk).

- *Environmental Impact Assessment* is a process that identifies the environmental effects (negative and positive) of development proposals. It aims to prevent, reduce and offset any adverse impacts (European Commission, 2001) helping organisations to improve their environmental performance (ec.europa.eu/environment/eia/home.htm)
— *Life Cycle Analysis* methodologies are use to evaluate the performance of a product development process for environmental assessment in product design (Soriano, 2004).

— *Eco-compas* provides a simple, holistic and visual summary of life cycle analysis data focusing on eco-efficiency indicators (www.ecocompass.com), and is mainly used to understand the impacts of production and products and how to improve them.

— The *Ecodesign Strategic Wheel* is a tool that identifies ecodesign strategies for products (Brezet and van Hemel, 1995).


**Socially-driven tools for sustainability:**


**Economics-driven tools for sustainability:**

All the below operate at the organisational level to assist decisions about the allocation of resources:

— *Prime* is a simulation model focusing on EU energy markets (European Commission, 1995).

— *Poles* is a partial equilibrium world-wide energy market model (ibid)

— The *QUEST* model simulates the economic impacts of policies and is used to analyse the economies of European member states and their interactions with the rest of the world (ibid).

The trend has been the appearance of tools that integrate more than one dimension (environmental, social and economic). Significant tools that illustrate this trend are listed below:

**Socio-environmentally-driven tools for sustainability:**

— The *Sustainability Circle*: draws key trends and issues from the environmental and social dimensions of sustainability (Charter, 1998:24), focusing mainly on product development.
— **CRAT (Corporate Responsibility Assessment Tool)** is a web-based tool that companies can use to manage, measure, and improve their CSR performance (Government of Canada, Conference Board of Canada, June 2004), focusing mainly on management.

— **The Management Change Guide** provides a useful diagnostic tool and route map for addressing climate change as a priority for organisations (Baekdal et al., 2005-206).

**Socio-economically driven tools for sustainability:**

— **Tremove** is a simulation model for the transport sector which allows the simulation of consumer/user behaviour regarding the choice of modes of transport, providing inputs for organisational strategy (http://europa.eu.int/comm/environment/air/tremoveassessment.htm).

— **Nemesis** is an econometric model estimative on the basis of long time series. It includes 30 productive sectors and 27 consumption categories to aid decision making in organisations (http://www.ecmodels.eu/index_files/Page616.htm).

Tools, method and methodologies that cross all dimensions of sustainability are presented below.

**Environmental and socio-economically driven tools for sustainability**

At the level of organisational management:

— **Quality of Life Capital** integrates and maximises environmental, economic and social benefits as part of land use and the management decisions related to it (http://www.naturalengland.org.uk/).

— **Impact Pathway Analysis** is a step analysis for linking different levels of a particular pollutant element with different levels of physical damage to human health and ecosystems (http://iatools.jrc.ec.europa.eu/bin/view/IQTool/Environmentalimpactassessmentmodels.html).


— **The Sustainability Dashboard** exposes the complex relationships between economic, social and environmental issues, and is an
excellent tool for assessment aimed at decision-makers and citizens interested in SD (http://www.green2sustainable.com/).

Tools, methods and methodologies that operate at an ethical and principles level:

— Sustainable Procurement Assessment Framework, a method for delivering organisations’ SD priorities. It takes social and environmental factors into consideration alongside financial factors in making decisions, involving the whole life-cycle cost, the associated risks, measures of success and implications for society and the environment (Forum for the Future - NGO, 2007).

2b.5.1. SUMMARY

There are numerous tools for creating, introducing, transforming and measuring performance sustainability at the business, manufacturing and design levels, to address sustainability.

Table 2.3 presents an overview of these, mapping them against the key dimensions of sustainability – society, economics, and the environment (Elkington, 1998) – and the main levels of intervention – principles, organisation/business, process, and product. This clarifies the key issues: most of the tools, methods and methodologies focus on one dimension of sustainability, while a small number populates two dimensions, and a only a few cross all dimensions.

This map also presents other features of the tools, methods and methodologies: 1) most have one focus of action, mainly the organisations’ impact or performance regarding their visions/goals/priorities/impacts; 2) tools, methods and methodologies that focus on more than one level of intervention (e.g. principles, processes, products, organisational/business) are rare.
Table 2.4: Levels and areas of intervention of tools, methods and methodologies

2b.5.2. SECTION CONCLUSION

There is a lack of tools that embrace all dimensions of sustainability includes the majority of areas of focus (ethics, organisational, process, products etc). Such conclusion presents a scenario that can be followed by this research: provide an outcome that embraces all dimensions of sustainability.

Another important issue is tools, methods and methodologies that operate under economic imperatives, which indicates once more that it is difficult to achieve a different value system, more in tune with the change of view needed in the business mentality, design community and manufacturing for greater levels of sustainability to be achieved. These conclusions set a challenge to the research aim: help on intervene, implement or re-direct the values system.
2.2. CHAPTER CONCLUSION

The literature review exposes the key findings that frame this research, informing the search for the answer to the research question as well as helping to frame the outcome of this research. The findings are as follows:

— It is necessary to involve whole systems thinking in pursuing a holistic perspective in order to engage in ecological thinking. (e.g. Ehrenfeld, 2004)

— Whole systems thinking enables understanding the whole and the relationships between its parts (e.g. Senge, 1994)

— Relationships and connections are better understood by the living systems theory which provides a hierarchy of the system components (or nested systems), helping to clarify connections as well as systems’ physical and behavioural elements (e.g. Bailye, 1995).

— Ecology helps framing the real limits to any activity (business, design, manufacturing), which responds earth’s capacity (e.g. Meadows et al, 1972)

— Sustainability is a mindset that integrates the fundamental ecological characteristics of endurance and resilience over time. It embraces context-specific or context-wise, as every system has its own characteristics and relates differently internally and externally. (e.g. Bodin and Wiman, 2004)

— Different perspectives of sustainability from different fields which should be integrated in order to achieve greater levels of improvement, and construct a coherent path towards sustainability (e.g. Aldridge, 2003).

— A change of focus is needed, from the impacts and profits that outputs bring to business, design and manufacturing to a focus on the whole cycle of the organisation, business, production and consumption (e.g. Capra, 1997).

— A strong necessity is felt for broadening the view from just outputs to include the processes and inputs in any activity. This calls for
rethinking the values, beliefs and motivations that frame any thought, idea and action (e.g. Findeli, 2001)

— According to Meadows (1997; 1999) the change from exclusively watching outputs to including processes and inputs. Actions should integrate the twelve leverage points of a system in which the most eco-efficient leverage point is the paradigm.

— The shift in paradigm should be from focusing on minimising unsustainability (outputs) towards generating the capability of creating sustainability (Ehrenfeld, 2004)

— The paradigm shift is specific to all fields of business, design and manufacturing, including politics and government, as they all share the mechanical framework. This framework focuses on quantitative aspects, measuring success against numbers created and specified within that framework and not against limits for growth; nor against the integration of natural capital and human capital and how these together can create truly economical capital (Hawken et al., 1994).

— Sterling (2003) points out that changing the ethos also changes the endo and the praxis. This is true in business, design and manufacturing: when they start embracing different values, their aims and goals and consequently their output may also change.

— Dialogue is an important way of achieving a paradigm shift because, as Bohm (1991, 2000) stresses, informing thought and ideas in a different way can break the established vicious circle of action, which can strongly, influence the achievement of different outputs and provide different solutions to existing problems. Changing inputs increases the chance of different outputs.
CHAPTER 3

Freedom from the desire for an answer is essential to the understanding of a problem (Krishnamurti, 1950).
Chapter 3

3. RESEARCH METHODOLOGY

This chapter outlines the methodological paradigm of this study, and an overview of the research method and tools that demonstrates its robustness, reliability and validity towards this thesis objective.

This chapter presents the interpretative paradigm on which the methodology of this research was grounded. This qualitative research, carried out within a constructivist paradigm, relies on a multi-purpose (exploratory and explanatory) and on both inductive and deductive perspectives. It follows a grounded theory strategy to uncover directions from the data. This chapter gives an overview of the qualitative data collection. It shows thematic coding and cognitive maps for the data analysis and concludes with a discussion of how the quality of the research was ensured.

3.0. SUMMARY

This chapter presents:

— an overview of the key characteristics of this research;
— dialogues as central to a) understand peoples’ views, thoughts and ideas (data collection), b) structure and analyse the data;
— cognitive maps to deal with messy and complex data without losing its richness.
3.1. INTRODUCTION

The previous chapter presented the academic context domain of this research, this chapter presents a social science research which deals with peoples’ views, experiences, stories, values, beliefs and motivations in order to understand thoughts and actions aimed at achieving sustainability.

There is no need for fancy techniques if you are asking the right questions.
(De Bono, 1971:8)

As indicated by the conclusions drawn from the review of the body of literature in Chapter 2, mindset is crucial in the way we think and act. Above De Bono (ibid) expresses the same in a manner that allows to understand what framed this research methodological choices: the questions expresses in the aim and objectives of this research mainly focus on the HOWs Tos: how sustainability can be created as opposed to how reducing unsustainability, therefore it is important to understand how people who do create sustainability act and think.

3.1.1. INTERPRETATIVE PARADIGM

The first step when conducting a research plan is to understand the relationship between ontology and epistemology, which will provide the methodological approach, the ‘basic set of beliefs that guide action’ (by Guba, 1990:17).

Figure 3.2 presents a schematic perspective of the interconnection between ontology, epistemology and methodology, completed by a summary (inspired by Denzin and Lincon, 2003) of the premises that the three components encapsulate. While ontology refers to the nature and social reality of the research and how the researcher understands and perceives the world, epistemology has largely to do with the theory of knowledge assumed by the researcher to make sense of his/her perceptions. Finally, the methodology refers to how the research will be approached. The ontological and epistemological positions and the methodological premises describe the interpretative paradigm of the research.
Figure 3.2: The basis of the research paradigm

Philosophical Research Paradigm – the “basic set of beliefs that guides action (Guba; 1990:17)

Epistemology
Studies the nature and grounds of knowledge under the domains of the research by specifying a set of questions

Ontology
Researcher bias – the way by which the world is approached

Methodology
The way by which the researcher is going to examine the domains of the research – determines the framework

Figure 3.2 is inspired by Guba (1990); Denzin and Lincoln (2003).

The several interpretative paradigms are summarised in Figure 3.3, following Denzin and Lincoln (2003). The constructivist paradigm which embraces multi-realities, co-creates with the correspondent realities and uses a naturalistic set of methodological procedures, is the philosophical perspective best suited to framing this research. The constructivist paradigm is often presented through a grounded theory approach, which Charmaz (2003) calls a constructivist grounded theory approach.

The constructivist grounded theory approach strongly relates to the aims and objectives of this research: creating dialogues and sharing visions to co-construct possible Factor 10 futures.

The constructivist grounded theory interpretative paradigm approach recognises the mutual creation of knowledge by the object of study and the participant: the conversation between them being an open-ended practice of grounded theory because it identifies the emergence and constructivist elements of this dialogue; furthermore, grounded theory methods are utilised in a more flexible manner than reporting formulaic procedures (Charmaz, 2003:250).
Figure 3.3: Four main interpretative paradigms

Figure 3.3 is inspired in Denzin and Lincoln (2003)
The constructivist grounded theory approach is reflected in the research strategy, which combines several elements that constitute the design of a study within this paradigm. Figure 4, inspired by Robson (2002), illustrates the elements/issues taken into account when a research process is configured.

Figure 3.4: Representation of the elements/issues of the research design

Inspired by Robson (2002) and Young (2003)
3.2.1. RESEARCH PURPOSE AND PERSPECTIVE

Doing research requires understanding the research objectives and how to approach them. But firstly there is a need to understand the diversity of research purposes and types of perspectives in order to be able to frame this particular research by characterising its purpose and unique perspective.

The purpose of this research is to find ways to deliver outputs that promote sustainability by viewing design as a strategic role through its intervention in organisations’ sets of values, strategies, structures, systems, processes and actions (e.g. beyond the traditional outputs: products and services), to introduce a new paradigm and interventions aimed at F10 outcomes.

Based on Robson (2002:58), the terms of research can be defined by the tripartite classification exploratory, descriptive, and explanatory. Marshal and Rossman (1999:33, cited in Robson, 2002), add a fourth category: emancipatory, which is related to the action perspective. Robson states:

A particular study may be concerned with more than one purpose, possibly all four, but often one will predominate. The purpose may also change as the study proceeds. (Robson 2002:58)

This suggests an interconnectivity and interdependence among all four. Depending on the aim of the research process, the journey will spend more time in one (or maybe two) of these categories (Robson, 2002).

— exploratory research is almost exclusively characterised by allowing flexible methodology design; it seeks to understand what is happening in a situation that has had little exploration in the past in order to generate new insights. (Robson, 2002:59). It is useful for making sense of a mass of raw material.

— explanatory research may have a flexible and/or fixed methodology design and seeks to identify relationships and explain patterns related to the phenomenon being researched, being able to elucidate a situation, normally in forms of causal relationships (Robson, 2002:59,60), and is identified with proving a theory.

— Descriptive research may have a flexible and/or fixed methodology design. It requires extensive previous knowledge of the subject of study to be able to address its aims in order to portray a correct profile of situations, events or people (Robson, 2002:59), which can be related to classifying the subject of study.
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— Emancipatory research aims to create opportunities and the will to engage in social actions, having (almost exclusively) a flexible design (Robson, 2002:60).

The exploratory phase of a study uses lateral thinking to explore and generate ideas but not to prove anything (De Bono, 1971:8). According to De Bono (ibid), aims, objectives, hypothesis are product of vertical thinking (i.e. deductive and explanatory), only if they emerge during the research process became product of lateral thinking as:

‘Lateral thinking recognizes no adequate solution but always tries to find the better one.’ (De Bono, 1971:8)

This research employs a social research perspective because it enquires into a social phenomenon. Therefore one must consider the two major perspectives of a social study: a) the positivist or deductive approach and b) the phenomenological or inductive approach.

Positivism (or hypothetico-deductivism) entails a perspective of a social world external to the subject of study: the observer is independent and considers that a phenomenon can be measured and quantified through scientific methodologies and aims to formulate and test the hypothesis or a theory by gathering appropriate data. The research is highly structured and reduces the subject of study to simple elements (Gill and Johnson, 1991, Blaikie, 1993, Robson, 2002).

The phenomenological perspective views reality as socially constructed and subjective. The observer is part of what is being observed and thus gets inside situations to better comprehend real life contexts. The researcher seeks to explain the meaning of the subject of study by collecting and understanding data from social interactions. S/he does not divide reality but rather tries to look to the totality (Robson 2002). Because of the subjectivity and consideration of everyday situations, the use of minimum structure in the research is indicated, and the mind of the observer should be open and free of preconceptions (Robson, 2002).

Blaikie (1993) states that the relationship between induction and deduction has been debated for about hundred and fifty years, and the key is to understand induction and deduction as the two ends of the same line. The debate continues today but, as Feyerabend (1978) points out, a fixed, absolute principle to conduct a study meets considerable difficulties; there is only one principle which can be defended under all circumstances and that is that anything goes in social research (Feyerabend, 1978:23,28, cited in Blaikie, 1993:160). Therefore precautions need to be taken to
prevent a sloppy research process. This study relies on both inductive and deductive perspectives to serve its aims and objectives.

The dialogue between the two perspectives is very useful in the objectives pursued in this research:

— first there is an exploratory phase to identify and refine this research focus in the secondary and primary data;

— next, an explanatory stage, classifying and arriving at a theory;

— in between there is an evaluation stage to generate a filter to present coherent and valid results;

— there is another exploratory phase to gather data to construct approaches, methods and/or tools to fit the theory or theories arrived at;

— this is followed by another evaluation period to again start the classification and understanding of the impact of the research output via a new explanatory stage.

Figure 3.5 explains this research’s journey as a multi-purpose (exploratory and explanatory) embedding both inductive and deductive perspectives. It is important to approach a deductive perspective through a qualitative test of a hypothesis rather than entering into a quantitative data approach (explained further later in this chapter).

For a research aiming to *shift mindsets*, a phenomenological approach will be used, following a constructivist grounded theory interpretative paradigm in a highly flexible structure.
Figure 3.5: Dialogue between deductive and inductive perspectives

Figure 3.5 is inspired by Blaikie (1993)
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In conclusion, this research follows:

— a multi-purpose (exploratory and explanatory purpose) embracing both inductive and deductive perspectives

— under a phenomenological approach, following a constructivist grounded theory interpretative paradigm with a highly flexible structure.

The next section introduces the strategy followed and classifies the type of research undertaken.

3.2.2. RESEARCH STRATEGY AND RESEARCH TYPE

It seems that defining the research type is easier than specifying a research strategy. This is a qualitative study:

Qualitative research has at its core a strength that counterbalances one of the weaknesses of structured, quantitative research... it is capable of answering not only the questions asked, but if executed in a relatively unstructured fashion, also answering those not originally asked. (Partington, 2002:110).

A unique consideration for this research was the ambiguity and scarcity of available knowledge that relates all the subject areas (sustainable development; design and manufacture; education; communication; and science of thought) which is needed to inform the research in order to achieve a paradigm change. The above considerations are related to ethnography because it:

...aims to see the world from the point of view of the informant, become immersed in their detail and get close to the phenomena of interest. (Partington, 2002:110).

Furthermore,

Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible... involves an interpretative, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meaning people bring to them. (Denzin and Lincoln 2003)
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The quote above points out one of the principal intentions of this research: to understand how people see, perceive and describe wellbeing, welfare, and desirable futures, and how these are transformed into a new business paradigm and different outputs emerge.

A qualitative study involves:

— studying the use and collection of a variety of empirical materials such as: a case study; personal experience; introspection; life story; interview; artefacts; observations; i.e. empirical material that helps to describe routines, problems, moments and meaning in individual's lives

— uncovering a wide range of interconnected interpretative practices, leading to better understanding of the subject

— often, a commitment to use more than one interpretative practice relates to the subjectivity of the study (Denzin and Lincoln, 2003).

A research strategy defines the framework, which influences how the data are approached and analysed and to the amount of control that the researcher has over the process.

In this research the objective is to:

— understand a situation (e.g. current paradigm; strategic decision making processes, outputs, etc) through a social interaction (e.g. conversations, dialogues etc) with the aim of drawing out data that will help to:

  1) introduce a new paradigm by developing elements that introduce new values and ethics;

  2) help people in creating sustainability

It relies on the development of skills to extract and gather rich information that will enable the researcher to uncover insights from the data, as Wolcott suggests (1995, cited in Partington, 2002): it does not depend on technical expertise but is rather an art. Many interpretations will be possible at the point of analysis; the challenge is to provide the most compelling interpretation, as there are no standard practices (Partington, 2002).

To achieve the purpose of this research it’s crucial the selection of an appropriate methodological strategy. According to tradition, there are three methodological strategies directly associated with the purposes and perspective chosen (Robson, 2002):
experiments, typically used in explanatory studies;
— surveys, appropriate for descriptive purposes;
— case studies, useful in exploratory works.

A fourth strategy to address this research is, _grounded theory_, developed by Glaser and Strauss (1967), which discovers theory from data from the ground-up (Blaikie, 1993). The theory (or outcome of this research) related to the domains of this research will emerge from the most relevant themes (Strauss and Corbin, 1990). Glaser (1992/1998) takes grounded theory further and considers it an emergent methodology.

With _constructivist grounded theory_ (which includes multi-realities; knower and correspondent co-create reality; follows a naturalistic set of methodological procedures, see 3.1.1) as an interpretative paradigm, the strategy will reflect this paradigm by using grounded theory strategy to approach the data collection and data analysis, aiming to respect the flexibility and emergent nature of this qualitative research.

### 3.3. RESEARCH METHODOLOGY

A grounded theory methodology permits the use of different methods (Robson, 2002:270).

A variety of methods have been explored throughout this research:

— different types of interview relevant to different contexts and stages of the research:

— exploratory and explanatory case studies (Yin, 1994), that have the potential to frame and understand the ‘How Tos’ of creating sustainability;

— workshops with different objectives: some primarily designed to gather data and others structured to gather feedback of emergent ideas from the data; and

— workshops in organization(s) to test the functional outcomes of the research.

The intention of the research was informed by Bohm’s (2000) suggestion that, to create interventions that allow different outputs to emerge, the use of dialogues is of central importance to collect and analyse data. Factor and Garrett (1991) propose the use of creativity strategies in order to increase understanding and a reflection on
personal assumptions and any incoherence of thought and action (see also Bohm et al., 1991), as emphasised in Chapter 2.

De Bono (1971) makes the point:

“Creativity involves breaking out of established patterns in order to look at things in a different way. Thus the very effectiveness of mind in establishing fixed patterns makes creativity very difficult”. (ibid:1)

This suggests that a study with objectives such as introducing and implementing a paradigm that induces different thinking and action towards sustainability should follow a more creative approach, enabling new research outcomes to emerge. De Bono (Ibid:2) emphasises that:

Data is useless until it is looked at in the context of an idea; only then, he suggests, does it become useful information. Different people looking at the same data will derive different information from it according to the idea which each of them uses to explore the data. Old data looked at through a new idea gives new information. Since data is available to everyone, it is the creativity with which an individual looks at the data that makes a big difference. (ibid:2)

De Bono’s argument validates creativity as a way of approaching the collection and analysis of data where the research directions are emergent. The aim, goals and objectives of this research not only frame the choice of this research methodology but also lead it in that the research methodology embraces new ideas while assessing the actual value and resilience of old ideas, particularly of those connected to the implementation of sustainability. If, as this research suggests, the pursuit of sustainability requires a different value paradigm, then the use of non-traditional ways of approaching data and techniques is necessary, alongside maintaining methodological logic and rigorous standards of analysis.

Examples of new methodological approaches in the research include storytelling, games and other techniques that enabled the exploration of different value-oriented issues concerned with language, communication, learning and teaching, thoughts and motivation. Consequently, the concept of dialogue was central and applicable to all the different stages of the research, and specifically the data were looked at through a variety of interpretations of dialogue:
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— dialogue as a philosophical base - a deep acknowledgment, as stressed by Bohm (2000), of peoples’ different views of issues and how they intervene to influence others’ perspectives;

— dialogue as a method - the understanding of the qualitative side of sustainability by capturing personal visions and knowledge. Conversations, narratives and storytelling as part of the sense-making process to ‘extract’ meaning (Yiannis, 2000:4). This related to the first part of the data collection, explained later in this chapter (section 3.4), that involved conversations with individuals from ecodesign and experts in ecological economics and corporate responsibility;

— dialogue as a process – a collection of personal journeys and experiences on the practical side of sustainability. Dialogues captured stories that served to transfer knowledge (Denning, S., 2006) and helped to understand and explain complexity (Brown, J.S., 2006). Organisations’ stories represent the ‘institutional memory system of the organization’ (Yiannis, 2000:19). This relates to the second part of the data collection, which involves conversations with organisations already creating sustainability;

— dialogue as a concept - the construction of a framework that provides cultural change, given stories serve as means of cultural shift (Yiannis 2000) and help foster transformational change (Denning, S., 2006); and

— dialogue as a guide when making different decisions - the communication and exploration of the different dimensions of sustainability in order to introduce new elements in the decision-making processes to facilitate the emergence of different outputs. This promotes strategic organisational reorientation/radical change by facilitating frame-breaking (Greenwood and Hinings, 1993).

The overall methodological research strategy placed the use of dialogues at the centre of the data collection. The next section presents the stages of data collection and analysis.

3.3.1. RESEARCH METHODOLOGY MODEL

This is not a positivist type of research typical of a vertical thinking approach in which a laboratory is used; it combines the use of both lateral and vertical thinking (De Bono, 1971:8).

Vertical thinking is traditional, logical thinking. One of its features is continuity. One of the characteristics of lateral thinking is discontinuity. Vertical thinking is so well-
known and well-established that identifying the nature of lateral thinking depends on the ability to escape from the rules of vertical thinking (ibid).

Figure 3.6 presents the research methodology model in which the three stages are represented. If lateral thinking seeks alternatives, the first step of this research has a prominent lateral thinking characteristic (exploratory stage). The second step (exploratory and explanatory stage) is mainly characterised by vertical thinking, yet lateral thinking still has a strong presence in exploratory activities that populate this stage. The third step (explanatory stage) is almost entirely dedicated to proving and establishing points or relationships (ibid). In between these steps, assessments and evaluations were made in order to uncover data in the deductive stage.

Although Figure 3.6 model refers to important findings and achievements of this research, it does not refer to the extensive literature review presented in Chapter 2 or to this thesis’ aims, goals and objectives as presented in Chapter 1. Both formed the foundations of the chosen research design and consequently its methodological approach.

### 3.3.1.1. First stage: Exploratory

The first stage of this research methodology is composed of three concurrent data collections:

— The literature already analysed and presented in Chapter 2 was carefully scrutinised.

— dialogues with sustainability experts in different fields such as ecodesign, ecological economics, management and engineering

— analysis of main values expressed in the communications material of seven UK organisations expressing different outputs under a broad understanding of sustainability beyond corporate responsibility. The objective was to understand the correspondence between the values towards sustainability highlighted in literature, and the ones communicated and expressed by organisations.

The data were approached through thematic coding in order to uncover key thoughts and ideas (the data analysis subsection reports the understanding from the thematic coding). The deductive findings, portrayed in more detail in Chapter 4, pointed to a need for a deeper understanding of the values towards sustainability in action and what differences exist between a business grounded in sustainability values (expressed through its outputs) and business-as-usual (although this does not exclude business-as-usual adopting sustainability practices – e.g. with CSR reports).
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3.3.1.2. Second stage: Exploratory and explanatory

The second stage of this research methodology took on board the previous findings as a starting point and looked for more information to confirm, reject or add detail. This involved two concurrent set of dialogues:

— dialogues with three consultants from the UK, Spain and Portugal with the objective of understanding the previous findings in more depth, how they approach organisations, and whether values, beliefs and motivations were important issues in the sustainability arena.

— dialogues with six organisations with sustainability at the core of their business. These companies represent different scales of awareness and therefore of commitment to sustainability. Chapter 5 presents these dialogues in more detail. The objective of these dialogues was to understand in depth whether their action is responsible for their outputs and vice versa.

— Findings from both consultant dialogues and dialogues with organisations revealed that different mindsets are needed to achieve greater sustainability and underlined the reflection of these mindsets in the companies’ outputs. They also provide data about possible ways of creating sustainability. Chapter 5 gives more detailed information about this.

3.3.1.3. Third stage: Explanatory

The third stage of this research methodology involved three steps:

— first step: Presenting the first draft of a methodology for sustainability (SuCo) at a workshop with fifteen participants, who suggested improvements. Feedback was collected using a pre-structured dialogue breaking the group in smaller groups and then a pre-structured general discussion (involving all) to compare ideas, thoughts and suggestions. Chapter 8 presents this and the results of this workshop.

— second step: literature was revisited to respond to the feedback of the workshop. This allowed the triangulation of the data and findings though a different source of data (enfolding literature that had not previously been examined it depth) and a new look into the dialogue data on the basis of these findings. This enriched the outcome. Chapters 7 and 8 present the details of the above.

— third step: two main studies were conducted in order to apply SuCo, uncovering its strengths and weaknesses. It was applied in industrial settings with two organisations, EDC Wales and Corus UK. This step allowed the analysis of
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SuCo in action and helped to detect further work needed, as presented in Chapters 8 and 9.

The deductive stage of this research (developing SuCo) is grounded in the findings of every stage mentioned. The finding of the third stage was particularly important in the development of SuCo.

The research methodology above illustrates the use of multiple data sources as a recommended way of triangulating the data (Robson, 2002).
Figure 3.6: Three step research methodology model

**Chapter 3**

**Collecting sustainability values, beliefs and motivations**

**Exploratory Literature**
- Secondary source
- Main values from main authors and concepts

**Exploratory interviews**
- Primary source
- Dialogues with ten sustainability experts

**Organisational analyses**
- Secondary source
- External communication analysis of seven UK organisations

**Conversations with consultants**
- Primary source
- Three consultants from different areas working closely with sustainability issues

**Conversations with organisations**
- Primary source
- Six UK organisations with sustainability in their core businesses

**Illustrating values in practice**

**Conversations with fifteen experts**
- Workshops
- SUH workshop
- EDC Wales
- Presentation of first draft of research outcome

**Revisit Literature**
- Secondary source
- Understanding relationship between outcomes and key theoretical concepts

**Main studies**
- Workshops
- EUC Wales workshop
- Corus UK workshop
- Applying the research outcome in industrial settings

**Methodology for innovation for sustainability**
- Sustainable Culture and Operations (SuCo)
As pointed out previously, data were collected through dialogues using a grounded theory strategy that allowed a multi-method approach. The modes and contexts in which these dialogues were performed varied between interviews, case studies, workshops and main studies.

Interviews were followed as a general approach, while dialogues characteristics (presented in both Chapters 1 and 2) were used when approaching experts, consultants and organisations.

### 3.4.1. INTERVIEWS

A strategic grounded theory approach, according to Robson (2002), involves the use of interviews as a way of getting a sense of the field:

> Interviews can be used as the primary or only approach in a study (Robson, 2002:270).

Miller and Crabtree (1999, cited in Robson, 2002:270) point out that in this type of approach:

> ... the respondent is largely free to say whatever they like on the broad topic of the interview, with minimal prompting from the researcher (ibid)

This use of interview was mainly applied to the first stage of this research, corresponding to the dialogues with experts. The secondary stage of this research aims to collect more in-depth information and to comprehend how people articulate, talk and think on different subjects.

— The first set of dialogues (first stage) is one-to-one in order to apprehend information about individual actions and motivations that cannot be obtained in a group discussion; it is intended as “a conversation between a researcher and a respondent” (Gordon, 1999: 21). Individual interviews are particularly suitable for dialogues about sensitive issues; such is in cases where personal opinions, thoughts and ideas are asked to be shared (Gordon, 1999:21). Basically, these first dialogues aimed to follow dialogues characteristics, which according to Bohm et al. (1991) dialogues are: everything except structured and under control, therefore these first conversations were unstructured interviews. The
dialogue unstructured characteristic is like a landscape where the places to pass through are not yet established and there are no signs pointing out the to specific areas. These last emerge while a tour on this landscape is taken (i.e. during the dialogue). Powney and Watts (1987, cited in Robson, 2002) call this type of interview an ‘informant interview’, sometimes referred to as non-directive, in which the primary concern is the interviewees’ perception of a particular situation or context.

— The second approach to dialogues followed a semi-structured interview. This can be compared to designing a landscape with different places that must be visited. These places are questions that can be modified according to the dynamics of the interview: there is no rigid path through the landscape and no strict relationships between the different places to visit, allowing the paths to emerge. Powney and Watts (ibid) call these ‘respondent interviews’ in where: what matters is the agenda of the interviewer, who rules and controls the situation. Because the objective is focusing on the dialogue, control of the situation is subjective depending on the flow of the conversation, openness of the interviewee and the time, context and place available.

Some points should be taken into consideration when approaching interviews. A ‘face-to-face interview offers the possibility of modifying one’s line of enquiry, following up interesting responses underlying motives in a way that postal and other self-administered questionnaires cannot’ (Robson, 2002: 272-273),

An interview is a kind of conversation, something that we all have experience of doing. However, interviewing does demand rather different emphases on the social interaction that takes place from those in ordinary conversations (ibid).

To carry out these types of interview instead of preparing a set of questions from a well prepared interview guide, a cognitive map was prepared (functioning like a script), but instead of using words it used visuals for identifying what needed to be understood at a glance while the conversation flowed, Chapters 4 and 5 explain this approach. It is important to understand that:

Maps re-present the world by providing versions of truth for human minds to apprehend. In turn, minds represent the world too, internally as cognitive maps. (Montello, 2002:283)
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The use of maps for research is not new. Brightman (2003) discusses methods anchored in mapping such as:

- mind mapping (creative thinking);
- concept mapping (knowledge representation and creation);
- cognitive mapping (defining and structuring problems to construct answers);
- dialogue mapping (question base);

All of these methods provide a framework for structuring qualitative data: that is, they help to structure thinking or gain new insights about research data, although each provides different insights depending on the objective. These four approaches are very useful for building understanding and consensus in groups, as well as for use as tools for individual thinking and learning (Brightman, 2003:1-2).

The maps used within the parameters of this research were cognitive maps. The study of cognition is the study of knowledge, structures and processes in sentient beings: humans, other animals, machines (e.g. Wilson and Keil, 1999 cited in Montello, 2002), which is key to this research. This research does not have the intention of portraying the cognitive connections or illustrating the journey of the people and organisations with who/which dialogues were held, it aims to express the deep thoughts, ideas, values and motivations. Cognition includes perception, learning, memory, thinking, reasoning and problem-solving, and communication (Montello, 2002).

A mapping method is indicated when the researcher is more:

...interested in following the interviewees’ agenda, rather than the interviewer’s, where you are involved in a dynamic and changing dialogue with the research subject(s) rather than just having an interest in taking a ‘snap shot’ of a particular time or particular event. (Brightman, 2003:9-10)

In this research maps were used to allow the conversation to flow as a dialogue in which control was shared by the interviewer and the interviewee, and, as Ackermann et al., (2004) state:

Interviews using cognitive mapping have often been used to facilitate data collection, especially for those problems which involve messy problems around internal issues.
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The use of maps reminds the interviewer why the dialogue is being held. In both types of dialogues they serve as a reminder of the key points to uncover in pursuit of the research aims.

In an interview process, maps

— serve as a means of capturing the chains of arguments;
— help to understand insights into the issue investigated;
— help to set the agenda for the interview;
— “If an idea is isolated – either due to a change in a direction of the discussion or the map is missing the clue – it can be easily identified and act as a prompt for further questions” (Ackermann, et al., 2004:2).
— acts as a prompt when attempting to collect individual or organizational aims and objectives (ibid).

There are some difficulties in using cognitive maps, such as the possibility of missing important points of view (Ackermann, et al., 2004:3). In this research this was avoided by recording all conversations. Although the interview transcripts include everything said by the interviewee, where an issue is referred to numerous times, using cognitive mapping to collect the key points of the conversation allows relating and linking them with other issues and quickly identifying areas of importance.

Ackermann et al. (2004) suggest sharing the maps with the interviewees, although they also point out that the maps can be too complex and complicated for the interviewees to understand. In this study maps were only shared when they represented an overview of essential issues (such as, for example, the business flow and distribution of River Nene portrayed in Chapter 5). What was shared was the verbatim transcript of the conversations, as stated before. Some interviewees felt uncomfortable about their words and suggested other ways of saying the same thing, even though they understood that the transcripts would not be shown in full in any document, being only a base for further analysis.

As also suggested by Ackermann et al. (ibid) some key sentences and issues were identified, a hierarchy of the issues emerging was created with a language that helps to identify this order (e.g. size of lettering); key generic concepts were drawn out, strong connections between the issues transmitted and potential opportunities and directions underlined in order to communicate not only the essence of the conversations taken but also to emphasise what was important to this research (ibid).
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In some cases, as in the main study, the interviewees gave their feedback on maps or diagrams which sometimes, depending on the feedback, allowed further interaction enriching the interview result. (Ackermann, F., et al., 2004:3).

As stated previously, although interviews were emphasised above, and references were made regarding the type of approach (to interviews) used in this research, they served as a methodological reference to use dialogues characteristics under the requirements of the type of interview approach selected to the different stages of this research.

### 3.4.2. WORKSHOPS

Workshops are a special type of focus group where the researcher can explore a particular subject and/or problem in order to acquire more information (Gilgeous, 1995). Young (2003) points out that by using a workshop the researcher gains a good understanding of the area under research and the ability to explore issues of interest, but it is time-consuming and difficult to find participants who will make the commitment, and there is a risk of producing a high level of information, which can make the data analysis difficult. But a compromise on the duration of the workshop and a well-structured session with focused questions, aims and objectives can minimise the risks (Young, 2003:19).

A workshop involves a process; a small group of people; and discussion of a concept or subject, with a high level of social interaction that, it can give a very reach inside with high quality data (if well-designed with a clear agenda and desired outcomes and a team to facilitate it) (Krueger and Casey, 2000; Young, 2003).

Several tools are used, from visual templates to games, narratives and storytelling to understand the mechanisms of intervention and to stimulate imagination and influence change both in the participants and in this research (Chapter 8 present details of these tools).

Three workshops were conducted, one with exploratory conversations (SDN workshop detailed in Chapter 8); and two in the main study.

The first workshop aimed to understand how people felt and thought about the first draft of SuCo by means of their social interaction. Group discussions emerged in the session (e.g. generating a creative event), from which qualitative data were collected (Krueger and Casey, 2000). This first workshop acted as a feedback loop of concepts that enabled presentation of SuCo and the generation of creative sessions to improve it.
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The other set of workshops was carried out under the main study strategy, explained below, using the workshop technique.

Chapter 8 presents detailed information about these workshop sessions, the results and their implications for this research.

3.4.3. CASE STUDY

The case study is another qualitative approach that involves exploration of an issue or subject, eliciting input to the evaluation stage of the research in a real life context using multiple sources of evidence that allow triangulation (Robson, 2002). Triangulation is a way of checking for validity. It is the display of multiple realities and refracted realities simultaneously, generating a cyclical validation approach rather than a sequential or linear validation approach (Denzin and Lincoln, 2003:8).

Quantitative research seeks:

...alternative methods for evaluating ... work, including verisimilitude, emotionality, personal responsibility, and ethic of caring, political praxis, multivoiced texts, and dialogues with subjects. (Denzin and Lincoln 2003, inspired by Huber 1995)

A case study offers an opportunity to explore these multiple methods and describe the impacts of the research outcomes, as well to identify weaknesses and strengths. It is the best source of data for the application of grounded theory data analysis.

According to Yin (1994), a case study helps in research that is centered in answering questions like “how” or “why”. This research seeks on understanding how to create sustainability: how people do it (thus dialogues with experts and consultants) and how organisations do it (thus dialogues with organisations). Further, Yin (1994) also underlines that case study can be exploratory, explanatory, and descriptive (ibid). In this research the use aimed to be explanatory, by explaining how people and organisations create sustainability.

The research strategies for the case study aimed to generate a rich understanding of state of the art situations regarding the way they create sustainability to inform the research questions identified in Chapter 1.
The literature review uncovered the need to:

- change the level of perception through interventions that introduce a new paradigm;
- understand Earth’s capacity as a limit to growth which should shape activities (e.g. economic activities);
- act within the inputs (e.g. values) of a system rather than uniquely on its outputs;
- intervene at more effective scales to create sustainability beyond numbers and logistics,

The opportunity to collect data from organisations already practicing sustainability gave generalisable, rich and detailed data, helping to

- generate a rich understanding of the issues involved in business regarding sustainability, their culture and ways of operating
- develop a richer awareness of different modes of integrating and operating towards sustainability;
- deeper recognition of how sustainability is perceived within a range of different organisations;
- learn from experts’ thoughts and actions as well as from their businesses;
- identify how they operate, process information and take decisions.

Finally, the case study provides a systematic approach from which findings emerge, and, following Eisenhardt (1989, cited in Gulbrandsen, 2006) to be faithful to the overarching grounded theory strategy, eight steps are taken as identified in Table 3.1.
<table>
<thead>
<tr>
<th>Esenhardy’s eight steps</th>
<th>This research interpretation of Esenhardy’s eight steps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Define the research question(s)</strong></td>
<td>Explanatory and exploratory Case study objective derived from: a) literature review: how sustainability is perceived in a range different of organisations; and b) findings in dialogues with experts that related sustainability to values, beliefs and motivation: how values, beliefs and motivations towards sustainability are placed in practice?</td>
</tr>
</tbody>
</table>
| **2. Select cases** | The sample organisations were selected according to:  
- the coherence between the external communications available and the outputs they presented  
- the values they were communicating  
- their willingness to participate in this research (no personal acquaintances were used, except in TYF) |
| **3. Craft data collection instruments** | Cognitive maps are structured form literature and/or from previous findings, (see Chapter 4 and 5) |
| **4. Data collection from the case(s)** | Data collected through dialogues which share characteristics form in-depth semi-structured interviews |
| **5. Data analysis** | Grounded theory approach using thematic coding and cognitive maps |
| **6. Shape the hypotheses** | The data revealed crucial differences between:  
- the mindset of businesses with sustainability at heart  
- how this mindset crosses the whole organisations and all operations |
| **7. Compare the data with conflicting and similar literature** | Other validation processes used:  
- Workshops (Chapter 8)  
- Main study (Chapter 8)  
- Revisiting the literature (Chapters 6 and 7) |
| **8. Formalise the theory** | The theory formalisation was substitute by a first research outcome which presented three frameworks of the findings (see Chapter 6) |

*Table 3.1: Eight case study steps from this research perspective*
Chapter 3

3.4.3.1. Main study

Two main studies were generated to obtain feedback from experts within the context of their organisations by testing SuCo – a methodology for innovation for sustainability enriching SuCo and also testing the hypothesis that emerged through this research: that different cultures provide different outputs (e.g. different strategies, actions, products). By setting the main study in two selected organisations (EDC Wales and Corus) it was possible to see whether SuCo was capable of achieving its objectives. Chapter 8 presents the full journey of these two organisations, which showed that SuCo has the potential to suggest different ways of looking from which new ways of acting emerge.

The selection of the companies followed a recommendation by Yin (1994): the possibility of replication. In this research methodology, replication was pursued by testing the same fragment of the research outcome.

It was decided that a workshop in a case study research strategy was most suitable for the main study, as it would provide an opportunity to collect rich, detailed information in a real-life situation (Lofthouse, V., 2001).

Although the case study strategy uses multiple cases to confer robustness to the findings and results (Yin, 1994), Yin acknowledges that a modest number of samples can have advantages compared to multiple cases: they offer the potential for gathering richer information and potentially deeper insights about the organisation (Yin, 1994) a fact also underlined by Robson (1993).

This researcher found the novelty of SuCo (and, in some cases, the limited knowledge and experience of participants) was a disadvantage that reduced the changes to obtain a richer understanding of SuCo’s potential (Lofthouse, V., 2001), although the feedback generated was used to enrich SuCo and test the hypothesis.

Feedback was collected in several ways that included: a) dialogues about each exercise after its execution; b) open discussion of SuCo; c) a questionnaire about the results of the workshop, all of which are detailed in Chapter 8.

The two main studies helped to provide information useful to understanding whether the workshops triggered new thoughts and new ideas for action (see Chapter 8).
3.5. DATA ANALYSIS

The ability to connect numerous details and simultaneously formulate a more comprehensive understanding of a qualitative data set remains a challenge.

Qualitative data analysis requires organizing and synthesizing often large quantities of text. In many cases, this analysis entails negotiating the interplay between raw data, semantic themes or codes, and the overarching conceptual framework. (Guest and McLellan, 2003:186)

3.5.1. GROUNDED THEORY APPROACH

Guest and McLellan (ibid) summarise different approaches to data as presented on Table 3.2:

<table>
<thead>
<tr>
<th>Positive approach</th>
<th>Transforming qualitative data in quantitative codes makes them easier to compare and to find patterns and relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground theory approach</td>
<td>Codes emerge from the raw data, allowing a qualitative or quantitative coding</td>
</tr>
<tr>
<td>Theory driven approach</td>
<td>Classic content analysis</td>
</tr>
</tbody>
</table>

*Table 3.2: Key approaches to data analysis following Guest and McLellan (2003)*

The data analysis took a grounded theory approach due to the nature of this research. According to Glaser and Strauss (1967), grounded theory offers an exploratory approach to data rather than testing an hypothesis, being a conversation with the data to understand what it is showing and hiding rather than looking for specific facts in order to prove a theory. It is a qualitative method that allows a theory to emerge. Even if it seems a superficial approach to the data, it has its own rigours:

— it is responsive to the situation in question;

— it continues to search for evidence that disconfirms what has emerged (the findings);

— it is driven by the data and not by something ‘predictable’ (Glaser and Strauss 1967).
Chapter 3

Grounded theory as a process for analysing data comprises five steps (Haig, 1995). The explanation of these is based on Glaser and Strauss (1967) and Strauss and Corbin (1997):

— focus on an area or identify a situation;
— extract data gathered by different methods to understand what is happening; how players manage their roles, (which can be uncovered by observation, conversations, interviews etc);
— approach the data using coding and theoretical sampling procedures: this stage is normally called note taking, meaning comparing data with data until some early theory starts to emerge which is then validated (or not) by the data;
— generate a theory with the help of interpretative procedures. The theory starts to emerge from categories resulting from the data comparison and data and theory comparison, which are themes or variables that can be defined by their properties (sub-categories). Through a process of coding these categories are differentiated and classified. Next, the link between categories is made visible through memoing and the properties of these relationships are found. When the coding is saturated and no more linkages can be made a core category emerges that provides the necessary input for the theory;
— write up and present, after sorting, a task that structures the report for communication of the theory to others; this is helped by grouping all the memos around the core category and acknowledging the relationships between them.

In this research, grounded theory allows the data to be looked at without a fix objective.

Following grounded theory was possible to identify, for example, the central idea in each expert dialogue, as well as understand major findings across the dialogues with expert. In this thesis the objective was not to formulate a theory or to arrive at a framework but to understand other peoples’ views of sustainability: how they feel about it, why they feel that; what they think about it and their unique perspective; how they do it and why they do it that way, stories that changed their personal course. This allows interpretation of the five steps mentioned above, as presented in Table 3.3
<table>
<thead>
<tr>
<th>Grounded Theory main steps</th>
<th>Grounded Theory applied to this research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on an area or identify a situation</td>
<td>Each set of dialogues has its own objective as outlined above and summarised in the Research Methodology Model</td>
</tr>
<tr>
<td>Extract data gathered from different methods</td>
<td>Data was extracted using the cognitive maps and records and notes were taken.</td>
</tr>
<tr>
<td></td>
<td>The cognitive maps allowed guiding dialogues and taking note of issues perceived to be more important and with richer content during the dialogue The notes allowed the quick capture of key ideas and relating issues uncovered during the dialogues.</td>
</tr>
<tr>
<td></td>
<td>Tape recording the dialogues allowed to detail key ideas and confirm or decline first perceptions gathered during the dialogue.</td>
</tr>
<tr>
<td>Approaching data using coding and theoretical sampling procedures</td>
<td>The coding focused on the main idea/thought and looked for relationships within the interview to enrich the understanding of this idea/thought. This helps to understand how the idea/thought was constructed, its background and experiences related to it.</td>
</tr>
<tr>
<td>Generating theory with the help of interpretative procedures</td>
<td>This step comprises two procedures:</td>
</tr>
<tr>
<td></td>
<td>Characterise the individual main idea/thought</td>
</tr>
<tr>
<td></td>
<td>Relate individual main ideas/thoughts to each other</td>
</tr>
<tr>
<td></td>
<td>Look for similarities and differences</td>
</tr>
<tr>
<td>Write up and present</td>
<td>The findings are expressed as meta-concepts rather than focusing in the uniqueness of each thought. Findings informed following steps of the research.</td>
</tr>
<tr>
<td></td>
<td>In the last research stage, the outcome is also a methodology for the innovate creation of sustainability</td>
</tr>
</tbody>
</table>

Table 3.3: Grounded theory applied to this research following Glaser and Strauss (1967) and Strauss and Corbin (1997)
Chapter 3

The research outcome arrived at through the data was not imposed by the aim of the research.

The next section presents the techniques used to analyse the data. The use of thematic coding and cognitive mapping is further explained.

3.5.1.1. Thematic coding

The majority of approaches to data are generally ‘useful but may limit the ability to extract the larger picture’ (Guest and McLellan, 2003:188). These methods:

...do not necessarily capture patterns between themes in the text but rather create taxonomies based on the researcher’s subjective interpretation of logically consistent conceptual relationships between themes and codes. (Ibid).

As Guest and McLellan (ibid) describe, in this research:

...a structural code was created for each domain of inquiry to provide a context within which to analyze and interpret responses too. (Ibid)

Here, these structural codes were dependent on the objective of each stage of data collection:

— dialogues with experts: the code emerged for the identification of each interviewee’s main idea/thought across to the dialogues. This code was used to find elements in the data that helped to understand this main idea/thought;

— dialogues with consultants: the code emerged from the findings in the first set of dialogues (dialogues with experts) and the literature on which the DNA of an organisation depends: a) conduct of action; b) strategy; c) systems; d) process; and e) results (Greenwood and Hinings, 1993). This coding identified relationships between the conduct of actions (ethics, inner values) of a system and its outputs. As explained in Chapter 5, consultants revealed their need to intervene at the level of motivation, values and beliefs in order to push sustainability further.

— dialogues with organisations (case studies): the code emerged first on identifying the meta-thought presented (e.g. behavioural issues); second on identifying key concepts in the literature that helped to illustrate these meta-thoughts with data (used in cognitive mapping)
dialogues with experts (second round) in a workshop session: the coding was pre-established by preparing a template with several points to focus the discussion and respond against. The analysis of these templates was carried out by uncovering key suggestions and thoughts that served as filters through which to look into the data and literature: for example, the lack of interrelationships between what was presented (see Chapter 8).

— dialogues in the main study were analysed by looking at the collected responses to the material presented; that is, the code was pre-established by having conversations focus uniquely on SuCo.

Chapters 4, 5, 6, 7 and 8 report details and show visual examples of the process of extracting meaning from the rich data this research collected through dialogues.

Although traditional codes are grounded in word repetition within a conversation or subject of reference, for example (Guest and McLellan, 2003), this was not the case in this research, as seen above in the establishment of structural codes prior to analysis, which:

...supports greater flexibility in refining analyses by context, in particular when dealing with interview scripts that cover a large number of conceptual domains. (Ibid:190)

The adoption of cognitive maps allows an overview of the codes chosen, which are:
a) the dimensions of sustainability; b) the eight levels of living system theory; c) the twelve leverage points to intervene in a system (see Chapter 6).

The adoption of cognitive mapping allows viewing the larger schematic framework, which Guest and McLellan (ibid:191) say is difficult to grasp in thematic coding, functioning as a ‘cluster analysis [which] provides a quick and effective means of data reduction that is both meaningful and easy to read’ (ibid).

Cognitive maps give a systemic view of the data and uncover linkages, giving additional meaning to the analysis (ibid:195) and helping to structure a narrative grounded in the data (ibid:198)

3.5.1.2. Cognitive Mapping

The use of maps is for those who work for most of their lives with language and ideas (Eden, 1988). Cognitive maps are use in this research to deal with language and ideas, i.e. qualitative data, rich data and deep qualitative data (Papageorgiou et al.,
2006:6118) and to make clear the interconnections between concepts, attributes, characteristics, ideas, like an:

*artificial neural network, where concepts are represented by neurons and causal relationships between concepts by weighted links connecting the neurons.* (Ibid)

Brightman (2003) underlines the fact that cognitive mapping is beneficial to qualitative research as it can express complex forms of relationships sometimes missing in other forms of analysis (Ackermann, et al., 2004). Furthermore, it is a technique that helps to reduce research bias (McGuiggan and Lee, 2008).

Cognitive mapping indicates the key point(s) of focus and:

— helps to identify aims and objectives, examine options and identify opportunities;
— distinguishes conflicts from dilemmas;
— allows the questioning of arguments and determine key issues to be focused on;
— allows a better understanding of the issue(s) (following Acherman, et al; 2004).

Cognitive mapping can help with different tasks such as:

— structuring messy and complex data;
— supporting problem solving;
— assisting the interview process;
— increasing understanding and generating agendas;
— managing large amounts of qualitative data;
— structuring, analysing and making sense of problems

It can be used:

— as a note-taking method during an interview – 'clear benefit over linear notes which can often contain ideas with little in the way of explanation as to why they were raised' (Ackermann et al., 2004:2);
— to provide a useful interviewing device;
— to record the transcripts of interviews;
— to promote analysis, questioning and understanding of the data. When using maps to analyse data it is possible to identify emergent issues, 'check for possible loops and explore the structure and thus coherency' (ibid).
Maps have been used to structuring and defining problems, structuring information and knowledge (Brightman, 2003:2). The use of cognitive mapping to analyse the data in this research was chosen due to the fact that cognitive maps identify the nature of thinking: of both the interviewees and the interviewer. A cognitive map can be seen as a representation of how people think about a particular issue or situation which can act as a “precursor of other forms of analysis with great effect” (Ackermann et al., 2004:2)

Furthermore, the cognitive map is the best tool for creative thinking.

Can be used as learning tools: helping researchers to explore and define what it is that they are trying to do – structuring their own thinking at various stages during the project (from outlining the project plan, to structuring the final report) or as exploratory tools: helping researchers to build a visual representation of an interviewees’ or groups’ perceptions of an issue. (Brightman, 2003:2)

To delve deeply into the dialogues to profoundly comprehend what the dialogues were showing, a typical cluster analysis tend to look for commonalities within the data. Eden (1988) stresses that “a grid is constraining in the degree of richness that can be captured. A grid much larger than 12 × 12 becomes unwieldy to elicit and even more confusing to analyse” (Eden, 1988:3). This suggests that some methods and tools are more appropriate to capture the richness of dialogues than others.

A cognitive map functions as a codebook of thematic codes. A codebook is a template approach to organising the data collected and understanding it, as previously defined (Fereday and Muir-Cochrane, 2006). As pointed out, each set of dialogues in this research had its own codebook, which was used as a cognitive map.

The language of cognitive mapping comes from the field of management. Outside this field it is possible to develop one’s own mapping style and coding system (Brightman, 2003). Brightman (2003:8) summarises the characteristics of cognitive mapping:

— multi-directional network of ideas (usually a small number of ‘uppermost’ ideas – goals – with a larger supporting body of ideas ‘beneath’);
— hierarchical – from generic (at the top of the map) to specific (at the bottom);
— causal – all links are in the form of ‘may lead to’;
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— goal-structured – specifically aimed at surfacing a goal structure of
desirable/undesirable outcomes;

— specifically aimed at being ‘action-oriented’ – concepts with a verb in the
imperative form;

— not explicitly question-based – ‘laddering’ up and down the chains of argument
in the map is achieved by asking ‘why’ questions to elicit outcomes and ‘how?’
questions to elicit enabling events.

Within the parameters of this research:

— the network of ideas is expressed by the main concept characterised by key
sentences of main extracts from the dialogues;

— the hierarchy is emphasised by: a) using predetermined maps in which the
hierarchy is already set; b) the central position they assume within those maps;
c) the connections raised (number and diversity), making them more relevant;

— the links or connections are made according to the objectives of the
predetermined maps (see Chapter 6);

— the goals are structured according to the questions raised after a set of dialogues
which influence the next dialogues set (e.g. dialogues with experts influence the
goal of the dialogues with consultants);

— action oriented is underlined by the aim to understand: How do the organisations
create sustainability?

— The predetermined maps do not impose questions: they allow for data to reveal
a, for example, mental model.

The above sections focus on thematic coding, underlined by the use of
predetermined maps during the dialogues, which presented a frame to analyse data.

Although thematic coding was used to analyse dialogues with organisations, he
richness of data was not capture in full by the coding (Chapter 5 and 6 report this)

Cognitive maps were use to understand, from different perspectives, the data from
organisations’ dialogues. These cognitive maps were created by revisiting literature.
These maps are shown in Chapter 6.
The cognitive mapping used to analyse data allowed to:

— make sense of the business of sustainability through contrast and similarity “that is meaning in the context of action derives from relativism” (Eden, 1988);
— explain why their world is as it is, “what made it so” (ibid);
— understand the significance of their world “by organising concepts hierarchically so that some constructs are superordinated to others” (ibid).

Cognitive maps are also indicated when the intention is to get feedback and co-construct a view as well as to diminish complexity and messiness and were used at the evaluation and validation stages of this research (see Chapter 9).

Analysing data from the dialogues with organisations using cognitive maps helped to better understand the context of each organisation, and the commonalities in between mindsets, actions, and priorities, leading to new insights “created by the synergy stimulated” (Eden, 1988:8).

**3.6. ENSURING RESEARCH QUALITY**

A key weakness of this research, as Robson (1993) points out, is the dialogue base that it pursues. Dialogues are face-to-face conversations that may influence responses or create uncomfortable feelings (ibid). Although this was felt in one case study, in which the interviewee changed his/her mind and was only able to continue the conversation for 20 minutes and then politely said: ‘I think we grasp all that I can think of’, in general people were very open to having conversations and in general the time passed without anyone noticing.

To avoid this weakness, some techniques were adopted: a) not having predetermined questions, so allowing the interviewee to semi-command the conversation; b) not judging any ideas; c) intervening as little as possible to allow the interviewee more space to talk; d) building on the interviewee’s ideas in order to understand details instead of asking questions.

Although the dialogues can be seen as a weakness, as explained above, they are also the strength of this research, as they enable deep comprehension of the major differences between the practice of creating sustainability and that of diminishing unsustainability. This research could have focused on many different paths, as the richness of the data could have led to different results.
3.6.1. RESEARCH VALIDITY

Dealing with qualitative data involves in-depth planning, which requires background knowledge of the object/phenomenon under study in order to choose the research method that will enable the right reasoning and arguments about the results and the to achieve rigorous (Fereday and Muir-Cochrane, 2006).

The use of transparency and the ability to relate the formulation of themes or overarching concepts to the data and knowledge (e.g. literature findings) allowed diminishing the risks that is to deal with the subjective interpretation (ibid). This is achieved, for example, by preserving the context and point of view of the research participants, quoting their own words from the raw data to illustrate the key findings and strengthen the validity and credibility of the research (Patton, 2002 cited in Fereday and Muir-Cochrane, 2006).

Yin (1994); Denzin and Lincoln (1998), and Miles and Huberman (1994), point out that validity reflects the accuracy with which the findings represent what is happening in the field. These authors refer to four ways of ensuring good quality research: internal and external validity; constructed validity; and replicability. Below is described how this research ensures its own validity.

3.6.1.1. Internal validity

Yin (1994) explains that bias can be reduced if researchers discuss unusual or contrary findings with colleagues during the data collection phase. Acknowledging this, several measures were undertaken:

— Validation of the findings with experts (interviews and workshops);
— Comparing findings with the literature;
— Using the literature as cognitive maps to collect data and understand the findings;
— Attending international conferences;
— Selecting sources (first and secondary).

3.6.1.2. External validity

Corresponds to the degree in which the findings can be generalised.

— Use of experts with different backgrounds to validate findings and perceptions.
  Use of the same material (cognitive maps) to collect data from across set of dialogues;
— Use of the same material to collect data across workshops;

— The study of cases of organisations of different sectors, sizes and businesses, responding to their different levels of sustainability and the use of the same material to collect data for all case studies (Chapter 5);

— The use of main studies of two organisations with different objectives, from different sectors, of different size and business type, using the same material to collect view;

— Avoiding creating a research outcome specific to a discipline or profession;

— Avoiding generating a step-by-step process to broadening the applications.

3.6.1.3. Construct validity

Relates with the way the phenomenon has been measured and studied rigorously and appropriately:

— Multiple sources of data and multiple data collection techniques were used allowing the triangulation of data

— Case studies taken from a range of organizations different in terms of business, size, and level of commitment to sustainability

— A chain of evidence established – each data collection depends on the previous research step. Findings lead to other findings in a coherent and well-documented way

— Transparency sought when reporting decisions made within the research journey

— Looking for supporting evidence in the literature during the research journey

Measure the quality and utility of the research by undertaking two main studies in industrial settings.

3.6.1.4. Reliability:

Relates to the ability to repeat the same methodological model

— Extensive documentation of the data collection and analysis, emphasizing not only how but also why data were collected or analysed (referring to decisions about the choice of focus)

— Use of well-documented methods and detailed explanation of those

— Share of all material use across the evaluation and validation process
Chapter 3

— Sources of information were outlined allowing a identification of literature foundations and influences

— Research outcome – Suco – implemented in a rigorous and documented way

Another characteristic of this research that ensures it’s quality is the triangulation that runs through the whole research. Triangulation is achieved by the multi-method approach as well as by looking for connections between the findings, the literature and the experts (including during the validation and evaluation process Chapter 9). Further, the triangulation was also employed when data was analysed by using cognitive maps based on the literature and theoretical positions, allowing the comprehension of the data through the lenses of already well-established theories.

3.7. CHAPTER CONCLUSION

This chapter has described and explained the Interpretative paradigm and where ontology and epistemology lie. It identifies the constructivist interpretative paradigm as best indicated for this research, as it embraces multi-realities and seeks to co-create understanding.

— The methodological approach used is constructive grounded theory, which is responsible for the research design choices and consequently relates to the choice of research strategy.

— The research is a qualitative study with an inductive approach and a strong exploratory nature, which evolved to an explanatory stage, and therefore engaged on a multi-purpose journey.

— The research follows a grounded theory research strategy which respects the flexibility and emergent nature of the qualitative characteristic of this research.

— A multi-method research methodology allowed the use of semi-structured interviews, case studies, main studies and workshops. This gave the research a collection of rich and qualitative data.

— Dialogues between two or more people were utilised across all data collection stages to uncover deep thinking.

— The data analysis methods and techniques used respect the grounded theory strategy chosen and use thematic coding and cognitive maps.
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— The implementation of the research outcome involved two main studies in where SuCo was applied.

The next chapter presents the dialogues with experts: the intentions, the approach, the process and findings.
A dialogue is very important. It is a form of communication in which question and answer continue till a question is left without an answer (Krishnamurti, 1984).
This chapter describes exploratory dialogues with ten sustainability experts and with three sustainability consultants.

The methods used for the dialogues and the analysis of the dialogues are presented. The approach, the intentions of each set of dialogues and the selection of sustainability experts and consultants is explained. Findings are shown and illustrated with examples of data.

### Summary

This chapter presents:

- ethnographic perspective about dialogues and games as the method of collecting data
- the case for exploratory dialogues is set instead of using interviews
- the cognitive maps that served as a script for the interviews
- the informants’ views, thoughts and ideas about sustainability
- stories of informants are shared about journeys towards sustainability
Figure 4.1: Summary of chapter content - dialogues with experts and consultants

Dialogues
10 sustainability experts

Approach
Intentions
Selection
Description
Findings
Implications

Dialogues
3 sustainability consultant

Approach
Intentions
Selection
Description
Findings
Due to the wide scope of this research – on the one hand, the scope of the subject *sustainability*, and on the other, the recent very compartmentalised literature in this area – it was important to start doing some exploratory dialogues to focus the research.

It is traditional to conduct a literature review based on secondary sources as a background resource, but this may not always be enough (Robson, 2002). Silverman (2000) underlines the importance of gathering data while doing the literature review in order to be able to identify what is relevant from what is less relevant.

The objective of exploratory dialogues was to understand an ‘expert view’ of sustainability – both academic and practitioner. Dialogues, as it will be underlined later on this chapter, have the ability to explore territories and allows themes to emerge. They were used to collect the ways the informants organise their thoughts in order to understand their priorities and the sense making. This is particularly important when the intention is to understand the visions, feelings and motivations of the individual in the field of sustainability, as with the first set of dialogues with experts in sustainability.

The literature underlines the need:

− to redefine the boundaries of design discipline, currently locked in a product development frame for historical reasons (e.g. political decisions and businesses). Its capacities surpass those of product development: they involve the abilities to design organisations, ways of working, people’s interactions and forms of lifestyles useful for designing possible sustainable futures.

− for design to embrace a broader focus which involves strategic thinking in order to respond differently to the challenges set by Factor 10 realities, referred as *design thinking* (following for example Manzini, 2005).

− to (re)connect the inputs of a system with its outputs, to inform that system differently to allow the creation of different outputs, as Bohm suggests (Bohm, 2000). Currently design is largely responsible for the outputs (e.g. products) for a system (e.g. industry): who or what is responsible for the inputs?
This answer relates to another key finding in the literature: the paradigm in which organisations operate, which need a shift in thinking from a focus on reducing unsustainability to one on creating sustainability (Ehrenfeld, 2004). A paradigm is responsible for what is valued and the set of priorities followed therefore responsible for the input to a system (e.g. organisations). This finding suggests the necessity for a different paradigm in organisations for greater success in achieving sustainability, as underlined in Chapter 2.

This chapter presents exploratory dialogues with experts, who engaged in two set of dialogues. The first set was with sustainability experts ('experts'), and the other with sustainability consultants ('consultants'): both, however, experts in sustainability.

The sustainability experts came from a variety of fields and backgrounds that share a view of design, sustainability, and portray design as a key element in creating sustainability. This chapter illustrates the emergent themes from the expert dialogues: values, beliefs and motivations to be responsible for driving sustainability capable of framing decisions in design, a view contributed greatly to this research. They further portray the individual as key in change.

The dialogues with sustainability consultants served as a type of “members check”, a method used to validate findings and provide validity to the researcher’s interpretation (Fereday and Muir-Cochrane, 2006). These dialogues show the importance of people in organisations; highlight the potential when these two come together, underlining organisations’ responsibility for conceiving of system inputs and the subsequent (framing of) outputs.

The next section describes the dialogue approach in developing a picture concerning how organisations already begin to create sustainability.

4.1.1. METHOD OVERVIEW

These sets of dialogues aimed to apprehend the cognitive workings of the interviewees and their mind maps – the connections made inside their head in order to obtain a rich picture about sustainability, how they see it, what inspires them, how they work to create sustainability, their connection to the subject and, by doing so have a collection of stories and perspectives high in quality. With this objective the overarching approach of the dialogues was one of cognitive anthropology, allowing the researcher to detect the central idea of the dialogues post-interview.

Traditionally, cognitive anthropology focused on understanding cultural knowledge through the study of semantic systems, emphasising the importance of the
relationships between words. Recently this has included the study of discourses and implicit cognitive understandings (Jacob, 1987:22).

Because one objective of this research is to understand the perception of sustainability beyond (mainly) an ‘environmental attribute’, understanding the difference between those convinced of the need for sustainability and others that are not, helps to collect enough knowledge about mind-shift. Thus how people think and make connections and their use of language, thought and actions are important. According to Jacob (1987), cognitive anthropology is helpful when studying ‘mentalistic culture’ (Jacob, 1987).

This cognitive approach influenced the way the cognitive maps of the interviews were configured (see Chapter 3 for an overview of cognitive maps).

The first set of dialogues (sustainability experts), was influenced by the need to integrate several views spread across different disciplines (e.g. eco-efficiency versus (social) responsibility) and schools of thought (e.g. sustainability seen as a technological problem versus sustainability viewed as a consumption problematic). This dictated the way the cognitive map was designed, allowing views, thoughts and feelings to be expressed. The next section goes deeper into this matter.

The second set of dialogues (sustainability consultants), served to understand perspective of people who help other people and organisations to embed sustainability and validate the findings from the experts’ dialogues. The cognitive map used focused on key subjects: a) how they approach their clients; b) when and what they do. These subjects evolve from the need triggered by the experts’ dialogues to understand the relationship between people’s values, beliefs and motivations and the organisation’s values - how do they see it? How they aligned it to the current set of values? How do they approach it?

The dialogues with consultants developed from this central intention: collect stories. Stories allowed understanding consultants view about the importance of individuals, alongside with values, beliefs and motivations to create sustainability
4.1.2. PROCESS OF DIALOGUES OVERVIEW

This section presents the general process to the dialogues and their overall importance to the course of this research. Detailed information about each set of dialogues (i.e. with experts and with consultants) is presented in the correspondent sections (4.2 and 4.3).

The dialogues are held in three key stages of this study: dialogues with experts, with consultants, and with organisations.

The first and second stages were exploratory. Although the dialogues with consultants explain the findings from the experts, they are part of an overall exploratory stage. These two set of dialogues are reported here. The dialogues with organisations are reported in Chapter 5.

To give an overview of the dialogue three-stages-process without referring to the dialogues with organisations would be to present an incomplete process, therefore the process presents the dynamic refers to all the three set of dialogues.

Dialogues with experts deliver an exploration of themes that informed the dialogues with consultants, while these last informed the context and scope of the dialogues with organisations. All three sets of dialogues inform the research outputs (Chapter 6 and 7 report this). Figure 4.2 presents the dynamics between these three set of dialogues.

**Figure 4.2: Overview of dialogues’ process**

Although the findings of each set of dialogues strongly influenced the research, this does not mean that the contributions are explicit and linear: it is difficult to attribute exact parts of each set of findings to exact parts of the outcome because “the whole is more than the sum of its parts” (Aristotle biography, Merriman, 2006).
The findings conveyed by the experts’ dialogues, together with the continued revisiting of the literature, allow developing the cognitive map that guided the consultants’ dialogues, and findings from both experts and consultants dialogues, and a revisit in literature, informed the development of the cognitive map used to steer the dialogues with organisations. Finally, the dialogues with experts and with consultants jointly with the dialogues held in organisations (Chapter 5) are responsible for the development of the cognitive maps that started shaping the outcome of this research (Chapter 6), as illustrated in Figure 4.3.

**Figure 4.3: Contribution of the dialogues to the research outcome**

Another characteristic of these dialogues is the selection of the sample: the criteria were: a) respondents’ important contribution in the field of sustainability; b) their personal views (collected from academic articles, websites, interviews, books, conferences, etc); c) their availability and willingness to contribute to this research.

The first set of dialogues, with experts, involved a range of participants from different fields (e.g. ecodesign, economics). The sample was bigger than those for the other dialogues due to the need to gather as many points of view as possible in order to refine the perspective of this research and select the focus of this study.

The next lines describe the dialogues with experts followed by those with consultants and the detail of the findings that contributed to the research outcome of each set of dialogues.
4.2. SUSTAINABILITY EXPERTS DIALOGUES

Ten experts from a range of backgrounds were approached. The diversity of backgrounds was important due to the broad scope of this research, therefore the sustainability experts came from ecodesign, ecological economics, environmental engineering, sustainable development and management, both in academia and industry.

They were initially contacted by email asking for their collaboration. The email explained why their contribution was considered desirable together with a brief description of the overall process. Figure 4.4 illustrates the process, presenting how people were approached, how dialogues were triggered and how data was collected.

The dialogues were face-to-face as far as possible, although the majority were conducted on the telephone. While there is a difference between a relationship built through a face-to-face conversation and one conducted by telephone, this was minimised due to the semi-open structure and by the game sent, allowing the building of common ground in both types of conversation. The next sub-section discusses the game.

Below is a more detailed description of the elements presented in Figure 4.4: the approach and intentions, the semi-open structure of the dialogues and the cognitive map, with the participants and the key results from each. Also portrayed are the overall results that influenced the research and the dialogues with sustainability consultants that followed.
4.2.1. THE APPROACH

A cognitive approach influenced the way the dialogues were designed and conducted (see Chapter 3). It influenced the cognitive map (script) used for the interview and the type of approach taken to establish a dialogue, a conversation, almost as one between friends. It was important to attempt to achieve this as the nature of this dialogue enables the sharing of ideas and mutual understanding of others’ perspectives in a more effective way (Spradley, 1979).

This kind of approach was essential due to the topics to be discussed which are sensitive, as it asked for a personal view and a deep sharing of ideas and feeling, and aimed to construct a solid relationship with the interviewee in a short time (i.e. that is why a game was used which is reported below), to tackle not only their personal viewpoint of the subject but also their deep feelings, frustrations and intuitions about present and future sustainability.

These types of premises are very similar to the ethnographic interview, which is ‘a particular kind of speech event’ (Spradley, 1979:55). Spradley also states:

... all speech events have cultural rules for beginning, ending, taking turns, asking questions, pausing, and even how close to stand to other people.

(ibid)

4.2.1.1. Friendly dialogues

In this research a friendly dialogue needed to be constructed to create common ground and allow pursuit of the ethnographic interview. Spradley (ibid:58) identifies some of the features of the friendly conversation (Chapter 3 has detail information) which set the ground rules for the dialogues, in here summarised: a) the nature and cultural forms of the greeting; no explicit agenda to cover; repetition is avoid; include expressions of interest; turn-taking to balance the dialogue; give partial information and not major details; pausing; verbal ritual to end.

4.2.1.2. Ethnographic interviews

The ethnographic interview shares many features with the friendly dialogues; skilled ethnographers may interview people without their knowing it by merely carrying out a friendly dialogues, therefore ethnographic interviews are a series of friendly dialogues:

...into which the researcher slowly introduces new elements to assist informants to respond as informants. (Spradley, 1979:58)
If a loss of trust occurs at any time it is not possible to return to a friendly dialogues.

The three main elements of the ethnographic interview approach are:

1) explicit purpose, as the talking is supposed to arrive somewhere;

2) ethnographic explanations, which indicate the exchange of information between people involved (can be about project, language, culture);

3) ethnographic questions, which involve descriptive questions (enabling the answers to be almost like a narrative or story); structural questions (showing how the informant organises knowledge); contrast questions (to discover the dimension of the meaning) (ibid:59,60).

Even though the friendly dialogue and the ethnographic interview are very similar there are some differences. In ethnographic interviewing turn-taking is less balanced (the relation is asymmetrical as the interviewer asks almost all the questions); questions may be repeated in contrast to avoiding repetition; expressing interest or ignorance is more related to the role of the interviewer; the normal practice of abbreviation is substituted by an expansion of what is being said (ibid:67,68).

4.2.1.3. Dialogues approach

These two positions complement each other in this research. Friendly dialogues start on common ground (feelings, interests, possessions – a dog, a child, etc). Such common ground was needed in this research to create an atmosphere in which people felt comfortable enough to share their deep thoughts; on the other hand, the ethnographic interviewer keeps in mind the objectives of the dialogue, allowing a relaxed manner in conducting these dialogues without a rigid structure, therefore the choice of a semi-structure interview in which the questions were not set, but passage points (or guiding elements such as cognitive maps) are required to achieve the dialogues’ objectives.

With the above in mind, common ground between the researcher and the interviewee needed to be constructed in order to understand people’s thoughts, feelings, ideas, and frustrations regarding sustainability. This framed the approach to the dialogues with experts.

4.2.2. THE INTENTIONS: BUILDING A RELATIONSHIP

Between friends is easier to share new ideas. Friends share something and is in that common ground which allows a relationship of friendship to flourish. Building a relationship with the individuals that participated in this research was crucial to gather
rich data in the dialogues. A friendly relationship allows space for creativity and personal expression to be shared through the dialogue (ibid).

Building a relationship is essential, because dialogues between friends (i.e. friendly conversations) have as foundations their previous relationship. This requirement provided input into developing the idea of approaching dialogues by having something in common with the interviewee, with the principal objective of opening the session by discussing this common ground. Thus a game was created (see 4.2.4).

The game comprised a presenting letter and a game template. The former included an explanation of the game and the importance of the game’s results for the dialogue. The language of the presentation follows Spradley’s (ibid) suggestion to adopt informal speech and treat people as acquaintances. The game template is composed of two parts:

- a secret box, in a pentahedron shape. It represents a personal item of the informant which, like a diary is private and a tool for sense making (Webb, 2005:72-73), which aims to collect the words by which people express sustainability and their values;

- five secret things in different geometric shapes such as a circle, a six-pointed star, two triangles, and a square. The aim is to understand thoughts and feelings and how these are prioritised by each individual.

The game (presenting letter and templates game) was sent some days before the dialogue and provided a common ground shared by both interviewer and interviewee. The game helped understanding feelings and motivations towards sustainability and the way the interviewee expresses and communicates such ideas (filling the secret box and the five secret things). This indirect and creative way of asking questions helped to build a bridge of understanding between interviewee and interviewer.

4.2.3. THE SELECTION

Collecting the views not only of different people but also from different fields of intervention (e.g. eco-design, sustainable development, economics) and different geographic locations (to investigate the existence – or not – of different realities and action drivers) was essential to the aims of this research and was in line with the intentions of these dialogues.

Sustainability experts were selected according to:

- their visions, ideas and projects as uncovered by the literature review, professional interaction, personal acquaintance;
− their interest in participating in this research;
− their availability and willingness to share their deep thoughts and opinions.

Table 4.1 presents the experts, their type of intervention and their country of action. It indicates whether the dialogues were face-to-face or via telephone and which experts did not play the game.

<table>
<thead>
<tr>
<th>Person</th>
<th>Field of action</th>
<th>Type of interview</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Elkington</td>
<td>Sustainable development consultant</td>
<td>Face-to-face</td>
<td>UK</td>
</tr>
<tr>
<td>(no game)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kate Fletcher</td>
<td>Ecodesign (DfS) consultant</td>
<td>Face-to-face</td>
<td>UK</td>
</tr>
<tr>
<td>Mark Smith</td>
<td>Academic</td>
<td>Face-to-face</td>
<td>UK</td>
</tr>
<tr>
<td>Ricardo Luz</td>
<td>Consultancy (business strategy)</td>
<td>Face-to-face</td>
<td>PT</td>
</tr>
<tr>
<td>(no game)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tim McAloone</td>
<td>Academic - expert in DfS</td>
<td>Telephone</td>
<td>DK</td>
</tr>
<tr>
<td>Frank O’Connor</td>
<td>Consultancy (ecodesign; DfS)</td>
<td>Telephone</td>
<td>UK</td>
</tr>
<tr>
<td>Seaton Baxter</td>
<td>Academic – Natural Design</td>
<td>Telephone</td>
<td>UK</td>
</tr>
<tr>
<td>Richard Douthwaite</td>
<td>Economist (Gov. Ireland)</td>
<td>Telephone</td>
<td>IE</td>
</tr>
<tr>
<td>(no game)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorothy Maxwell</td>
<td>Academic – expert in product development</td>
<td>Telephone</td>
<td>UK</td>
</tr>
<tr>
<td>(ecodesign and DfS main interests)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alastar Fuad Luke</td>
<td>Academic – expert in ecodesign and DfS</td>
<td>Telephone</td>
<td>UK</td>
</tr>
</tbody>
</table>

Table 4.1: Summary of informants
4.2.4. THE DESCRIPTION

People were first contacted by email asking if they were willing to participate in this research journey, after which the presenting letter and game template were sent via email. The day for the dialogue was set. Participants were informed that the game results would be reported in this thesis. A few people preferred to skip the game as indicated in Table 4.1.

4.2.4.1. The game

Games are used in the political sciences to understand interactions between the player, the set (e.g. war game scenario, or a game template) and the outcomes, as, for example in game theoretical models (Goodin, 2009), or the use of market structure (Sutton, 1996), or even war games for studying limited war situations (Weiner, 1959), all showing that games allow the rationalisation of issues that appear difficult to relate with (e.g. extreme situations) or to understand their relations and influences.

In this research the use of games was employed in order to understand the interactions between the player and sustainability (the set) and their actions and thoughts, ideas and visions (individual outputs) to express complex ideas and thoughts in a more rational form:

Sustainability is something complex, and the game that you sent puts intangible elements in a rational support (Fuad-Luke, 2005 dialogues).

The game helps to settle a hierarchy in the informants' ideas, thoughts and visions by: a) presenting the idea a secret box which takes a central role in getting the player to consider how they think about sustainability; this is achieved in a number of ways: a) relate words and values that the player associates with sustainability; b) giving five ‘precious things’ of which the hierarchical relation is established by the shape of each, allowing the players to prioritise their feelings and thoughts. Annexes 4.1 and 4.2 show the presentation letter and game templates.

After playing the game individually, the sustainability experts were invited to engage in a further dialogue.

4.2.4.2. The dialogue cognitive map

The cognitive approach adopted by this research and the use of dialogues as a tool influenced the way the script of the interview (cognitive map), was configured (see Figure 4.5). The cognitive map (diagram) was intended to offer possible dimensions...
of dialogue content from very personal issues involving feelings and individual perspectives to less emotionally-oriented issues that involved more intellectual ideas and thoughts about current subjects related to sustainability. Therefore the interviews were conducted with an unstructured approach based on the cognitive map.

It was not always possible to hold face-to-face interviews, therefore a remote interview strategy was also developed that involved prompted questions (see Annex 4.3). Another emergent difficulty was that the experts invited to interview were not always able to complete the game first or to engage in a dialogue; instead they preferred a more structured interview, and so a list of open-ended format questions was developed based on the cognitive map (Annex 4.4).

Although the deepness of dialogues conducted as referred above was lost, the richness of opinions, thoughts and ideas was still there. This was accomplished due to the level of personal open-ended format questions asked such as: “What are your feelings in relation to the current practice of sustainability? This type of questions do not focus in anything specific, the questions guide the informant to reflect about their personal opinions, views, intentions, and ideas about sustainability in his/her field of practice or outside.
Figure 4.5: Cognitive map of sustainability expert interview

**Emergent subjects**

- Focus on challenging current ideas on sustainability
- Focus on the interviewed journey - Present

**SD /or DfS**

- Focus on what was placed in the game
- Focus on historicity of the main area of interest - Past
- Focus on historicity of the main area of interest - Past

**Vision**

- Focus on present main area of interest
- Focus on future visions of personal journey!
- Focus on testing some ideas and thoughts

**Ethics**

- Focus on the interviewed journey - Past
- Focus on general definitions of sustainability

**Theories**

- Understand involvement of the interviewer in the main area of interest (Focus on past and present)
- Understand - instigators and key elements that contributed to main interest (focus on past)

**Antagonisms**

- Understand the involvement of the interviewer in the main area of interest
- Understanding of key elements thematic from the main topic.

**Activities**

- Understand the personal perspective/opinion, in areas/key elements/thematic from the main topic.
4.2.5. THE FINDINGS

Below is summarised the dialogues with each of the ten sustainability experts.

The objective was not to find similarities of thoughts, ideas and visions among the interviewees, nor to compare them. This justified the non-use of software support such as NVIVO to analyse the results: instead the objective was to capture the diversity of ideas, thoughts and visions and to understand the foundations of each. Following this line of thought, the data were approached by reading the dialogue transcripts, highlighting anything related to the objectives of the dialogue such as:

- central idea(s);
- the main vision(s) – current and future;
- ways of approaching and communicating;
- How people understood and embedded sustainability in their daily life and work and how they transmit this richness to others.

Was important to understand what idea was central and what ideas were satellites. The distinction was made by using thematic coding (see Chapter 3). The thematic coding was not used to compare the dialogues from different informants (as explained earlier), instead was used to uncover themes that were similar in the same dialogue. The theme is grounded from the data, and this allowed identifying the central idea. Following that, through sub-themes was possible to identify the vision(s) as it was explaining the central ideas; the same happened with the identification of ways of approaching and communication. These last were pointing out practicalities of such central idea and the visions that characterise it.

4.2.5.1. Central ideas and visions

As explained earlier, these findings were uncovered by reading the dialogues and:

- highlighting central ideas and everything related to them;
- highlighting visions of what sustainability is and what is related to it;
- underlining how respondents communicate and approach sustainability in their everyday lives and professional activities.

Annexes 4.5a to 4.5g give a detail overview of the findings of each expert. But first Figure 4.6, sums up these findings in which central ideas are represents by full coloured grey circles, and the satellite ideas (visions) are represented by smaller circles.
Figure 4.6: Summary of sustainability expert dialogue findings

- **Simplicity**: Sustainability has been move away from.
- **Sustainability Branding**: Simplicity - built confidence not an empty and pure set of constructing an image.
- **Intelligent marketing**: Transmitting the values of sustainability.
- **Ethical Decisions**: Context Base - which shape your actions.
- **Corruption**: Is getting in a way of real development.
- **Myopia**: Inability to think long term affect the decision making processes.
- **Radical Changes**: What type of society we want - built visions.
- **Parallel Universes**: People continuouslyshan'ting future solution when current systems collapse.
- **Time**: Opportunity to understand and think in sustainability.
- **Ecological Futures**: Systemic production & consumption opposes to a framework of isolation. To enable quality of life.
- **MIND SHIFT**: Foster Simplicity looking at needs instead of looking to materials.
- **Rethink connections**: Awareness of the self trigger new design capabilities.
- **Stimulate Environmental Futures**: Different ways of looking.
- **Wellbeing**: Re-evaluate value system.
4.2.5.2. Relating central ideas and visions

The visual representation in Figure 4.6 allowed relating the several central ideas and visions of the sustainability experts, making it easier to understand not only the relationship but also the dependencies between them (some more obvious than others). These connections are done again by thematic coding across the different central ideas and satellite ideas of each dialogue. Each main idea is related according to their familiarity of the theme, and the same happen across the satellite ideas: higher the familiarity (i.e. connections between the central ideas or satellite ideas), higher the importance given by the experts to that group of ideas. Relating the ideas and visions was important in order to uncover and decide the next steps of the research (see sub-section 4.2.6), because by connecting the findings clarified several points:

- **Holism** (thinking holistically) is core to all experts’ ideas.
- **Time** is not as relevant as it seems to a *change in value systems* or to *different thinking*, but it is in the implementation of action-driven *sustainable oriented futures*, for example.
- **Ethical decisions**, sustainable *oriented futures* and the act of rethinking *connections* are fundamental to fostering alternative realities and systems (parallel universes)
- the dependency between *corruption, ethics, mind-shifts* and *radical changes*, and the *value system* implemented
- **Simplicity**, although it was mentioned several times, has a lower level of importance than it has to foster *ecological futures* and *mind-shift* in an overall sustainability journey, because of the level of connections existing.

Figure 4.7 illustrates these connections uncovered by the findings: 1) blue represents connections between central ideas (grey circles) and visions (small circles); 2) orange, connections between visions (small circles); 3) green, connections between the various central ideas (grey circles) and holism; 4) pink/violet, other existing connections between the various central ideas (grey circles); and 5) grey relates central ideas and visions of the same person.
Figure 4.7: Connecting the sustainability experts' central ideas and visions
4.2.5.3. Personal motivations

A coding structure was used with two main general thematic codes: *personal motivation* and *ways of communicating*.

To understand the personal motivation code, the following thematic sub-groups were grounded from the data which uncovered the following sub themes: *individual perspective, altruistic perspective, human-oriented wellbeing, market-oriented opportunities, approaches, action-driven solutions, behaviours, strategies*. These were then group allowing a broader view and enabling generalisation of the findings by disconnecting them from each informant’s dialogue (Annex 4.6 summarises the themes and sub-themes uncovered from the data). This process showed that triggering motivation:

- involves the ability to construct *desirable futures*;
- includes a range of opportunities for *uncovering new possibilities*;
- presents the possibility of *constructing a path*;
- depends on *behavioural* change in the individual – through the incentive of inclusive behaviour
- requires *strategic thinking*

4.2.5.4. Ways of communicating

To understand the code for *ways of communicating*, the same procedure was used utilising three sub-codes: *main characteristics*, applied to issues related to how the value/quality of sustainability was communicated; *adjectives*, to code what was related to transmitting sustainability; and *results*: issues associated with what can be achieved through a sustainability approach. Annex 4.7 summarises the key findings.

The result revealed an overall communication strategy:

- a *systemic thinking* approach underlining system characteristics and their importance (e.g. connectivity, co-evolution, adaptivity, holisticness, resilience; complexity, diversity etc)
- underpinning *basic elements* to approach/act upon sustainability (e.g. participation responsibility, creativity, innovation, interdisciplinary, logic, common sense etc.)
- exploring abstract values as metaphors to underline a *human perspective approach* (e.g. fairness, equity, inclusivity, love, compassion, etc.)
− sharing some existing outputs in different dimensions: environmental; social (individual, organisational), cultural, economic (market)
− uncovering urgency of action underlining environmental/eco-system limits (e.g. resources, essential needs, environmental performance, tradeoffs, etc.)

4.2.5.5. The responsibility of organisations

From this analysis the responsibility of organisations was another theme emerging from the data, a subject already mention in literature review (Chapter 2) in which some refer to Business Imperatives which do not acknowledge the limits for growth (Capra, 1997:4-5), instead, organisations promote unlimited growth (O’Riordan, 1981).

The responsibility of organisations in a journey towards sustainability is reflected in the way experts saw organisations. It is important to mention that these experts refer to organisations beyond enterprises: they had a broader view that included educational and government institutions, etc. They saw organisations as a leverage point to drive sustainability; as setting the design context to respond to the demands of sustainability; to propose and find new ways of value creating; and to push innovation to deliver opportunities to adopt more sustainable life-styles. Below these points are summarised:
− as a leverage point to establishing system that can push sustainability forward;
− as setting the context of design as key players in a system that dictates the market rules framing consumption and production;
− as responsible for value creation beyond distribution to shareholders instead create multiple forms of value
− as responsible for pushing innovation for sustainability to generate different outputs to society helping to embraces a sustainable life-style.

Annex 4.8 shows data which support these four points which characterises their views about the responsibility of organisations in driving sustainability.

4.2.5.6. Words related to sustainability

The dialogues with the experts provided a collection of words that they associated with sustainability, adding further richness to this research in that these provided a deeper comprehension of the role of values in the sustainability arena and what
experts relate to, and pursued towards sustainability. These words were used by the experts to communicate sustainability and what it means to them (their motivation).

Figure 4.8 (next page) gives an overview of the types of words used, under headings such as ecology, environment, society, culture, business, design, futurity and individual.

These words and the literature findings were vital in identifying different types of organisations by looking to the way they were communicating their business, and understanding what they relate to when approaching sustainability values and the different scales by which they express them framing the selection of organisations for dialogue (Chapter 5). This is further explained in section 4.3

This collection of values is not exhaustive due to its objective, which is to arrive at diversity and variety rather than a large quantity of value clusters. Later is explained how this collection of values was essential to generating the cognitive map for the dialogues with the six organisations.
Figure 4.8: Words used to communicate sustainability and personal thoughts
4.2.5.7. Visions of design for sustainability

The dialogues allowed the characterisation of a new way of seeing design. Table (4.2) summarises these findings, comparing them with views of traditional design and eco-design gathered from the literature (see Chapter 2) and the sustainability expert dialogues.

The sustainability experts’ dialogues show views of design operating under the sustainability framework of limits to growth under Earth’s capacity (i.e. F10 reality - 90% less use of resources and energy by 2050) which allows illustrating design when responding to F10 challenges.
### Table 4.2: The role of design for F10 realities

<table>
<thead>
<tr>
<th>What is valued</th>
<th>Traditional design practices (secondary sources - literature)</th>
<th>Eco-design practices (secondary sources)</th>
<th>Design for F10 realities (primary and secondary sources)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Competitive</td>
<td>- Competitive</td>
<td>- Competitive</td>
<td>- Cooperative</td>
</tr>
<tr>
<td>- Financially fulfilling</td>
<td>- Respectful</td>
<td>- Accountable</td>
<td>- Accountable</td>
</tr>
<tr>
<td>- exclusive</td>
<td>- Inclusive</td>
<td>- Empowering</td>
<td>- Empowering</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td><strong>Profitability</strong></td>
<td><strong>Profitability</strong></td>
<td><strong>Partnership</strong></td>
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<tr>
<td>- Industry-oriented</td>
<td>- Environmentally friendly</td>
<td>- Limits: natural capital</td>
<td>- Limits: natural capital</td>
</tr>
<tr>
<td>- Consumption-oriented</td>
<td>- User-friendly</td>
<td>- Effective</td>
<td>- Effective</td>
</tr>
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<td>- Prestige</td>
<td>- Efficiency</td>
<td>- Involvement</td>
<td>- Involvement</td>
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<tr>
<td>- Control</td>
<td>- Commitment</td>
<td>- Participatory</td>
<td>- Participatory</td>
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<tr>
<td>- Success = Growth market</td>
<td>- Integrity</td>
<td>- Radical change</td>
<td>- Radical change</td>
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<tr>
<td>- User utility</td>
<td>- Incremental</td>
<td>- Ethically adaptable</td>
<td>- Ethically adaptable</td>
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<tr>
<td>- Productivity</td>
<td>- Flexibility</td>
<td></td>
<td></td>
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<td><strong>Framework</strong></td>
<td><strong>Short-term thinking</strong></td>
<td><strong>Medium-term thinking</strong></td>
<td><strong>Long-term thinking</strong></td>
</tr>
<tr>
<td><strong>Elements</strong></td>
<td><strong>Form and function</strong></td>
<td><strong>Incremental changes to products</strong></td>
<td><strong>Radical change in organisational output</strong></td>
</tr>
<tr>
<td>- Material specific to form and function demands</td>
<td>- Uses eco-materials and inspired by natural systems</td>
<td>- Solutions grow from places (local resources and energy)</td>
<td>- Multidisciplinary – team work</td>
</tr>
<tr>
<td>- Disregards energy usage</td>
<td>- Conscientious energy use</td>
<td>- Connection and synergy</td>
<td>- Connection and synergy</td>
</tr>
<tr>
<td>- Submission to industrial energy</td>
<td>- Appropriate use of industrial technology</td>
<td>- System thinking scale</td>
<td>- System thinking scale</td>
</tr>
<tr>
<td>- Market-oriented</td>
<td>- Tends to be niche-oriented</td>
<td>- Simplicity</td>
<td>- Simplicity</td>
</tr>
<tr>
<td>- Convenience-oriented</td>
<td>- Tend to diversity and organic</td>
<td>- Strong participation in strategic business decisions</td>
<td>- Strong participation in strategic business decisions</td>
</tr>
<tr>
<td>- Standard and homogeneous</td>
<td>- Convenient</td>
<td>- System challenging – paradigm change</td>
<td>- System challenging – paradigm change</td>
</tr>
<tr>
<td>- Discipline-focused</td>
<td>- Group work – team work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Non participatory in strategic decisions</td>
<td>- Mild participation in strategic decisions (</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Does not challenge the system</td>
<td>- Incremental improvements in the system</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td><strong>Fulfills business imperatives and marketing demands: Design for profit</strong></td>
<td><strong>Fulfills business imperatives and marketing demands respecting the environment</strong></td>
<td><strong>Interventions in organisations strategies through values, motivations and beliefs</strong></td>
</tr>
<tr>
<td><strong>Processes</strong></td>
<td><strong>Linear</strong></td>
<td><strong>Circular</strong></td>
<td><strong>Systemic</strong></td>
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</table>
As showed in the design literature (Chapter 2), design discipline is seen as responding to business’ contexts and focus on product development, the dialogue with experts allowed to understand what characteristics design should embrace to respond to F10 realities. Design such challenging the current boundaries of its discipline and focusing on its inner capacities, which involve more than product development.

4.2.6. RESEARCH IMPLICATIONS

The expert dialogues confirm the need for a paradigm shift that involves systems thinking, holism and the capacity to reconnect the causes and effects of decisions. They also validate findings in the literature relating to the current reductionist view of sustainability which promotes “quick fixes” (Ehrenfeld, 2004) diminishing the capacity of response by both design and the corporate world. The use of sustainability as a tool, and not as a new paradigm, as Figure 4.9 illustrates, is not the path by which to intervene, although it represents the common view. Furthermore, the dialogues highlighted key points with strategic implications for the course of this research:

− The importance of the values, beliefs and motivations of individuals drove an interest in understanding the importance of individuals in organisations in order to trigger/drive the sustainability;
− The responsibility of the organisational ethos in creating paths towards sustainability involves looking for further understanding of how to intervene in the organisational ethos and what levels of importance individuals have to have in organisations to trigger/drive sustainability;
− The role of design for F10 realities (i.e. the sustainability context) shows design as a key enabler of innovation for sustainability in order to generate opportunities for creating sustainability.

The importance of these findings corroborates the literature conclusions that frame this research (e.g. design should embrace a new role) and, as Baxter highlights (2005, dialogues):

> Eco design was functioning on the same paradigm – a reductionism vision of the world given by science, that in fact is about understanding how things function but not acting on those things, and I wanted something that could work in the new paradigm that we are entering in the moment: that is, holism. (Baxter, 2005 dialogues)
Figure 4.9: Different paradigms for design and organisations

Annex 4.9 presents the relation of the data and illustrates in detail these research implications.

4.2.7. SECTION CONCLUSION

Section 4.2 has described the key findings from the sustainability expert dialogues, which strongly influenced the course of this research. This served as a basis for the next research steps. As mentioned earlier, these findings needed validation, as they brought the individual and organisations to the debate.

Understanding the role of people’s values, beliefs and motivations to push the sustainability agenda were highlighted through what the experts had to say. This focus was further pursued with three sustainability consultants, the nature of these dialogues are further explored in the next section.
4.3. SUSTAINABILITY CONSULTANT DIALOGUES

Three sustainability consultants were approached with the aim of confirming and enriching the earlier dialogues.

The dialogues were brief and had the objective of understanding the practical side of people that help other to embrace a path towards sustainability. The idea was to understand organisations' views of sustainability and their values, beliefs and motivations, together with innovation and the role of design (highlighted in the experts dialogues).

The consultants were first contacted by an email asking if they were available and willing to share their experience of how they approach sustainability, and if they had stories to share. All the dialogues were face-to-face. Figure 4.10 shows the process followed.

Figure 4.10: Process of dialogues with sustainability consultants

Following the same structure as outlined in section 4.2, below is presented a more detailed description of the elements highlighted in Figure 4.10 – the approach and intentions, the cognitive dialogue map, the findings, and the implications of this latter in the research.

4.3.1. THE APPROACH – VALIDATING THE FINDINGS

The cognitive approach used for the sustainability expert dialogues was also used to explore issues with the consultants. These dialogues also followed the ethnographic interview approach. A cognitive map to guide dialogues was used, although here, the
objective of the dialogues involved fewer points to cover as it focused on validating the findings from the previous dialogues and enrich those with stories.

Validating the previous findings was necessary in order to comprehend deeper what experts highlighted such as: the role of organisations in the sustainability journey and their connection with values, beliefs and motivations of the individuals; and to understand the connection between organisations and the future of design towards sustainability.

Although again the idea was to hold a friendly conversation, these dialogues did not require the consultants’ deeper personal views about themselves, so commonalities to open the dialogues were not necessary and therefore the introductory game that explored individual views and foci concerning sustainability was not used.

4.3.2. THE INTENTIONS – UNCOVER STORIES

The dialogues with the three consultants were held with the objective of confirming (or not) the findings from the dialogues with sustainability experts. It was also a goal to collect stories in order to show the practical side of these findings.

Approaching consultants who deal with both the top and bottom levels of organisations afforded an opportunity to look through their eyes at the context in which organisations pursue sustainability. Further allowed to find how these consultants approach their clients and help them to embed sustainability.

Storytelling is largely recognised as part of the social fabric of organisations of which the values, beliefs, motivations and ideas of individuals are an integrative part (Brown et al., 2005:83). The outputs of an organisation are a reflection of the whole organisation – its values, processes, strategies, visions and mission – and reveal the expectations in relation to its future (Brown et al., 2005:30).

To enable the consultants to share their stories, guidance in the conversation was necessary. A cognitive map was used that would allow stories to emerge. Due to confidentiality issues the stories and storytellers (the consultants) are anonymous here.

To satisfy this objective the cognitive map needed to give to the interviewee a large amount of control of the course of the dialogue. It was flexible in the way it covered the different elements of organisations: conduct of action; strategy; systems; process and results (Greenwood and Hinings, 1993).

The next subsection presents an overview of the selection process and of the three consultants.
4.3.3. THE SELECTION

With the stated intention it was not important to collect a vast number of views to understand and validate (or discard) the expert findings.

The selection was made according to the possibility of conducting dialogues in which the informants were willing to disclose stories of their own work in order to understand deeper the previous findings.

Furthermore, it was important to collect different views from different points of entry: that is, from different fields in which sustainability is starting to be applied.

The sustainability consultants were selected according to the following criteria:

- Their experience (validity) in the area of sustainability practise
- Their availability and ease of contact and meeting with the researcher in person;
- Their interest in participating in this research;
- Their willingness to share their modes of operating and stories to illustrate their views.

<table>
<thead>
<tr>
<th>Person</th>
<th>Background</th>
<th>Field of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank O’Connor</td>
<td>PhD ecodesign and sustainability</td>
<td>Ecodesign consultant (strategic level)</td>
</tr>
<tr>
<td>Sharon Jackson</td>
<td>MBA</td>
<td>Corporate responsibility</td>
</tr>
<tr>
<td>Michael King</td>
<td>MBA</td>
<td>Risk and value of organisational performance</td>
</tr>
</tbody>
</table>

*Table 4.3: Summary of participating consultants*
4.3.4. THE DESCRIPTION

The consultants were first contacted by email to find whether they were willing to participate in this research journey and inform them of the intentions of these conversations.

A dialogue day was set. The duration varied between one and three hours depending on the consultants' stories and their availability.

4.3.4.1. The interview diagram

The same cognitive approach was used as for the dialogues with experts, and the previous findings of experts' dialogues shaped the cognitive map use to guide conversation. The use of a cognitive map in these dialogues allowed stories to emerge, so once again there were no prompt questions. The cognitive map follows the ideas pursued by Greenwood and Hinings (1993) regarding the different elements that constitute organisations – conduct of action, strategy, systems, process and results. Figure 4.11 offers a general perspective of the cognitive map.
Figure 4.11: Cognitive map – General sustainability consultant interview guide

- Values
- Ethics
- Motifs
- Goals & objectives
- Course of action
- Resource allocation

Organisation ethos

Organisation strategy
- Organisation design
  a) Structure
  b) System

Organisation configuration

Organisational System

Organisational outputs

Product and service systems
- Services
- Intangibles
- Product strategy

- Products
- Intangibles
- Tangibles

Tangibles to support
- Intangibles
- Product strategy
Dialogues were opened by reviewing the research interest and asking for, in the conduct of action element, examples (stories) about main barriers and catalysts found (which allows to understand for example, if in fact individuals, in a practical view, are key) or what is the core idea or motivation that they follow, and why? following by asking for examples among their work.

The researcher intervention was kept to the minimum to allow the consultants to share their thoughts and experiences concerning how they operate. The interventions were made by: a) asking questions in order to add further detail to the storytelling or b) changing the course of the storytelling. Adding to the storytelling allowed for more detailed explanation of an issue which enabled the consultant to illustrate it with other elements of the stories: ‘but how you do engage people?’ or ‘and how did management react?’, and changing the course of the storytelling allowed the introduction of a new subject: ‘how did this influence the strategy, if it did?’

The next section reports the findings, which are divided into two categories: findings that validate and detail the expert dialogue outcome, and new findings uncovered by the sustainability consultant dialogues.

### 4.3.5. THE FINDINGS – VALIDATING THE FIRST DIALOGUE FINDINGS

The dialogues were analysed using the findings from the experts’ dialogues as coding in order to validate them. Data were isolated to understand the practical side of the previous findings.

Undertaken in a very open way to gain a deep understanding of different (organisational) situations (Morsing, 2006), these consultants’ dialogues provided an understanding of the values that are key to pursuing a sustainability agenda; that people are the ones to drive change; and that a top-down approach is as important as a bottom-up approach.

These three findings are illustrated by the consultants’ stories in order to validate the findings from the dialogues with the experts. These stories give enlightenment more than a rational and theoretical explanation of the findings; therefore they are presented as they stand, reported verbatim to preserve their richness. For anonymity, any identifiable information has been removed.

#### 4.3.5.1. The important of values to pursue a sustainability agenda

Consultants view values as the forte of the outputs of an organisation. A company with strong sustainability values is not only creating sustainable products, but also
transmitting these values in all they do. Consultants also underlined the importance of communicating internally and externally these values (an example of a story as evidence in Annex 4.10a).

4.3.5.2. People driving change

These dialogues reveal the power of people to push sustainability further just by offering ways for people to participate in the creation of solutions. It was underlined the importance of involving all that are part of the business (end-users too) in order to find solutions not only appropriate to the needs of those people, but also appropriate for the natural limits (an example of a story as evidence in Annex 4.10b).

4.3.5.3. Top down and bottom up approach

Consultants highlight the fact that creating change towards sustainability in organisations does not depend strictly to the buy in of the top management; it goes down to good ideas that underline the strength of the organisations and create value. All businesses want to prosper, and a good idea for value creation, add to the business prosperity (an example of a story as evidence in Annex 4.10c).

4.3.6. OTHER FINDINGS

Although these dialogues helped to validate the findings from previous conversations, they uncovered other key aspects of organisations aiming to integrate sustainability:

− eco-innovation capacity: organisations’ capacity to create the proper environment for eco-innovation by challenging the ethos of the organisation
− brand power reflection of human capital and output coherence
− embracing people’s capacities
− ability to ask different questions
− capacity to intervene at various levels

4.3.6.1. Eco-innovation capacity

Eco-innovation capacity under the view of the consultants, relates to the organisations’ capacity to create the proper environment for eco-innovation by challenging the ethos of the organisation
− Needs to trigger organisational change via internal cultural modification and the utilisation of human capital creativity to allow different questions and outputs to emerge;

− Rebirth of organisations as expression of their human capital and utilisation of the relationship between natural and human capital to produce innovative outputs, reconnecting production and consumption.

Interventions at the levels expressed above, go beyond corporate responsibility. Annex 4.11a shows a story that illustrates the above.

4.3.6.2. Brand power reflection of human capital

Intervening at the level of corporative values allows the connection of sustainability and individual values in order to make sure that organisation’s brand are a reflection of organisational human capital together with a reflection of limits to growth.

Further, consultants outlined the need to draw out simple activities to ensure organisational outputs to express brand values by:

− long-term thinking – communicating and sharing visions;

− setting up a team culture of collaboration to express ideas and individuals’ beliefs in order to explore opportunities and build solutions together;

− replace competition (inside the organisation and externally) with collaboration with natural capital, people, community, other organisations, etc.

The dialogues also underline the importance of consistence and coherence in all that is involved in, not only the product life-cycle, but also across the whole business-cycle. Stories illustrate that brand is the identity of a organisation, and such identity operates and is perceived in every output of any organisation (Annex 4.11b presents a story that illustrate this finding)

4.3.6.3. Embrace people’s capacities

The consultants’ stories underlined ways to intervene in organisations in order to create the proper atmosphere for sustainability to emerge daily. They suggested:

− Understanding and re-educating the individuals in the organisation as a team sharing similar values in relation to natural capital;

− Managing the team with ideas about ‘contextualised leadership’;

− Comprehending and incorporating the limits to growth in every activity.
The story shared in Annex 4.11c as example, shows the importance of individual responsibility to add to the sustainability journey, because sustainability goes from big visions to small and discrete everyday decisions. To embrace people’s capacities is been shown as creating better results at the long-term, for everyday small decisions start to be framed differently.

4.3.6.4. Ability to ask different questions

Organisations that are able to embrace different questions are more likely to be more competitive, as they eventually arrive at different solutions. Such a route focuses not only on the act of designing a product or a service but also on asking: ‘What do we really do well?’ It is again related to the brand of an organisation, to the roots of its values and to their human capital. Consultants underlined that asking questions differently is the starting point to re-evaluate and re-think the strategy (as Annex 4.11d shows)

4.3.6.5. Capacity to intervene at various levels

It is necessary to understand the different scales of interventions in order to pursue outputs that are intrinsically related to sustainability by acknowledging the dependency of these outputs to the business life-cycle: how can all aspects of businesses work towards sustainability?

Consultants agree that opportunities to create sustainability is not reserved to products; the difficulty is on transmitting to organisations that people are becoming more aware of their individual responsibility as consumers, and what their purchase, and everything that is associated with (e.g. responsible value-chain), needs to reflect their worries. Annex 4.11e illustrate the difficulties that is to approach sustainability beyond the need for a solution, to instead focus on re-formulate the need (and not the solution)

4.3.7. SECTION CONCLUSION

These stories not only helped to validate the findings from the dialogues with the sustainability experts but also uncovered other key findings that shaped the rest of the research:

- the importance of the individual and his/her values, beliefs and motivations to perpetuate the journey towards sustainability independently of the context in which this individual operates (e.g. family, organisation, government, etc.);
organisations’ alignment with their essential values and the values of their human capital and towards the natural capital not only benefit the corporate whole (e.g. through a spirit of belonging and business longevity), but drive innovation at different scales;

- understanding the business’ outputs by considering not only the outputs that they sell (products, services, processes or systems) but also their overall contribution to the environment and communities;

- business innovation’s dependence on people’s (beyond staff) engagement and accountability;

- the importance of the values from which business strategies emerge and operate and their connection to the outputs of the organisation.

These findings suggest the dependence of outputs aiming for sustainability on the values and beliefs of individuals, and how these are applied in the corporate whole.

Furthermore, they portray design outside the boundaries of its discipline, also highlighted in Chapter 2 and by the sustainability experts. For example, consultants refer to the ability to start questioning: a) the strategy (point; 4.3.6.4) by asking questions differently, which literature supports (Chapter 2); b) the need previously than the solution (point 4.3.6.5), design is a key player in respond to needs and find solutions. Also consultants show for example, that sustainability concerns all that is involved in the product (points: 4.3.6.1; 4.3.6.2) and design is the responsible for products. This view places design at a strategic level, as products are expected to reflect all decisions in the business-cycle.

The way design embraces strategic thinking to drive cultural and operational change has been illustrated with different stories that provide practical evidence and validate the findings from the first set of dialogues with the ten sustainability experts.

4.3.8. RESEARCH IMPLICATIONS

The dialogues with sustainability consultants had two major implications for the research:

- Values are the foundation of sustainability at any level or scale of intervention. Research implication: investigate sustainability values further;

- Organisations that create sustainability should reflect their values across the whole organisation (including organisational outputs). Research implication:
investigate organisations that currently create sustainability across the whole organisation.

To understand how people seek to create sustainability, these dialogues and those with the sustainability experts have led to an investigation of organisations that are already engaged in a process of creating sustainability as the next step of this research, in order to understand how they do it, and what is the role of design in helping other (organisations, people, etc) to embrace sustainability.

Both research implications suggest the need for further investigation of values and organisations, and point out to a several paths that design could embrace to participate in creating sustainability. Consultants and experts show the need to create systems of interaction between people; between people and nature; between people and their organisations; between people and organisations’ outputs. Currently organisations relate to people through their products, if new relations are point out to be important in the journey for sustainability, design should pursue these leads and explore its ability to design systems of relationships.

4.4. CHAPTER CONCLUSION

The set of dialogues with sustainability experts and consultants helped to start developing a response to the challenge of design in the course of sustainability as suggested as central in literature review (Chapter 2). The dialogues suggest a role that fully utilises design thinking, in which design for F10 realities involve designing systems beyond products and services (e.g.systems of interaction between human, natural and economic capital).

The dialogues pointed to innovation as a way to lead sustainability and pursue change. An innovation process which utilises human capital creativity creates more opportunities for different questions and outputs to emerge across the organisation.

The findings also suggest the dependence of more sustainable outputs on the values and beliefs of individuals and indicate their impacts in the corporate whole.

The dialogues, particularly those with the sustainability consultants, importantly helped to define the difference between a traditional organisation and one that behaves within a sustainability paradigm, as Figure 4.12 suggests.
**Figure 4.9:** Differences between organisations that embrace their people’s independence and those that embrace connectivity and dependency in their people

Chapter 5 presents this continuation of the research by reporting dialogues with organisations already creating sustainability in order to understand how they express sustainability values in the several elements of the organisations (conduct of action, strategy, structure, processes, products, etc) and how these influence the business output. The aim is to uncover elements that allow exploring design for sustainability differently.
Fortunately, there are a few who are in earnest, who are willing to examine our human problems without the prejudice of the right or of the left (Krishnamurti, 1953).
5. DIALOGUES WITH ORGANISATIONS

This chapter describes dialogues with six UK organisations which distinguish themselves as creating sustainability.

This chapter highlights the way these organisations were selected and the dialogue approach are explained together with the: intentions of the dialogues, the method used, and how the data were approached and analysed. Examples of the key findings are presented together with the findings implications in the research.

5.0. SUMMARY

This chapter presents:

- the elements of the different organisations’ gathered through analysis of their values
- What guided understanding of the DNA of organisations already creating sustainability
- an introduction to each participating organisation
- an overview of the most interesting discoveries from the dialogues
- the contribution of these dialogues to the research outcome.
Figure 5.1: Summary of chapter content - dialogues with organisations
5.1. INTRODUCTION

This chapter reports the dialogues held with organisations creating sustainability. The need for such dialogues was highlighted by the exploratory dialogues with the ten sustainability experts and three sustainability consultants, who talked about how people and their values are key to the long-term journey towards sustainability; they referred to different forms of valuing nature, and the importance of people in discovering new ways to create sustainability; they also underlined the differences between traditional organisations (e.g. without acknowledging Earth capacity) and organisations that aim to achieve sustainability; moreover, they presented different ways of questioning what is done and why it is being done, and for what purpose.

The dialogues with consultants underlined the importance of the foundations necessary to create sustainability – the values, beliefs and motivations of everyone involved in the move towards sustainability – and the speakers' stories underlined a different type of behaviour and a different way of doing things from business-as-usual.

The experts and consultants highlighted the significance of redefining design interventions to look beyond outputs to position design at the strategic level in order to enable sustainability. Both sets of dialogues helped to characterise new frontiers for design outside traditional boundaries, where products towards sustainability are a consequence of the redefinition of businesses, the results of a consumption and production dialect and, mainly, and respond to nature limits to instigate sustainable lifestyles.

The conversations led to the need to know how these transitions are made, what makes people, places and organisations create sustainability, and furthermore, how they do it. Although the consultants and experts shared their stories and ways of approaching sustainability, investigating those who have created sustainability themselves was revealed to be paramount. The organisations offered a variety of views and a diversity of ways of operating. The aim of this research is not only to describe these but also to illustrate them, so enabling others to drive their own sustainability journey.

5.1.1. VALUES

A key point uncovered by the earlier dialogues was the need for better understanding of the place of organisational and personal values in the creation of sustainability, and therefore it
was necessary to find their place in organisations already creating sustainability. Organisations are not only enterprises: they are a collection of individuals that work together to deliver an output.

This section focuses on values and the importance to the way dialogues with the six organisations were conducted. The following lines show:

- theoretical collections of values regarding their impacts and implications on the course of this research;
- the theoretical views about seven organisations that helped to characterise the values and how they are translated in the elements that characterise organisations the implications of the above and on the choice of the six organisations with whom to have dialogues;
- the implications of the process of understanding values in the arena of organisations in the cognitive map that drove the dialogues.

5.1.2 COLLECTION OF VALUES

The necessity to understand values deeper is born from the findings of dialogues with experts and consultants, although values had already been collected from:

- primary sources: dialogues with sustainability experts and consultants who portrayed different values through stories (summarised in Annex 4.6);
- secondary sources: literature reviewed in Chapter 2 in which several positions for example regarding corporate responsibility start highlighting the importance of values, for branding position in a journey to embed sustainability.

Again, the collection of values is not quantitative but qualitative, which makes it richer if values are collected from different sources. The objective is of clustering the values in order to understand the different elements that constitute the ‘DNA’ of organisations creating sustainability. The elements that characterise organisations are, according to Greenwood and Hinings (1993): conduct of action (e.g. the ethos), strategy, structures (systems), process, and results (Greenwood and Hinings, 1993).

To illustrate these organisational elements and draw up a list of criteria for the selection of organisations with which to hold deep conversation, it was important to relate the values from the primary and secondary sources, and the values of organisations that were
expressing sustainability. One outcome of this exercise was to identify organisations that were already creating sustainability, with which, potentially, dialogues could be pursued.

Seven organisations communicating values of sustainability were analysed through their publicly available communications material (websites, flyers, and blogs from consumer organisations). Such organisations were selected according to:

- their different levels of commitment to sustainability, understanding their drivers by the elements that compose their organisation’s history;
- the different values explored by each organisation through their outputs (e.g. using organic ingredients, or promoting a more natural lifestyle) including their communications material.

These organisations (portrayed in Annex 5.1) are:

- Rachel’s Organics; Eglu (from Omlet) at the product and service level;
- Waitrose, at the organisation configuration level (e.g. cooperative which represents a different organisational structure and one more inclusive)
- Green & Blacks and River Nene at the organisational strategy level;
- The Open University and Fairtrade, representing the organisations’ values, ethics and motives.

These organisations were analysed not only to illustrate the different elements that compose the DNA of such organisations but also to collect enough material about them to be able to ask whether they were open to participating in this research.

**5.1.3 ANALYSIS OF VALUES**

The analysis looked at the organisations’ key messages and the words they used to express their values, not only in what they say about themselves but also in consumer blogs and profiles; how the enterprise is organised (such as Waitrose); the importance of the origin of the ingredients they use (e.g. Green & Blacks); and the importance of their providers. Figure 5.2 presents the key words with which these companies communicate and express sustainability (directly or indirectly, consciously or unconsciously) regarding their awareness of sustainability – e.g. the Open University teaching style called ‘open learning’: learning in your own time is not a foundational principle consciously created towards sustainability but it is strongly related to sustainability.
The analysis continues along two paths:

- relating these findings with the findings from the primary and secondary sources related to values. Annex 5.2 presents a table illustrative of the findings from each one of the above sources, and annex 5.3 maps the findings, categorising them into thirteen clusters (resources; production; interaction; ecosystem; systems thinking; approaches/strategy; innovation; individuals; equity; limits; wellbeing; consumption; futurity);

- grounding clusters that characterise the findings at each level (conduct of action, strategy, structures (systems); process, and results), in order to understand the values according to the context. Annex 5.4 presents these five levels of value clusters in five figures. This cluster-analysis allows to identify the characteristics of each level in the lights of sustainability values.
5.1.4 THE RESULTS OF THE VALUE ANALYSIS

These two paths to understanding the values were combined and unified which enabled to characterise, as highlighted previously, each of the elements that define organisations: Greenwood and Hinings’ (1993) conduct of action; strategy; structure; process and results. Below are the combined results of the analysis which are complemented with annexes (5.5a – 5.5e) in where each element is characterised in more detail.

5.1.4.1. Conduct of action

Conduct of action relates to values, beliefs and motivations that frame the visions, strategies and actions of any system (e.g. organisations). Conduct of action should involve both the individual and the social organism and the ecological boundaries (nature limits to grow). The analysis revealed the practical side of conduct of action which depends on the understanding of its scales (timescale, context); conduct of action depends also on the notion of equity in terms of natural and human capital and social justice towards appropriativeness (e.g. accountability of resources) and the ability to operate under the limits imposed by nature, society and trades off which translate into systems of interaction that respect the rhythm and cycles of the systems involved. The table presented in Annex 5.5a portrays the characteristics of conduct of action drawn from this analysis.

5.1.4.2. Strategy

The analysis of values across the primary and secondary sources and of the seven organisations’ publicly available communications showed that strategy dictates the course of action of the system in stake (e.g. designing a product or an organisation activities), and involves a combination of long and short term actions, as well as incremental and radical activities. The analysis also revealed different drivers towards sustainability from a human perspective (e.g. social justice), an economic perspective (e.g. market opportunity) and a nature perspective (e.g. use of different resources).

Furthermore, the analysis showed that strategy is characterised by priorities; takes into account impacts at different levels; explores local and global opportunities to rethink the future, is founded on a common vision of limits to growth; and aspires to innovation based on cooperation, collaboration and a balance between human ingenuity, respect for natural limits and respectful technology applications. Annex 5.5b presents a table of the elements of strategy.

Strategy in the lights of this analysis is understood as involving the organisations’ structure, process and results (as nested system) the three other organisational elements pointed out
by Greenwood and Hinings (ibid). Below these elements are presented separately, but seen as a consequence of a well-defined *strategy*. Likewise, *strategy* is a consequence of the foundations of *conduct of action*. Figure 5.3 presents this relationship between conduct of action and strategy.
Figure 5.3: Conduct of action and strategy: a hierarchical relationship

- Conduct - action
  - Motivation
  - Beliefs
  - Scale
  - Ecological limits

- Conduct - action
  - Conduct - action
  - Conduct - action
  - Conduct - action

- Strategy
  - Course of action
    - Human, economic, natural
    - Long-term, Incremental/Radical
    - Goals & Objectives
      - Local & Global
      - Internal & External
    - Resource allocation
      - Process, Structures, relations

- Innovation
  - Opportunities
    - Future needs, expectations
    - Common social, biophysical
      - Common social, biophysical

- Priorities
  - Socio-economic impacts
  - Socio-economic impacts

- Policy
  - Policies
  - Policies
  - Policies

- Stakeholders
  - Individuals, Communities, Programs
  - Individuals, Communities, Programs
  - Individuals, Communities, Programs

- Values
  - Values
  - Values
  - Values

- Scale
  - Scale
  - Scale
  - Scale
5.1.4.3. Structure

According to the analysis, the element *structure* combines several structures such as the people ecosystem involved, both internally and externally; the stakeholders’ ecosystem, which goes beyond the sense of shareholders to all who are involved in the business life cycle, including the community ecosystem and the systems and nature involved. Moreover, *structure* is characterised by all the human interactions at its different scales, together with the relationships that this interactions comprise, Annex 5.5c presents *structure* and its characteristics according to the analysis.

5.1.4.4. Processes

The analysis of values made it clear that *processes* refers not only to the industrial processes by which products are created but also to organisational processes (e.g. incentives; promotions; hierarchies). From the point of view of this analysis, *processes* towards sustainability entail system thinking in order to acknowledge the metabolisms involved: the ability to relate, interrelate, connect and interact with a diversity of elements in order to co-evolve with the different ecosystems involved (e.g. individuals; communities; nature). Furthermore it understands wellbeing as including the people directly and indirectly involved, together with the resources utilised, in which awareness of the metabolisms involved, how they are transformed, and the need of people and society they fulfil is required. Annex 5.5d presents the items that characterise the organisation’s *processes* element in detail.

5.1.4.5. Results

Human creativity, the potential of technology, the needs of people and society and the capabilities of ecology and nature are responsible and characterise *results* as an element of organisations, according to the analysis. Other aspects of *results* underlined by the analyse terms is their responsibility in constructing a path towards sustainability: a) for creating wellbeing and for generating outputs to allow a healthy and good-quality lifestyle for both people by acknowledging nature; b) to distribute fulfilment, to educate and to contribute to a balance between what is used and what and how it is created. Annex 5.5e presents the result of the analysis and details the items that characterise the results.

The analysis also clarified how *structures*, *processes* and *results* operate according to a *strategy*. Figure 5.4 shows the hierarchy among these elements.
Figure 5.4: Strategy elements and their characterisation

**Structures**
- People ecosystem
- Stakeholders ecosystem
- Communities ecosystem
- System(s) ecology
- Nature evolution

**Processes**
- Product & services
- Organisational systems (social, economic, technological, ecological)

**Results**
- Human creativity
- Technology potential
- Individual & society needs
- Nature capabilities & rhythm
- Ecological capabilities & rhythm

**Human Interaction**
- People & people
- People & products
- People & services
- People & systems
- People & nature
- Nature & systems
- Nature & products
- Nature & services

**Wellbeing**
- Internal individual wellbeing in the process

**System Thinking**
- Acknowledge: Diversity of elements: metabolisms involved
- Mind shift: complexity, interconnection, interactions
- Autism, simplicity, flow, correlations, logicsness

**Resources**
- Midstream: Natural Capital
- Conservate, harvest, support nature and natural processes
- Usable: Intelligent, independent (non-fossil), efficient & effectiveness

**Production**
- Mindful, awareness of limits (nature), metabolism/cyclicity
- Awareness: 'technology as interaction between human & nature: resources limited & action efficiency and effectiveness

**Create Wellbeing**
- Individual
- Societal
- Environmental economic
5.1.5. SECTION CONCLUSIONS

The analysis clarified the values in action from different levels of application and their responsibility on the path to sustainability. This helped to characterise the organisational elements according to the results. This opened the way for conversations with organisations already creating sustainability, as it permitted the delineation of a purpose for these conversations together with what has already been pointed out in the dialogues with sustainability experts and consultants, and the establishment of what the conversations’ focus should be. Moreover, it led to the creation of a guide for dialogues with organisations by providing a cognitive map which enabled understanding of how these values are applied in real life from the perspective of the organisations in which dialogues were held.

The next section reports on the organisations with which dialogues were held, the approach to and intentions of the dialogues, and the results, which strongly influenced the research outcome.

5.2. DIALOGUES WITH SIX ORGANISATIONS

Several organisations were contacted and asked to take part in the dialogues. Some responded positively, others simply referred the researcher to their organisation’s sustainability report. Although the majority were happy to share their knowledge, difficulties with timing meant that it was not possible to fully engage in dialogues with all of them (e.g. Eglu). Therefore other organisations were contacted to provide a bigger sample and thus illustrate the different levels of values involved in creating sustainability. The sample is presented in section 5.5, which presents the six organisations that participated in this research in order to understand the values inherent in their creation of sustainability.

The overall method and process followed were the same as those followed for the dialogues with experts and the consultants (Chapter 4).

Organisations were contacted by email presenting the premises of this research and explaining how valuable their contribution would be in further developing the study. The emails were sent directly to the person with whom the dialogue was sought. When the response was positive a day was set for the dialogue, reserving one and a half hours for the purpose. The conversations were held on the organisations'
premises, which enabled the researcher to get some sense of the day-to-day environments of these organisations. Conversations were tape-recorded and notes taken. These written notes were very useful later when analysing the conversations, as they helped to distinguish the most important information from the rest. Figure 5.5 presents the general process of contacting organisations.

After the tape-recorded dialogues had been transcribed verbatim the organisations were contacted again with the transcript and asked for permission to use the information gathered.

The next section once again presents friendly conversations (i.e. dialogues) as ethnographic interviews as the approach chosen. It also presents the organisations with which conversations were held and why; shows the cognitive map that guided the conversations; and outlines results from the dialogues.

5.2.1. THE APPROACH

As highlighted in Chapters 3 and 4, this research and the dialogues follow a cognitive approach. This had a major influence on how the dialogues were approached and conducted.

As Chapter 4 points out referring to dialogues with experts and consultants, the dialogues followed a semi-structured interview format in which the questions were not set and important key issues were introduced at opportune moments.

This common approach to all the dialogues conducted in this research was designed to glean deeper knowledge of people and their everyday efforts to achieve
sustainability. For the majority it is a natural way of doing things and a simple way of being, as the conversations show.

5.2.2. THE INTENTIONS

As underlined previously, the intention to build a relationship was maintained and applied to all the dialogues. When talking with people in their work setting it is important to divagate as little as possible and to retain the focus as much as possible while maintaining the characteristics of a friendly conversation:

− The casual nature of the dialogue was maintained by asking personal questions; for example why respondents like their organisation or why they like to work for that particular organisation. This encouraged people to start sharing personal stories and allowed them to disengage them from their work mode.

− Another characteristic of a friendly dialogue is the lack of an explicit agenda. The conversations were carefully guided to cover all the points in the cognitive map – although some points were more important in some dialogues than in others due to the richness of the stories.

− Asking for clarification was not permitted: instead, the researcher would add to a story with a short personal comment if more detail was needed, such as ‘this happened to me once, what did you do?’ or ‘I heard that also happened to X, how you dealt with it?’

− References were not asked for and instead storytelling was encouraged: for example when an interviewee said that the organisation had had some problems with its seasonal vegetables the researcher asked indirectly for an illustrative story by sharing examples of how this might happen, which enabled the interviewee to correct this with a story: ‘Like brown colour on the banana peel, and how onions get very soft in hot weather...which is a problem for us as we cannot send these to our costumers’

− When silences occurred, questions were not asked, instead silence was used to introduce a new topic by connecting already shared stories with the next focus point by, for example, sharing another story from another company: ‘This also happened with Innocent, which was bought out by Coca-Cola: do you think that they wanted to buy the company for its values, which would be very difficult to replicate in such a big institutionalised company as Coca-Cola?’
In conclusion, these organisations were communicating values and presenting solutions regarding achieving sustainability and the aim was to understand how this was done on a day to day basis. To facilitate the natural share of stories, as underlined in Chapter 4, the language used was very natural, laid-back without being too relaxed and uncomfortable for a stranger. Engaging the interviewees in their personal stories and views about their organisation was productive.

The next section presents the organisations that participated in this research and how they were selected.

5.2.3. THE SELECTION OF ORGANISATIONS

To identify the values of organisations that were already creating sustainability, the selection followed the same criteria as the one used to select the seven organisations in which their values expressed in publicly available communication material was analysed (see section 5.1), such as: the different levels of commitment to sustainability, by understanding the organisation’s history and understand the different values explored though their outputs (involving also the communication material).

As mentioned earlier in this chapter, the seven organisations from which the analysis was made and some of those that responded positively were able to participate in this research, while others were unable to get involved due to time issues. Other companies were contacted: below are the six organisations that contributed to this study (one organisation chose to remain anonymous):

- TYF, representing the organisation’s values, ethics and motivation;
- Co-Op and River Nene illustrating the organisation configuration level;
- Green & Blacks and River Nene as examples of organisational strategy level;
- Green People; Organisation Z at the products and services level;

Although these organisations proved to embrace all of these levels, some more than others, the first analysis of their communication material available dictated the cluster presented above. This cluster served as a selection map to assure strong representation at each level. Table 5.1 presents the organisations creating sustainability with a brief description and the position of the person with which dialogues were held.
<table>
<thead>
<tr>
<th>Organisations</th>
<th>Description</th>
<th>Dialogues with</th>
</tr>
</thead>
<tbody>
<tr>
<td>TyF</td>
<td>Aims to teach people to play and think differently under five business headings (education, leisure, hospitality and retail)</td>
<td>Founder</td>
</tr>
<tr>
<td>Co-Op</td>
<td>The Co-operative Group is a unique consumer-owned business with about 11 different businesses units, recognised for its high ethical values</td>
<td>Corporate responsibility department manager</td>
</tr>
<tr>
<td>River Nene</td>
<td>A business to help people access a different lifestyle by growing, distributing and facilitating the use of organic vegetables</td>
<td>Franchise business leaders</td>
</tr>
<tr>
<td>Green &amp; Blacks</td>
<td>Creation of organic chocolate products using ethical trading, to gives a taste experience like no other.</td>
<td>Founder</td>
</tr>
<tr>
<td>Organisation Z</td>
<td>Architect and design practice which consistently challenges traditional preconceptions of space and demonstrates environmental concern and efficiency, without compromising on contemporary form</td>
<td>Associate</td>
</tr>
<tr>
<td>Green People</td>
<td>Provides high quality, truly organic natural health and home care formulations (skin, body, hair, beauty and baby care products)</td>
<td>Top business manager</td>
</tr>
</tbody>
</table>

Table 5.1: Summary of organisations with which dialogues were held

5.2.4. THE DESCRIPTION OF THE PROCESS FOLLOWED

The organisations were contacted and all emails addressed to the individual with whom the interview was requested or a key person in the organisation with whom a rich dialogue would be possible. The targets were individuals who were fully committed to the business and to sustainability and had a good understanding of the history of the organisation and, if not the founder, knowledge of the motivation, beliefs and values pursued by these people.

Face-to-face dialogues were held on the organisations’ premises. For example TYF in St Davis runs a hotel in that offers a more complete service to clients, and staying there enabled the researcher to get a sense of the type of service the organisation offered and how its values impregnated even this business satellite.
The atmosphere of the dialogues was intended to be friendly and the same approach was taken as described earlier, using a cognitive map to guide the dialogues without disrupting either the thoughts of the informant or the flow of the conversation. Another way of avoiding disruption and allowing conversation was taking as few notes as possible in situ, and when notes were taken this was done discreetly; therefore dialogues were tape recorded.

Transcripts were later sent back for approval and permission to use and share the data. Figure 5.6 presents the process of the dialogues’ development with organisations.

**Figure 5.6: Key elements in the process of dialogues’ development**

5.2.4.1. The cognitive map for dialogues with organisations

Because the aim of these dialogues with organisations was to understand how they create sustainability daily and what puts them at the fore of those seeking to achieve sustainability, the cognitive dialogue map (diagram) used the elements of the organisations already presented in this chapter and their characteristics (the result of the previous analysis presented in section 5.1).

This cognitive map clarified several aspects of the elements conduct of action strategy, structure, processes and results of these organisations by following the characteristics found previously. Figure 5.7 presents the cognitive map used. The characteristics of the elements gather presented in annexes 5.4a to 5.4e.
Figure 5.7: Cognitive map for guiding the dialogues with organisations
5.2.5. INITIAL FINDINGS

This section shares the initial findings from this set of dialogues. Chapters 6 and 7 present a deeper process of analyse and the findings in detail. The objective of the analysis reported in this chapter was not to look for similarities but instead to capture the richness of these organisations’ actions, activities and stories. This was not a comparative study: it aimed to portray the layers of sustainability from the perspective of organisations that apply it every day. Annex 5.6a to 5.6e present key examples of stories shared during the dialogues which illustrate each element of Greenwood and Hinings (1993), and present the meta-concepts and the values highlighted in these stories, while below some relevant stories representing each element will be portrayed from Tables 5.2 to 5.6.
### Organisation elements | Organisations’ example stories

**Conduct of action**<br>- Individual beliefs & motivation<br>- People’s beliefs & motivation<br>- Social beliefs & motivation<br>- Ecological limits

‘We believe in the organic production of food, we believe that organic foods are nutritionally better … anything you put on your skin. Up to 60% of it can be absorbed through the skin into the bloodstream… we are passionate about avoiding chemicals in products, not just the chemicals we add which are the preservative agents and so on… but also the hidden ingredients which are part of plant materials derived from conventional agriculture. It’s just something that is central philosophy to what we do. We don’t question it because it’s is just one of the core values.’ (Green People – R&D director; 2006)

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**Strategy**<br>- Course of action: Drivers (human, economic, natural); Long/short term; Incremental radical<br>- Goal & objectives: Local & global;<br>- Internal & external<br>- Resource allocation: Process, structures

When we designed the primary school, Meadlands, the teachers were quite concerned (and this is young children aged 6 to 11), that they would be taken out of the kind of safety of the classroom that they knew and put into this weird-shaped base and that they would feel uncomfortable, and it would affect their behaviour. In fact the opposite happened: they go into the space far from the conventional classroom. What the teachers have observed is that the children focus a lot better in the space that we’ve designed – they feel incredibly comfortable – it’s sort of womb like, enveloping, and they feel very comfortable, very safe. So they work harder.’ (Organisation Z – partner; 2006)
### Organisational elements

<table>
<thead>
<tr>
<th>Structure</th>
<th>Organisations’ stories and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>People's ecosystem</td>
<td>‘They said they wanted to move the operation, as they are based in Devon and they didn’t want to be supplying this far; it was against what they believe, as for example, delivering so far was just increasing food miles…the food miles is a bit of a funny one, people are obsessed by that, but It’s not as simple as saying: “driving a lorry from A to B is not ecologically sound”. ..You have all these factors to deal with, for example: what is better, to grow tomatoes under hot houses in the winter with paraffin heaters in Devon or to fly them in from Spain? Which is actually better for the environment?’ (River Nene – Bedford Franchise; 2005)</td>
</tr>
<tr>
<td>Stakeholders’ ecosystem</td>
<td></td>
</tr>
<tr>
<td>Communities’ ecosystem</td>
<td></td>
</tr>
<tr>
<td>System(s) ecology</td>
<td></td>
</tr>
<tr>
<td>Nature ecology</td>
<td></td>
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</tbody>
</table>

Table 5.4: Key findings – Structure

### Process

<table>
<thead>
<tr>
<th>Organisational elements</th>
<th>Organisations’ stories and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products &amp; services</td>
<td>‘I think it would be fair to say the [food retail] business was a bit neglected. We’ve got an expert coming in to head up food retail who has really pushed good stores, good products…it’s basically products and stores and the whole customers’ experience of being in a Co-op rather than it looking a bit shabby and not having fruit on the shelves… it’s really about trying to turn that overall customer experience around. At the end of the day you want to offer good products and services. You also want to offer good ethics and one should not be at the expense of the other.’ (Co-Op; Senior manager; 2007)</td>
</tr>
<tr>
<td>Organisational</td>
<td></td>
</tr>
<tr>
<td>Systems (social, economical, technological &amp; ecological)</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.5: Key findings - Processes
### Organisational elements

<table>
<thead>
<tr>
<th>Results</th>
<th>Organisations’ stories and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Human creativity</td>
<td>‘There are reports of more environmentally-friendly packaging materials becoming available based on potato starch and various other things. They’re not stable enough for cosmetics yet. They’re okay for short-term products; food packaging, and I think there’s a milk package which has been made out of some kind of starch and chalk, for example. But milk packaging only has to remain stable for a week or so, whereas our products have a shelf life of anything up to three years, and there is no natural plastic or natural packaging material which will last that long – yet. They’re working on it and one day they’ll crack it, and when they do we’ll change over to it.’ (Green People – R&amp;D director; 2007)</td>
</tr>
<tr>
<td>- Technology potential</td>
<td></td>
</tr>
<tr>
<td>- Individual &amp; societal needs</td>
<td></td>
</tr>
<tr>
<td>- Nature’s capabilities &amp; rhythm</td>
<td></td>
</tr>
<tr>
<td>- Ecological capabilities &amp; rhythm</td>
<td></td>
</tr>
</tbody>
</table>

*Table 5.6: Key findings - Results*
Findings from the dialogue analysis revealed the organisations’ different ways of actively applying sustainability at the levels of the different elements; each do this differently, but they all see their business as a way of expressing their view of nature and of people.

The organisations have different ways of doing things:

\[ \ldots I \text{ do not want my money invested in any business that (\ldots)} \text{extracts fossil fuels because I've got big concerns about climate change (\ldots)} \text{that subject is reflected in a policy which governs how the bank will or won't invest its money. (Co-Op, 2007)} \]

They carefully plan their strategies and processes to reflect their beliefs:

\[ \text{We belong to quite a big company, but we're split up into different units. We have different distributors, which facilitates the business: it makes a little bit easier to manage...our little company's quite small. So we're lots of little companies under a bigger company. (\ldots) In Devon they can't grow onions to save their lives down there because the soil is just rubbish for onions. What they'll be doing is using some of our onions (\ldots) and vice versa: there are some things that they can grow better down there; they can grow artichokes down there better. (River Nene, 2005)} \]

Figure 5.8 shows the Co-Op’s collaborative and participatory system of decision-making involving all its associates, and how this process is reflected in their ethical statement and their products. Figure 5.9 presents River Nene’s \textit{modus operandi}, which reflects its values and beliefs in its strategy and structure.
Figure 5.8: Participatory decision making

- Monitoring the issues with bigger impact in society in general
- Focus group consultation: selected groups of customers around the country
- Customer evaluation: most important statements for ethical policy
- Final ethical policy which governs Co-Op

Each business will have something which is relevant to their core business.

- Food stores
- Travel
- Funeral care
- Bank
- Insurance

Initiating the 100% first eco-friendly car insurance...
Figure 5.9: Organisation macro-strategy and micro-structure
The organisations have ways of caring for and nurturing communities and nature as part of their business, suggesting that they understand output as going beyond their products and services.

Four years ago we helped [the growers] with an application to the British Foreign Aid body department for international development (...) they've planted more than a million new trees. And they are now training people outside of their area, and helping them not just to grow cocoa but to ferment it: when to harvest, how to ferment, how to dry... (Green & Blacks, 2006)

The way these organisations see their businesses is not as a job but as a lifestyle, as portrayed in the way they view the world:

It is a different franchise because is about lifestyle, it's a lifestyle change, and about the products, and about organic farming, organic growing, and making sure that everybody is happy all the way along the line, right from the grower right through to the customer and everybody in between. (River Nene, 2005)

Below is a summary of the findings from these dialogues with organisations.

**5.2.5.1. Summary of Findings**

This set of dialogues with organisations already creating sustainability helped to understand sustainability in practice. The initial findings helped see the act of creating sustainability as dependent of:

- seeing business values as dependent on individuals with strong environmental and social values;
- view of business as responsible for the environment and social wellbeing;
- a collaborative approach and the accountability of each individual;
- a strong correlation between individual values and organisations’ values
- flexible and adaptable structures
- creating space to share ideas;
- work-life balance;
− collaborative decision making;
− strong communication across positions and departments;
− global vision and local interdependency and awareness (e.g. between businesses and local communities);
− seeing outputs as beyond products and services: using the organisation as a platform from which to contribute to communities and the environment;
− a strong relationship between business success and people’s engagement (beyond staff engagement, at a personal and individual level).

These dialogues suggested a different type of behaviour in business and as an organisation to the ones showed by business-as-usual together with a different way of seeing their value chains and understanding their own business cycles. Their values as people, businesses and organisations lie in their different ways of acting.

5.3. CHAPTER CONCLUSIONS

The dialogues with experts and consultants suggested the dependence of outputs towards sustainability on the values and beliefs of individuals, which are responsible for the way they are applied in the corporate whole. The dialogues with organisations presented the views that their human capital and love of nature are the driving force that shapes their business innovation. This is what distinguishes these businesses from others. They are grounded in sustainability values, which create their unique market value.

Furthermore, these organisations tend to behave organically: that is, there is connectivity between each member of the organisation and its decisions, together with the awareness that every detail of the business cycle and in the product cycle reflects the whole organisation and its values. There is a sense of empowerment and responsibility among people which is not only manifest in their products but also felt in the organisations’ strategies, structures and people’s relations.

Even if there was no direct concern to understand design as a discipline and its role in these organisations, it is clear that the organisations are system designers: they see their organisations as a system of interactions, and these interactions are responsible by their unique outputs (e.g. the relations of Green & Blacks with the
cacao growers is key for the final product success). Because the organisations see their outputs more than their products and services they make a big contribution to communities, society and the environment. They do not force these actions as externalities (e.g. making time for voluntary work), they are part of the way they do business, such as the way TYF help to set best practice in how businesses relate to the national park).

These dialogues with organisations showed the relationship between paths to sustainability and individual values and beliefs in practice, as suggested by the experts’ dialogues; they also revealed how these organisations see their human and natural capital and their importance in how they do business.

This chapter has helped to validate and illustrate the findings of this research, but the rich data gathered require deeper analysis. These dialogues with organisations revealed two fundamental pathways to create sustainability, one that relates to a different culture and the other pathway shows different ways of doing business. Acknowledging this, the data was looked at with the help of cognitive maps strongly supported by findings from the literature in order to uncover other relevant findings. This further analysis is reported in Chapter 6.
There is only one movement, which is the outer and the inner. With the understanding of the outer, then the inner movement begins, not in opposition or in contradiction (Krishnamurti, 1961).
6. SENSE MAKING OF THE DIALOGUES DATA

Presenting the foundational elements of a methodology for approaching sustainability

The findings of previous chapters are reviewed. The cognitive maps are presented for further analysis of the dialogue data and the new findings discussed as components of a methodology with sustainability at its core. The requirements for such a methodology are set.

6.0. SUMMARY

This chapter presents:

- the three cognitive maps used as frameworks to analyse the data;
- the process of the analysis of each cognitive map and the findings therefrom;
- the findings as components of the methodology for approaching sustainability from an innovation perspective;
- the requirements that served as starting points for designing the methodology as: systemic, holistic, and from an innovation perspective.
Figure 6.1: Summary of chapter content

- Physical part of a system
- Behavioural part of a system
- Eco & Sustainable Innovation
- Innovation
- Systemic
- Holistic
- Cognitive maps
- Requirements for methodology's development
- Dialogues
- Findings
The dialogues with experts and organisations (Chapter 4 and Chapter 5) have emphasised the importance of innovation as an approach to sustainability and underlined the importance of: a) the links between different value-systems that seek sustainability and, b) outputs that create sustainability rather than acting to diminish unsustainability (Ehrenfeld, 2004). These dialogues presented stories about how values are applied throughout the whole organisations (i.e. the inputs of a system which, from the Sterling (2003) perspective can be seen as the system’s ethos). The major conclusion from the dialogues with organisations is the differences from ‘business-as-usual’ they entail: the way these businesses and their people operate from strong value-systems responsible for different approaches to decisions resulting in different outputs. This conclusion links back to innovation, for which, as De Bono (1995) suggests, it is necessary to challenge what people know (ibid) and explore the different dimensions of performance at the organisational level (Drucker, 1988).

The existing SI literature does not challenge the dominant business value-system, as underlined in Chapter 2. Instead it uses environmental strategies to explore unique capabilities for new product success (Hart, 1995) and reinforces the goals of creating new market demand and adding value (Anderson, 2004: 3).

The analysis of the dialogues and the conclusions reached (see Chapters 4 and 5) provided an understanding of how the organisations express their values and how these values frame their outputs across the whole organisation as well as across the business cycle. This helped providing a picture about how to create interventions to achieve outputs that differ radically from ‘business-as-usual’, as they incorporate ecological limits.

First, it is important to remember the significance of a creative approach to reframing the business view, as emphasised in Chapter 5, which depends on the following elements:

- The personal values of each individual and their reflection in the organisation;
- people as responsible to leave a legacy intrinsic in any activity in the business cycle;
- the potential of any interaction in any transaction, relationship (business or personal) and surroundings (e.g. in local communities);
- the opportunity to add value to the different dimensions of sustainability, including financial achievement to the economic dimension;

- realising and embracing interdependencies across the value-chain and interacting agents (e.g. providers).

The above key points were also emphasised by the experts (see Chapter 4), who uncover two other major points: the importance of individuals’ motivations, beliefs and values, and the need to create awareness and accountability in forging a coherent vision which enables the co-creation of a path (and therefore a framework) for action. These findings, together with the literature review about innovation in Chapter 2, reveal the vital need for a radical approach to sustainability that embraces a new way of thinking. This idea is supported by Bohm (2000), who outlines the need to break out of the vicious circle of thought and action with new interventions in order for new outputs to emerge.

Previous chapters have indicated the need to find a way to engage in different thinking in order not only to act in a more holistic way (an ecological principle), but also to adopt a view of sustainability as an amplifier of the inner potential of institutions, businesses, individuals, people, communities and society as a whole, and of their relationship with nature. This is paramount in the development of a model: methodology for sustainability embracing an innovation perspective — this thesis deliverable.

The aim that arose from the deep understanding of what people and organisations that participated in this research thought and were doing in relation to sustainability was: seek to deliver a way of creating different kinds of outcomes by expressing and exploring the values of sustainability. The connection between the intentions, actions and outputs that these organisations felt touches the foundations of each, and they are diligent in seeking to understand impacts of their businesses in a broader sense which involves the whole value chain. Hence it is important to deliver a structured model that: a) uncovers the values related to the organisation’s inner capacity for sustainability and the context of focus (business, team or individuals, for example) on the one hand; and b) explores ways to create, rethink and speculate on a strategic path towards sustainability: 1) the actions to be implemented; 2) the processes required to fulfil this aim; 3) a system for monitoring process with key performance indicators.

This chapter uncovers the requirements for a structured methodology, and why a structured methodology can be a better model to create sustainability.
Chapter 6

6.2. APPROACHING THE DATA

The approach to data through multiple-method of conceptualisation and cognitive mapping (see Chapter 3), allow to contextual the analysis of the data and to keep it strongly aligned with the objectives and aim of this investigation.

The multiple-method of conceptualisation and cognitive mapping was applied using the dimensions of sustainability and other elements taken from the ecological and SI literature as cognitive maps. This clarified the key element of this research when approaching organisations from were dialogues were taken: how do they create sustainability?

The method helps to characterise these organisations in relation to their approach to sustainability from an eco and SI perspective.

The first findings from the dialogues with organisations helped to define two distinctive arenas: 1) the different mindsets these organisations follow and; 2) their different ways of doing business every day. Moreover, not only these two factors contributed to the business success: there was also a constant pursuit of innovation beyond the technical, as also highlighted by the experts (Chapter 4).

These observations led to questions that contributed greatly to the design of the cognitive maps:

- how are the different dimensions of sustainability seen in practice from an innovation perspective? The answer will show that the organisations do not approach each dimension of sustainability alone: they instigate thinking on synergies between the different dimensions

- what are the different types of internal and external relationships in organisations that help them to create sustainability? The path towards the answer points out, for example, the need to reinterpret these organisations perception of outputs beyond end products or services;

- what are these organisations' basic beliefs, concepts and attitudes? This question brought the need to understand how these organisations see their businesses as extensions of their peoples' and surrounding communities' values without diminishing their capacity to generate financial value.
These questions started to shape the cognitive maps, which facilitated deeper comprehension of how the organisations were creating sustainability from different perspectives.

The Figure below (6.2) presents a summary of a) how the data was approached; b) what informed the cognitive maps; and c) the primary findings emerging from the data analysis.

Figure 6.2: Pathway for data analysis

Emergent questions

- How are the dimensions of sustainability seen in practice?
- What are the different types of relationships?
- What are the basic beliefs, concepts and attitudes?

Cognitive maps

- Eco and sustainable innovation view of the dimensions of sustainability
- 8 sub-system levels of interdependency
- 12 leverage points of a systems

Findings

- AgreeCulture
- OvOlution
- Seeds of Change
The following lines review the three cognitive maps used to further analyse the data from the dialogues to construct a model for SI. These maps are detailed in the sub-sections below showing the lenses through which data was looked at, helping to maintain the focus in order to respond to questions that emerged.

### 6.3.1 ECO-INNOVATION AND SUSTAINABLE INNOVATION COGNITIVE MAP

The cognitive maps aid the understanding of important facts highlighted during the dialogues with the experts, consultants and organisations, such as the features of their innovation and how they characterise sustainability (its dimensions, e.g. society, environment and economics). Driven by the question how are the different dimensions of sustainability seen in practice? a return to the innovation literature and the dimensions of sustainability were important to understand key perspectives on the matter.

Chapter 2 discusses eco-innovation and sustainable innovation (SI) from a generic perspective, while the question above encapsulates the need to go deeper and look into different perspectives about the two in order to understand:

- the several foci inherent in each perspective; the key dimensions of intervention (e.g. economical); and the key elements that characterise these dimensions from each perspective;
- the characteristics that contribute to an approach to sustainability from an innovation perspective (see section 6.4);

This section presents the first cognitive map, which is grounded in eco-innovation and SI.

#### 6.3.1.1 Background to the cognitive map

The terms eco-innovation and sustainable innovation (SI) are frequently used interchangeably. Eco-innovation is generally associated with generating a low environmental impact (e.g. product dematerialisation), while SI is increasingly related to technology to increase efficiency in the use of natural resources within the strategic domains of product development. Brezet (1997) proposes a four-step model detailing levels of SI: 1) product improvement; 2) product redesign; 3) function
innovation; and 4) system innovation, being the first level easier to implement than the last one although with less impact on the creation of sustainability than the last level. Brezet (ibid) sees the two concepts differently: sees eco-innovation as related to product improvement; redesign; and SI being the last one a strategic view which allows achieving more added-value to the arena of sustainability.

Although these differences are becoming recognised, and different levels of interventions are being theorised, they do not: a) present a path to sustainability independent of levels of commitment (if you are committed with a sustainability path there are no levels, there is only commitment); b) portray characteristics that help in practical intervention, such as guiding elements to focus: (e.g. competitors; industrial processes). Therefore different views of eco-innovation and SI were looked at to uncover key elements and their strengths that would inform the cognitive map of eco-innovation and sustainable innovation. This enables:

− the extraction of areas/dimensions that innovation for sustainability embodies;
− the extraction of elements that characterise innovation for sustainability within such areas/dimensions.

It is important to explore different perspectives in more depth and collect views across disciplines about innovation for sustainability to broaden the potential for a more holistic view of a) the diversity of starting points or drivers (e.g. product, policy, materials) and b) understand how the dimensions of sustainability are seen and characterised because the intention is to look beyond a discipline focus (e.g. design, engineering, marketing), to incorporate different perspectives that will allow the creation of a cognitive map that looks at the data from different perspectives. As a result the findings are also grounded in a more holistic view than current view on the dimensions of sustainability.

Specific information was drawn out from product policies, market competitiveness, risk assessment, technological improvements, strategic positioning, enviropreneurial marketing (entrepreneurial and environmental marketing), and knowledge management for a wide perspective on eco-innovation and SI, aiming to represent the views of different disciplines. Each of these positions is summarised in Annex 6.1 with examples representing each perspective. Table 6.1 summarises the different views on each dimensions (e.g. society, technology, and economics) through the elements that characterise each (e.g. consumer needs or market share) underlined in the eco-innovation and SI perspectives. Such elements are fundamental in creating the cognitive map in order to analyse the data.
<table>
<thead>
<tr>
<th>Eco-innovation and sustainable innovation perspectives</th>
<th>Focus of perspectives</th>
<th>Key dimensions</th>
<th>Key elements characterising the key dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product policies</td>
<td>Create eco-efficient products and services for sustainable development</td>
<td>Economics (financial bottom line), social (people’s needs) and technology (operational efficiency)</td>
<td>1) Market share; 2) Consumer needs, 3) Incremental improvements to energy and materials use</td>
</tr>
<tr>
<td>Market competitiveness</td>
<td>Environment is an external problematic which needs internal interventions at the organisational level to respond to such demands</td>
<td>Economics (e.g. market, management); technology (e.g. processes); environment (the external problematic)</td>
<td>1) Market orientation 2) Competitor orientation 3) Consumer orientation 4) Inter-functional coordination 5) Environment</td>
</tr>
<tr>
<td>Risk assessment</td>
<td>Competitiveness to meet environmental legislation to nourish an emerging ‘green market’ for economic benefit</td>
<td>Economics (market driven); social economics (human resources and skills)</td>
<td>1) Skills; 2) Exploit the market; 3) Outputs (products and service) 4) Legislation (governance)</td>
</tr>
<tr>
<td>Technological improvements</td>
<td>Eco-innovation seen as dependent on a technological revolution in order to contribute to sustainable development requirements</td>
<td>Economics (market value); social (benefits and consumer focus); environmental (energy and materials use, impacts); technology (processes, solutions and operations)</td>
<td>1) Add market value; 2) Produce environmental and social benefits; 3) Use environmentally friendly: a) technologies b) materials, c) energy, d) processes and e) products</td>
</tr>
<tr>
<td>Strategic positioning</td>
<td>Associated with a marketing strategy analysis from feedback loops to interpret complex systems and foster opportunities</td>
<td>Economics (business position, competitor distinction); techno-social (capacity or skills to think differently)</td>
<td>Innovation is related to systems theory</td>
</tr>
<tr>
<td>Enviropreneurial marketing</td>
<td>Focus on environmental strategies for product success, in conjunction with a value-led environmental strategy</td>
<td>Environment (strategy, impacts, use); economics (value led, market driven); social (behavioural change)</td>
<td>1) Physical environment - creates economic value; 2) organisational values related to brand identity; 3) organisational strategy related to organisational behavioural</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>Innovation system is related to synergies between environmental and innovation policies</td>
<td>Technology (e.g production, design); social economics (e.g. knowledge economy); economics (e.g. business model)</td>
<td>1) Value creation in the market place: a) production and knowledge; b) technology, c) organisational business model and d) design and marketing</td>
</tr>
</tbody>
</table>

*Table 6.1: Key elements from the viewpoints of eco-innovation and SI*
6.3.1.2 The elements of the cognitive map

The different perspectives on eco-innovation and innovation for sustainability gave insights that, together with the views of sustainability described in Chapter 2, allowed an approach to the data through the cognitive mapping. The views about dimensions of sustainability presented in Chapter 2 are summarised here:

- Elkington (1997) presents a triple bottom line comprising society, economics and the environment;
- Ehrenfeld (2004) suggests as sustainability dimensions the ethics, the human dimension and nature (economics being part of society’s metabolism);
- Fuad-Luke (2005, dialogues) proposes societal (society and culture), economics and environmental and suggests that the human dimension should be situated in the middle of these three converging dimensions.

Table 6.2 presents the correspondence between the dimensions that characterise sustainability and the key elements previously taken from the different views of eco-innovation and SI (see Table 6.1)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Synthesised elements taken from the eco-innovation and SI literature (table 6.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Society and the human dimension</td>
<td>Needs, legislations (rules), skills, knowledge</td>
</tr>
<tr>
<td>Culture</td>
<td>Behaviour, rituals, beliefs</td>
</tr>
<tr>
<td>Economics</td>
<td>Market, competitors, consumers</td>
</tr>
<tr>
<td>Environment and nature</td>
<td>Energy and material use, impacts</td>
</tr>
<tr>
<td>Technology</td>
<td>Processes, products and services, operations, design</td>
</tr>
</tbody>
</table>

*Table 6.2: links between the dimension of sustainability and the key elements of eco-innovation and SI*

To conclude, Table 6.2 presents the cognitive map used to approach the data to find out how the organisations sample of this research view these dimensions and the elements that characterise them.

6.3.1.3 Analysing the data

Using the cognitive map helped with understanding how the organisations view the dimensions of sustainability, by populating each of dimension of sustainability with key quotes representing their views on the matter, having as focus the elements taking out of eco-innovation and SI literature (tables 6.1 and 6.2). Annex 6.2 shows a table that summarises the process of populating these dimensions characterised by the elements of eco-innovation and SI (see Table 6.1). This analysis brought their different understandings about the dimensions of sustainability and their
characterisation to the surface, allowing a sense of how these are embedded in each decision.

Figure 6.3 presents the process of populating the cognitive map in a visual manner, and although it is too small to be readable, it shows how the data was treated. It would be simpler to show each of the dimensions separately (as in Annex 6.2), but it was the visualisation of the whole and the inter-relations and connections among the dimensions of sustainability that enabled the understanding that these dimensions are not seen as apart but as different sides of the same: that is, the business itself, rooted in sustainability values, has the same approach to all the dimensions, although it may have a stronger relation with one of the dimensions because it is its primary business driver (e.g. as in River Nene, whose business driver is the environment dimension). Figure 6.4 shows how the cognitive map was populated; showing a detail of Figure 6.3 of the society dimension populated with data from River Nene (2005, dialogues), which was revealed to be an important component of the business’ current success (although with a environmental driver) due to the farmers’ relationship with the distribution franchise.
Figure 6.3: Example of cognitive mapping

RiverNene Franchise
6.3.1.4 Findings of eco-innovation and sustainable innovation cognitive map

According to the data analysis, the way the organisations participated in this research see the dimensions of sustainability as framework that shows how sustainability can be created rather than unsustainability diminished. Below are the findings from the analysis:

**People:** The dialogues reveal that the key is not to see society as external to the individual, or to the cultural context in which individuals operate, but understand the individuals universe (direct implication with individuals’ empowerment, responsibility and awareness). The key factor when approaching sustainability is focus on **people** - not only underpinning the different levels of society (individual, communities, populations, etc) but also:

- infrastructure (e.g. education, communications, employment);
- culture (e.g. moral system, symbols and symbolism, behaviour, and level (individual, family, community);
- government (e.g. administration, policies, legislation, rules, rights).
**Trades**: The sample of this research shows, from a sustainability perspective, economics goes beyond financial achievement to looking at the trading-system in place, from an ethical and ecological perspective. This is another key component to bear in mind when approaching sustainability: trades are a symbiotic relationship between natural, human and economic capital, beyond finance. It is important to bear in mind the following at any level:

- metabolisms (e.g. ecosystem, regeneration capacity);
- source (e.g. geographic location of providers, resources or material);
- procedures (e.g. cultivation, process, extract, usage).

**Nature**: The different dialogues revealed a way of seeing the environment holistically rather than treating it as external to the system. Organisations and people that have values, beliefs and motivation related to sustainability at their core, look at the environment beyond materials, energy and impacts; they see it as part of a system of interactions. The key component is nature – seen not as an externality, but as the relationships between different levels of the ecosystem, of which people are an integrative part, and where is key to have a systemic perspective of the dynamics of:

- cyclicity;
- seasonality;
- rhythms.

**Operations**: The majority of approaches to sustainability are made via an evaluation of industrial processes and their efficiency focusing, for example, on products and materials, as well as on the energy efficiency of the product and its disposability. Conversations with the organisations explored the technological dimension beyond machines and industrial processes; they see it as encompassing the arena of all actions. **Operations** involves understanding how (the business, the team, the manufacturing...) relate to people, nature and trades in order to create, produce and use any outcome/output, involving the systems, structures and processes in place in any level and to interveen:

- inputs: natural (energy & resources); human (knowledge & labour); financial (investment & return)
- transformation: systems, structures, process, tools
- outputs: initial phase, transformation phase, distribution & storing phase, commercialisation, end of life.
These findings arose from a practical understanding of the different dimensions of sustainability from the perspective of innovation (as the cognitive map allows understanding both the dimensions of sustainability and the innovation elements from the eco-innovation and SI literature). The findings showed how these organisations mould their everyday actions. Thereby, the findings listed above, represent a framework from which to delineate actions that will generate outputs for sustainable living at different levels: in their relationships with suppliers; in the services they provide; in communities; across product life-cycles; and in the products produced.

6.3.1.5 Conclusions

There was a need for a deeper analysis of the dialogue data to understand it from an innovation and sustainability perspective, as portrayed above. However this approach left out other aspects that emerged from the dialogues, which include not only the outputs and processes (the actions and activities towards sustainability), but also people’s relationships and creativity, for example, which is part of their behaviour. Organisations, like living systems, have different levels, are messy and can behave unpredictably; furthermore they are reflections of ideas, people and relationships, which make them complex social systems with several elements that must be taken into account (Ricard et al., 2004; Swanson, 1995). Organisations are part of the social fabric and can be seen as performing as a living system (Ricard et al, 2004; Swanson, 1995:57). Organisations are also viewed as a hierarchy of systems (Weckowicz, 1988:11). This view was influential when approaching the data beyond the dimensions of sustainability and the elements that populate them. Living systems theory was essential to understanding and approaching the data holistically.

Living systems, as outlined in Chapter 2, embrace both abstract (e.g. behaviour) and concrete systems (physical part of the system e.g. buildings), these both aspects of a system can be useful in systems analysis (Bailey, 1995:85-86), allowing a system perspective and a holistic understanding of:

1) the way organisations operate in relation to what informs their outputs and what people in organisations perceive to be those outputs—allowing to understand the physical aspect of the organisations that were involved in this research;

2) the cultural aspect, to capture types of behaviour towards sustainability – to understand the abstract aspect of these organisations.

These two aspects were an important contribution to the development of the other two cognitive maps: 1) the eight hierarchical levels of living systems (here forward
the eight sub-systems) cognitive map; 2) the twelve leverage points cognitive map. The first should explain the outputs and all that is involved in the system; while the other should explain the values, beliefs and motivations (cultural side) of the system.

Taking these on board enriched the research findings. Below, the aspects at the core of living systems that greatly contributed to the design of the other two cognitive maps are presented as lenses to look at other aspect of the data.

6.3.2. THE EIGHT SUB-SYSTEMS COGNITIVE MAP

The understanding of how the organisations that participated in this research operate in relation to what informs their outputs; what these organisations understand outputs to be; and how they create and produce their outputs, became fundamental.

Below is the theoretical background that enabled the design of this cognitive map to show the operational side of these organisations.

6.3.2.1 Background to the cognitive map

The eight sub-system cognitive map characterises the physical (operational) side of a system, and helped to uncovered the correspondence between these sub-systems and the data from the dialogues, showing what people do to create sustainability when aiming for a holistic intervention.

6.3.2.2 The elements of the cognitive map

In Living System Theory the physical part of a system acknowledges the hierarchy involved in it (Miller and Miller, 1995). The eight hierarchical levels of living systems (i.e. eight sub-systems) represent this hierarchy and were used to look into the data at the cell, organ, organism, group, organisation, community, society and supranational levels (Miller and Miller, 1995:12-15). This enabled understanding the correlation of each level with a holistic approach to sustainability by detecting the importance of “endo” and “exo” relations – i.e. inter- and intra-relationships within a system – a view in design perspective explored by Amir (2004:68-69). These elements were used as lenses through which to look at the dialogues. The following lines present an example of the process of populating these eight sub-systems with key extracts from the dialogues to illustrate the organisations’ visions.

6.3.2.3 Analysing data

A table with the eight sub-systems (hierarchical levels of living systems) cognitive map is presented in Annex 6.3 populated with extracts representative of the dialogues presenting the operational part through the organisations’ inter- and intra-
relationships. The finding is a mindset from which the operational side of an organisation’s system can be approached from a holistic perspective. The subsection below illustrates this finding and highlights its uniqueness in relation to the creation of sustainability from an innovation perspective.

### 6.3.2.4 Findings

The finding demonstrates an hierarchical relationship regarding system operations (inter- and intra-relationships between the actors forming a system of relationships in for example an organisations – e.g. business – life-cycle), and illustrates each with examples of levels of intervention: the higher the level of intervention, the higher the value added to sustainability and, in consequence, the greater the potential for innovation.

At the level of the **cell**, the intervention is at the level of materials, energy, aesthetics, software, meetings, business cards, words in a sentence, attributes and has a minor impact on the whole system and therefore, offers little opportunity to create sustainability.

The level of the **organ** is the result of several inter- and extra-relationships with the “cells” (e.g. materials) that produce a product and/or service which includes abstract products (e.g. insurance) or concrete products (e.g. chair). This level of intervention is greater than the previous one, but fails to have a significant impact at the whole system level. Nevertheless, Green People (2007, dialogues) is an example of an organisation focusing on this level of intervention on the operational side and it is creating sustainability. Through this level of intervention it pushes itself to perform better on all other levels.

The **organism** level of intervention involves relationships within the organisation (e.g. internal relationships) and the outcomes expected from the relationships deals with combining both concrete products (material) with abstract products (non material) – such as in a product and services outcome – TYF (2006, dialogues) offers a product and service outcome by combining the several business units. This can be seen as an opportunity to offer sustainable live style choices.

The **group** level refers to an assemblage of related organisms (e.g. two enterprises working together to deliver an outcome) which allows the generation of product services systems - e.g. architecture or a laundry delivery service.

The level of the **organisation** is one of the higher levels for creating sustainability as it refers to the whole system supporting the outputs: for example, the actors in a business model in enterprises and companies (e.g. providers), but also the indirect
actors not taken into account, such as the urban and/or rural surroundings and landscape, the existing ecological systems.

The **community** level refers to external partnerships (e.g. multinationals and businesses associations) and internal partnerships (e.g. cooperatives and unions) as well as internal and external infrastructures (e.g. the buildings and their urban locations). The Co-Op is a good example of this.

At the level of **society** the intervention has a higher level of added value which involves elements that contribute to the dynamics of the system: external influences (e.g. regions, states, countries and cities) and internal influences (e.g. business culture, rules of compensation etc). It is at this level that the operational hierarchies are established shaping the ability of the system to create greater levels of sustainability.

Finally, the **supranational** level represents the organisation of societies: e.g. governments, laws and legislation, as also the internal and external value systems implied in which the strategies are designed and which affect world economics, wider society and ultimately, nature.

**6.3.2.5 Conclusions**

The finding delivers a mindset by which to start conceptualising a range of opportunities through a systems thinking approach. Further, not only creates, makes explicit and explicates the levels of intervention and their subsequent impacts, it also portrays the relationships existing in the level (internal) and across levels (external): for example: products related to their own attributes as well as to organisational attributes (e.g. the branding of an organisation is reflected in its product branding). Further, relating all these levels allows the creation of systems that behave as ecosystems rather than as independent sub-systems; in other words, this allows understanding operations as nested, thus as part of one another (Voronin, 2008).

**6.3.3. THE TWELVE LEVERAGE POINTS COGNITIVE MAP**

One pillar of this research is the importance of values in creating sustainability (see Chapter 2 and Chapter 4); this relates to the abstract side of a systems. The cognitive map of the twelve leverage points of a system (Meadows, 1997/99) is used to capture the essential values and beliefs that characterise the behaviour, culture and inner values of the organisations that participated in this research, helping to discover their basic beliefs, concepts and attitudes.
6.3.3.1 Background of the cognitive map

The analysis of the dialogue data sought to understand the business paradigm of these organisations. Paradigms of social contexts are systems which involve human factors, cannot be approached as physical identities and “always involve meanings, values and behaviours” (Devereux, 1967 cited in Alhadeff-Jones, 2009:67).

The cognitive map’s twelve leverage points as places to intervene in a system (Meadows, 1997/99) helped to characterise such paradigm.

6.3.3.2 The cognitive map elements

Meadows (1997/99) propose twelve leverage points as places to intervene in a system, presented hierarchically in accordance with their impact. These leverage points can be seen as belonging to three categories: numbers (e.g. stock and flows of materials); interactions and dependencies (e.g. the power to add change); and the goals and mindset of a system. Meadows (1997/99) points out the first, second and third are the most efficient places to intervene in a system.

The twelve leverage points were used as the cognitive map to look into the data and understand how different the system dynamics of these organisations are to ‘business-as-usual’. Figure 6.5 presents the Meadows (1997/99:3) leverage points.
Figure 6.5: Places to intervene in a system (Meadows, 1997/99:3)

Places to Intervene in a System
(in increasing order of effectiveness)

12. Constants, parameters, numbers (such as subsidies, taxes, standards)
11. The sizes of buffers and other stabilizing stocks, relative to their flows.
10. The structure of material stocks and flows (such as transport networks, population age structures)
9. The lengths of delays, relative to the rate of system change
8. The strength of negative feedback loops, relative to the impacts they are trying to correct against
7. The gain around driving positive feedback loops
6. The structure of information flows (who does and does not have access to what kinds of information)
5. The rules of the system (such as incentives, punishments, constraints)
4. The power to add, change, evolve, or self-organize system structure
3. The goals of the system
2. The mindset or paradigm out of which the system—its goals, structure, rules, delays, parameters—arises
1. The power to transcend paradigms
6.3.3.3 Analysing the data

Annex 6.4 presents the use of the cognitive map, illustrating each leverage point with representative stories from the dialogues with organisations which offer different ways of understanding these businesses’ behaviour.

Below are two examples of this analysis:

- **Leverage point 5 – system rules** (e.g. incentives, punishments, constraints)

  “Angelo: his two great strengths were 1) he could just take cocoa beans raw before they’d been roasted, hold them to his nose, crack them open, take another batch and then say: ‘Ok, roast these for 25 minutes at this temperature, roast these for 20 minutes at a lower temperature and then blend 40% of this with 60% of that’. So, all the time, year after year, we had the same taste in our finished chocolate.” (Green & Blacks, 2006)

- **Leverage point 8 – the strength of negative feedback loops** (relative to the impacts they are trying to correct)

  ...for instance, if we get an oil company coming in and saying we need X million pounds to finance some new exploration in Y, our ethical policy will kick in and say: ‘No! We can’t do that because our customers have told us that they have concerns about climate change and our ethical policy has a clear position with regard to fossil fuel extraction. (Co-Op, 2007)

6.3.3.4 Findings

These organisations’ overall systems of values were understood and the process of mapping the data enabled deep comprehension of their different ways of approaching, viewing and applying sustainability.

While the twelve leverage points were used to analyse the data, the final finding was not twelve key characteristics of an overall sustainability paradigm. The view through the twelve leverage points uncovered new insights that allow key elements that characterise a culture with sustainability practice at the core. These new findings portraits a paradigm though conceptual values, which are distinct from those of ‘businesses-as-usual’ and go beyond economic drivers. Conceptual values do not characterise the absolute culture of these businesses with which dialogues were held, as they are not exclusive. They illustrate a mindset, which is contextual, as value-systems are, because they represent “symbols which [motivate and guide] the
behavior of individuals and societies” (Weckowicz, 1988:15 referring to the body of knowledge defended by von Bertalanffy).

6.3.3.5 Conclusions

The paradigm of a sustainability-oriented business culture, non-specifically, was uncovered by characterise the conceptual values (mindset) embedded in business cultures with sustainability grounded in their practice.

Given that behaviour is space and time-dependent relative to reality and modes of thinking and seeing (Weckowicz, 1988:19), the objective of this finding is not to produce copies of these organisations samples; instead it allows understanding the current mindset by exposing a system that wants to start a path towards sustainability (e.g. people in a department) to these principles, aiming to uncover inner values already existing as quest for physical, emotional, mental and spiritual wellbeing related with nature.

This was done by relating the previous findings under thematic coding, as explained in Chapter 3. The result is shown in Annex 6.4 in a table that characterises this paradigm with nine principles and presents the final finding of this analysis. The table indicates key conceptual features characterising principles that illustrate a sustainability paradigm which potentially helps to construct a sustainability pathway.

The finding portrays a cultural paradigm summarised below:

1) **Time as an inherent quality** - first principle (related to matter):

2) **Accountability of resource use** - second principle (related to relationships with matter):

3) **Legacy, giving something back** - third principle (matter and peoples’ relation to it):

4) **Reframing Growth** - fourth principle (related to the relationships between matter, people and system objective):

5) **Collaborative Cultures** - fifth principle (related to people and the system):

6) **Leader as facilitator** - sixth principle (related to people relating to people):

7) **Co-dependence and Self-Sufficiency** - seventh principle (related to relationships):

8) **Creating healthy metabolisms** - eighth principle (related to systems’ approach to its outputs):
9) Nature as a partner (key stakeholder) - ninth principle (related to the foundations of the systems aim):

The nine principles characterise the mindset of the behavioural side of these organisations.

6.3.4 SECTION CONCLUSION

The analysis through the cognitive maps allowed the forging of the foundational elements of the model: methodology for innovative creation of sustainability. Each result at this stage, was given a name to allow the quick recognition of each function in the model. Below is a summary of the findings from the data analysis:

- The eco-innovation and sustainable innovation cognitive map allow finding a framework that characterises an intensive dialogue seen as fundamental to tradeoffs between these dimensions, avoiding major gains in one dimension to the detriment of others. This finding was named AgreeCulture. AgreeCulture is not a culture of agreement, but agree on having a dialogues’ culture.

- The eight sub-systems cognitive map allowed to defined each subsystem level of intervention. The levels are nested (contained in or containing the next level) and relate to each other through a hierarchical structure, as in the eight subsystems of Living Systems Theory. The objective of this outcome is to identify the current level of intervention and design an evolutionary journey to a more powerful level. This finding was given the name OvOlation, as it represents not only the different layers (nests) of an egg (Latin ovo: “from the beginning”, “the origin”, “the egg”), but also the origin, which in this case is the existing interventional potential which can be further explore to evolve for greater levels of sustainability, hence (e)volution.

- The twelve leverage point cognitive map revealed the paradigm embraced by the organisations with which dialogues were taken. The finding revealed nine key principles that illustrate the behavioural stand (cultural side) that these organisations take in viewing sustainability. This finding was named Seeds of Change because introduces a different mindset for different strategies to emerge from, and with then, different actions, as suggested by Senge (1997).

The findings presented above represent the first attempt to design and develop a structured model to creating sustainability. However, its practical applicability was questioned at the first validation session by the academics’ and practitioners’ panel
(see Chapter 8), who saw these findings as: a) distinctive but unrelated and b) lacking a clear focus of applicability. This led to the need to understand the requirements for a structural model towards the creation of sustainability. The next section will present the requirements that allow designing this structured model (i.e. methodology for sustainability) taken into account the findings already uncovered.

### 6.4. METHODOLOGY FOR SUSTAINABILITY REQUIREMENTS

The next sections and subsections present the requirements for a methodological model towards sustainability embedding an innovation perspective, creating the grounds for further development of this methodology for the innovative creation of sustainability.

#### 6.4.1. GENERAL REQUIREMENTS

A key issue captured from the innovation for sustainability literature concerns the central role of systems thinking (Senge, 2004) in understanding a new frame of reference for innovative strategy and action, and, the interconnectivity and development of new relationships, both informed (although not exclusively) by the findings from the organisation dialogues. The previous helps to explain how the research findings were approached and their relevance in supporting the development of a systemic methodology with sustainability at its core, coming from an innovation perspective.

The model explored here aspires to understand different opportunities for growth that acknowledge ecological limits and the value of human capital (beliefs, ideas, knowledge and skills). It explores strategic paths by which sustainability can be created and endorses a radical approach in scoping new thinking about sustainability with innovation at its core.

The objective of the model is to create a holistic and systemic methodology for application at different levels (e.g. by organisations, governments, teams) and to different foci (e.g. products, strategies, cultures). The organisations that participated in this research supported the above with their dialogues.

- Different levels are related, for example, to relationships built with all actors within the whole business. River Nene exemplifies this, illustrating a change in focus from product life-cycle to business-cycle in respect to the bounds between all the actors in the values chain.
The new focus is illustrated by the importance of having the same concerns across the whole of the business and its units in relation to sustainability, as portrayed by TYF’s view across the whole business of the impact of decisions on creating sustainability.

The above were important in developing the model further, to become a systemic methodology that needed to involve two characteristics: applicability at different levels and embrace different focus.

Below are the specific requirements for the methodology and their implications in the previous findings.

### 6.4.2. SYSTEMIC AND HOLISTIC REQUIREMENTS

It is important to define the type of model this research aims to develop and how a model can be a methodology that incorporates systems thinking at the core. This need is aligned with the requirements of a systems methodology. A methodology is a system of elements that are related. The purpose of this methodology is to guide on creating sustainability, which, according to data analyse, depends on cultural and operational transformation and intervention.

A systems methodology, as defined by the International Society for the Systems Sciences in the Primer Project (Francois, 1998a; Francois, 1998b; Francois, 1998c) is a system of inquiry in which approaches, methods and tools appropriate to the purpose and nature of the inquiry into a specific problem or situation are selected (ibid).

The term methodology refers here to the identification and description of the search for a mind-frame, a framework and key procedures (i.e. a process) to create sustainability. These three components are essential in developing a model as a systems methodology, as in Ludwig Von Bertalanffy’s general systems theory (as explored by Weckowicz, 1988). Von Bertalanffy refers to these three components as the “domains of systemic approach” to applying systems theory and systemic thinking in the analysis, design and development of complex systems (Francois, 1998a). This resonates with fractal theory, which states that a structure can be replicated at any level or in any context due to its different levels or dimensions (Zhou et al., 1994).

The design of these systems methodology (aka: methodology) to be used at different levels and to meet different needs for intervention is related to “context specific”. Context-specific or cultural relativism depends on the point of view, reality, and
relative to the thinking (Weckowicz, 1988: 18-19). By being context specific, the methodology moves outside a discipline-oriented view and entails a multi-disciplinary view - a requirement towards a holistic perspective.

Therefore the methodology does not need to present specific tools or a step-by-step process: instead it should have a mindset, a framework and a guidance to intervene (process).

6.4.3 INNOVATION APPROACH REQUIREMENTS

It is important to distinguish between linear/incremental and radical/disruptive innovation, for, as underlined in Chapter 2, radical innovation can achieve greater levels of sustainability than linear innovation. Table 6.3 below sets out the differences between: a) linear innovation (or incremental) and, b) radical innovation (or disruptive).

<table>
<thead>
<tr>
<th>Linear or incremental innovation</th>
<th>Incremental innovation corresponds to a context undergoing a slow change which has low external and internal turbulence. It is normally applied by industries with low external threats, normally to keep up with flat and almost non-existent competition (Baler and Sinkula, 2005:466). It is followed by an internal culture that is resistant to change (Fosfuri and Rønde, 2007)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radical or disruptive innovation</td>
<td>Radical innovation is more associated with a quick response to turbulence or external shock that affects performance and forces fast action, (Baker and Sinkula, 2005:466)</td>
</tr>
</tbody>
</table>

Table 6.3: Summary of linear and radical innovation

Building on the conclusions drawn from the aims and objectives of this investigation (Chapter 1) and the results of the dialogues with experts (Chapter 4) and with organisations (Chapter 5), the focus of this study is the stimulation of radical or disruptive innovation leading to sustainability thinking and action. These are the requirements of the methodology to incorporate at heart elements that allow innovating.

The literature on eco-innovation and SI mentioned earlier in this chapter, together with Chapter 2’s findings and the requirements of a systemic methodology, allowed the identification of some prerequisites leading to the creation of a methodology that leads to innovation:
response to external and internal challenges, which suggests: a) organisational behavioural change and b) focusing on solutions for different outputs to emerge;

− using strategic thinking to explore opportunities, which helps to clarify the urgency of incorporating innovation in creating sustainability in decision-making processes;

− systems thinking for a holistic approach, simultaneously taking into account the several dimensions of sustainability discussed previously;

− outputs are both tangible (products; services; systems; etc) and intangible (culture; visions, strategies).

### 6.4.4. SECTION CONCLUSION

These requirements once more underline how sustainability is strongly related to systems thinking, and reinforce the idea of a paradigm shift, as outlined in Chapter 2. They embrace a need for:

1) a different praxis that rethinks the values-systems applied and therefore challenges the ‘business-as-usual’ culture (see Chapter 2);

2) strategic thinking about decision making that directly affects the directions chosen, which will re-frame action towards sustainability;

3) understanding how sustainability is related to different levels of action.

To conclude, the objectives that the systemic methodology model for sustainability should fulfil are:

− deliver transformation to respond to the need for a paradigm shift by implementing systems thinking and proposing new strategies that embrace different levels of action towards sustainability: the cultural approach;

− reframing opportunities by developing the capacity to approach problems holistically by understanding the different dimensions of sustainability and the elements that characterise them, and acknowledging the different levels of intervention: the operational approach.

These requirements for the methodology aim not only to incorporate a systemic view, a holistic approach and an innovative perspective at the core of the organisation but also enable the creation of a language: in this research, a language for applying sustainability. Language is not seen in the narrow sense of the spoken word but in a broader sense such as that used in the definition by the Faculty of Language, which
“...includes a sensory-motor system, a conceptual-intentional system, and the computational mechanisms for recursion, providing the capacity to generate an infinite range of expressions from a finite set of elements” (Hauser et al., 2002:1569).

This position is defended by biolinguistic theories and the main instigator of this view of language is Noam Chomsky (see, for example, Hauser et al., 2002) who insists that:

The human faculty of language appears to be organized like the genetic code – hierarchical, generative, recursive and virtually limitless with respect to its scope of expression (Hauser et al., 2002).

This can be understood in light of what creating a methodology entails: a mindset (philosophical approach) which can be compared to a sensory-motor system (e.g. ability to talk); the framework which can be compared to the conceptual-intentional system (e.g. intention of the message); and the guidance process which relates to the computational mechanism (e.g. grammatical rules).

The methodology for the innovative creation of sustainability needs a hierarchy to sustain it and structure its applicability, enabling it to generate infinite results from finite elements. This explains why the intention of the final outcome of this research – SuCo (Sustainable Cultures and Operations, presented in Chapter 7) – focuses not on solving specific problems but instead on creating a way to allow infinite number of problems to be approached from a sustainability perspective, as presented through the methodology.
6.5 FOUNDATIONAL ELEMENTS OF THE METHODOLOGY

This section relates the findings from the analysis using the cognitive maps with the requirements to build a model as a *systems methodology*, and defines which path each finding belongs to (cultural or operational); and which of the elements of a *systemic methodology* – mindset; framework; process – it represents.

Both *Ovolution* and *Seeds of Change* suggest a philosophical approach, while *Agreeculture* delivers a framework:

- *Ovolution* inspires new thinking that embeds new levels of action; moreover, it instigates the need to look at inter- and intra-relations in the system in which it is being applied (e.g. an organisation) for new opportunities to act;

- *Seeds of Change*, by introducing the nine principles that characterise different ways of thinking, explores the idea of bringing values and beliefs to the surface to create sustainability.

- *Agreeculture*, on the other hand, delivers a framework by outlining key parameters that characterise sustainability (the four dimensions and their parameters).

Thus both *Ovolution* and *Agreeculture* belong to the operational path of the *methodology* for the innovative creation of sustainability, but each relates to a different dimension of this path: the first characterises the mindset (methodological approach) and the second, a framework (domains of the field). *Seeds of Change* belongs to a different path pursued by the *methodology* – the cultural path – and illustrates a mindset.

6.5.1 SECTION CONCLUSION

This new look at *Agreeculture, Ovolution* and *Seeds of Change* indicates the need for further development to complete each pathway of the *methodology* with elements as yet uncovered, and thereby responds to the different levels that should be represented in a *systems methodology*: the mindset element, the framework element and the process element.

This is discussed further in Chapter 7, which presents a holistic and *systemic methodology* for approaching sustainability from the perspective of innovation.
The grand objective of the *methodology for innovative creation of sustainability* is to explore the potential of social interactions and behaviour (cultural path) to facilitate the creation of sustainability through outputs (operational path); in summary, it seeks to develop a thinkin-action-thinking about sustainable cultures and operations. This inspired the name of the *methodology*: SuCo (Sustainable Cultures and Operations). Chapter 7 presents SuCo and its elements.
If we can really understand the problem, the answer will come out of it, because the answer is not separate from the problem (Krishnamurti, 1950).
7. DEVELOPMENT OF A METHODOLOGY FOR SUSTAINABILITY

The SuCo methodology is fully described, highlighting its components and how they relate with each other; the contexts of its use; and key expected results.

Chapter 7 presents the development of a holistic methodology, SuCo, the final outcome of this research. SuCo’s two pathways are described having as starting point the findings: Seeds of Change, OvOlution and AgreeCulture.

7.0. SUMMARY

This chapter presents both the cultural and the operational pathways of the SuCo methodology as complementary yet independent approaches.

1. The cultural path is characterised by the methodological elements that compose it as an independent methodological approach:

   a) the mindset involves nine principles that introduce a paradigm grounded in sustainability;
   
   b) the framework illustrates the elements that need to be understood and transformed;
   
   c) the process shows the key objectives to be understood in order to make an intervention towards cultural change.

2. The operational path is also characterised by the methodological elements that compose it as an independent methodological approach:

   a) the mindset presents an operational paradigm through which different scales of relationships between the different elements of a system can be explored;
   
   b) the framework illustrates the different dimensions of sustainability and the key parameters that characterise them;
   
   c) the process involves six major steps for interventions in the value chain to create scenarios of opportunity.
Figure 7.1 - Summary of chapter content – Presenting the SuCo methodology

SuCo

Cultural transformation towards a different output (apply attitude)

Operational path

Long term: continuous intervention

Operational: towards a different input (apply ways of doing)

Changing Inputs

Changing Outputs
7.1. INTRODUCTION

Ecological texts deeply question man’s relationship with nature, which is a fundamental part of the challenge to create sustainability: to see the whole system and the interdependency of its parts and how it connects and embeds the natural and social environment (Pepper, 1996; Capra, 1997). This sets the foundations for a holistic methodology grounded in systems thinking: understanding the behaviour of the system as well as the physical elements/levels of the system.

This chapter reports how the foundations of SuCo (explained in Chapter 6) have been developed into a holistic methodology which can help individuals, groups, organisations, governments and countries to actively apply their whole being to creating a sustainability-oriented future. Annex 7.1 presents three tables which summarise SuCo’s foundations—Seeds of Change, AgreeCulture and OvOlution—which were crucial to the further development of the methodology and are discussed in this chapter.

While Seeds of Change, AgreeCulture and OvOlution are grounded in the different ways of looking at how the organisations in this research sample have been applying sustainability, none of these elements, together or individually, delivers a consistent, structured, and ready-to-apply holistic methodology grounded in systems thinking that responds to the aim of this research: helping to transform unsustainable business practices into sustainable business practices within an ecological framework represented by F10 improvement.

Furthermore, during the Evaluation and Validation process the first workshop in which these elements were presented (reported in detail in Chapter 8) had as feedback the lack of interrelation between them.

As going to be shown below, literature underlines the importance of a hierarchical tree structure. Tree analysis serves to create hierarchical relationships between different ideas, characteristics, etc (Salembier et al., 2000). Decision trees belong to the state-of-the-art techniques, used to make decisions in system’s Design (Papageorgiou et al., 2006); genetics uses tree visualisation in data analysis for decision making as, for example, pattern recognition, (Robardet et al., 2004); computer science is known for developing software using a tree hierarchy and decision tree induction is being explored to increase the number of potential results (Peng et al., 2001); and biology
classifies its groups and sub-groups hierarchically (Miller and Miller, 1995) according to organisms’ characteristics.

Taking into account the above, it was clear that the *Seeds of Change*, *AgreeCulture*, and *OvOlution* needed a structure and a hierarchy to relate each other. Therefore this second look at the data presents a process of analysis with the objective of:

- uncovering the missing elements to provide complete and applicable SuCo cultural and operational paths;
- creating hierarchical structures in both the cultural and operational parts of SuCo.

In terms of structure, a holistic approach requires that SuCo’s pathways and elements should work together on any scale for a large variety of needs or problems. This implies that each path (cultural and operational) should be able to stand alone to work independently – a feature which allows understanding the whole and intervening only in one part if that is what is necessary. It enables the use (replication) of SuCo at any scale as it reflects fractal-based systems thinking as opposed to linear-based systems thinking, fractal being a characteristic of complex systems (as people, society and organisations are). A methodology with fractal-based systems thinking at its core reflects not only the already mentioned systems thinking requirements but also fractal theory, which is characterised by a self-similar structure on different scales (Zhou et al., 1994), as underlined in Chapter 6.

In addition to this, SuCo’s components should share the same language. The term *language* is used here in the broad sense already mentioned in Chapter 6 to refer to the need to establish communication between the elements (Hauser et al., 2002:1569), in this case *Seeds of Change*, *AgreeCulture* and *OvOlution* - as in an orchestra.

As already underlined, interconnections and inter-relationships among the three elements – *Seeds of Change*, *AgreeCulture* and *OvOlution* – need to respond to the aim of providing a holistic methodology to create sustainability. This required the development of further components to complete both pathways and fulfil the key requirements, as Chapter 6 refers to as the key requirements for a *systems methodology*:

- a mindset: illustrating a paradigm for intervention, cited by many authors (e.g. Capra, 1996; Sterling, 2003) as important for holistic intervention;
- a framework: to support the design of sustainable innovation strategies, as Flores et al. (2008) point out;
– a process: for developing opportunities to embed and move towards sustainability, present in many approaches to product development and eco-innovation.

Although Chapter 8 presents the three stages on which SuCo methodology bases its development, this chapter reports the end result of the development journey.

The next lines present the theoretical background that frames the development of the missing elements to complete SuCo as a holistic methodology under the above requirements.

### 7.2. THEORETICAL BACKGROUND OF SUCO METHODOLOGY

As seen in Chapter 2, most approaches to sustainability and to design for sustainability aim to bridge the creative approach through idea or concept generation and assessment frameworks populated with performance indicators (see table in Annex 7.2, which presents frameworks for supporting the design of sustainable innovation strategies). The SuCo methodology intervenes before the idea generation stage. It aspires to provoke change in the perception of identity and inner values and the perception of the capability and capacity to add value from both a cultural and an operational approach, as underlined in Chapter 6, because, as De Bono puts it:

> Logical and mathematical techniques are never applied to a situation. They can only be applied when that situation has been divided into concepts, features, factors, effects, and other perceptual parcels. These perceptual parcels are not themselves created by the application of any special techniques, but by the natural patterning processes of mind with all their limitations and arbitrariness.
> (De Bono, 1971:5)

A structural congruence should occur between the cultural and operational pathways which does not impose changes but triggers effects, as underlined by Maturana et al. (1998) as a result of the interactions among them (ibid, 1998:96). This sets the tone for the interdependence as well as the independence which both paths of SuCo methodology entail.

Finally, SuCo’s methodology involves a radical innovation intervention with the ability to act at the incremental level. Although some authors refer to radical innovation as controversial, as it requires a high level of trust from stakeholders, they are referring mainly to technical innovation (Flores et al., 2008:279). SuCo’s radicalism is in its aim
challenging the paradigm implemented, evoking a transition to one that involves key sustainability values. The radicalism pursued by the SuCo methodology is not in the way it is implemented but in how it can redirect the way that people see their capacity and capability to create sustainability based on their unique identity. Therefore it helps to think differently about sustainability and the ability to positively intervene towards creating it, which challenges current answers focusing on diminishing unsustainability (Ehrenfeld, 2004).

7.2.1 SECTION CONCLUSION

In summary, the lines above present the key characteristics of SuCo as a holistic methodology which:

a) embrace the different components of a methodology (mindset, framework, and process);

b) integrate systems thinking into an ecological worldview;

c) present different ways of looking in order to influence ways of thinking and ways of operating (Sterling, 2003).

This last characteristic potentially allows the integration of a variety of perspectives and generates an awareness of relationships and interdependencies, as suggested by Werhane (2007):

A multiple perspectives approach forces us to think more broadly, and to look at particular systems or problems from different points of view. (Werhane, 2007:6)

7.3. CULTURAL PATH: CHARACTERISTICS AND COMPONENTES

A change in perceptions is needed to engage in systems thinking and holistic approach that incorporates new values capable of apprehending the whole as dependent on and related to all of its parts (Capra, 1997:4-5; Ehrenfeld, 2004).

The ethos of systems in place (e.g. in organisations) needs to be challenged by understanding the place of values, beliefs, motivations and ideas of the individuals who form the organisations’ social fabric (Brown et al., 2005:83). To implement and follow values that understand nature as capital, requires interventions in different elements that constitute such human-created systems (e.g. teams, organisations, communities, governments) because they are closely dependent on their social mechanisms, which
consist of individuals and their relationships (Greenwood and Hinings, 1993). Values and beliefs function as action drivers or work motives (Blau and McKinley, 1979), and interventions at the paradigm level, together with the accountability of individuals, are key. This background set the aim of the cultural path.

### 7.3.1. CULTURAL MINDSET: SEEDS OF CHANGE

The mindset of *Seeds of Change* is composed of principles that emerged from dialogues with companies (see Chapter 6) and illustrates ways of valuing different issues seen as key to these companies’ ability to foster outcomes that create sustainability: *Seeds of Change*.

*Seeds of Change* has been presented in detail in Chapter 6 when reporting the analysis of the data. In this chapter the objective is mainly present its objective within the cultural path. *Seeds of Change* presents a paradigm with nine principles which illustrate attitudinal ideas that prevail at the core of the researched companies. *Seeds of Change* is, therefore, the mindset of the cultural path allowing presenting these principles, which can open opportunities for adopting different behaviour (see Figure 7.2).

*Figure 7.2 - Mindset of the cultural path*
7.3.2. CULTURAL FRAMEWORK

The framework of the cultural path should facilitate the need to look at things in a new way by starting to question attitudes, assumptions and intentions of the system in case (e.g. teams, departments, organisations) with the aim of creating sustainability.

7.3.2.1. Theoretical background

A cultural framework promoting sustainability needs more than environmental champions and regulations. Senge (1999) suggests that the key catalyst can be developing learning capabilities (ibid:530). From this research perspective, gathered from secondary sources as well as from the dialogues (Chapters 4 and 5), there is a need for interventions at the paradigm level. Sterling (2003) proposes intervention at the levels of the following: ethos, eidos and praxis. The cultural framework should also integrate elements that embrace learning capabilities, which, in Sterling’s view, refer to the intentional search to acknowledge, transcend and change (ibid:235). This framework responds to this by integrate and redirect different values towards a new way of perceiving the potential of positive contributions across many levels, including the individual and the corporate.

By proposing something radical without condemning the existing system (e.g. a company), the cultural framework helps in the maintenance and survival of the system in which SuCo aims to intervene, as it increases its plasticity, allowing a leap towards a different way of thinking through the existing (or new) interactions in a system (Maturana et al., 1987:127).

The triadic model proposed by Sterling (2003) which presents three interpenetrating dimensions – seeing, knowing, and doing – that induce a worldview change involves whole systems thinking and can assist with change at the paradigm level (ibid:9). The framework of the cultural pathway embraces this triadic model, as allows focusing extensively on people’s views and perceptions and the roots of their ideas and actions. This allows the design of a cultural framework based on a deep understanding of:

- values, beliefs and motivation – the seeing – which deals with the roots of our perceptions (ethos) enabling the reframing of assumptions:

  People need to be challenge in the way they perceive the environment; I think we all have a kind of comfort zone which we understand and know, but through experience a space that you are familiar with or are in the journey of being familiar with, the environment have a very big impact in how we feel and relate: volume, the shape, the softness of it, the acoustics...how a person feels
in a certain way; and I think in every aspect of our life is important to challenge
to go beyond of what you know (Organisation Z, 2006).

− the potential of the capabilities and capacities of the system – the knowing –
which is related to the opportunities arise in connections (eidos), enabling the
reframing of priorities:

…it does impact upon our products and services but it's mainly about our
operational activity... it’s a broad kind of question: how we deliver value; how
we do that in a socially responsible manner; and how we do that in an
ecologically sustainable manner. And those principles are mainly operational
(Co-Op, 2007).

− strategies, actions, and activities – the doing – which refers to the modus
operandi (praxis), allowing the reframing of intentions:

We’ve done some work this year with The Guardian newspaper and they came
down and stayed at the hotel, which is designed to work in a way that reflects
the values of the business: the quality of the food; the fact that we have
organic beers and organic wines; the fact that it’s relaxed and it’s based on
trust means that the whole experience that people have there reflects what we
are trying to teach, so they get to experience it: they sleep in a space that is
‘teaching’ (TYF, 2006).

7.3.2.2. Seeing, Knowing, Doing: The Cultural Framework

As seen above, the cultural framework adopts three categories that belong to the way
paradigms constitute ethos (seeing – assumptions), eidos (knowing – not about
intellectual or technical achievement alone, but also acknowledging what informs the
way we think and what motivates and engages people), and praxis (doing – strategies,
actions and activities). This challenges established values, visions, and actions, aiming
to create different relationships with nature, people, trades and operations.

This framework shows that a cultural path involves questioning what frames what we
know; how the world is perceived and, how and why things are done. This process of
questioning enables the introduction of different values and ways of seeing which have
the potential to change current ways of doing. Figure 7.3 illustrates the cultural
framework.
In conclusion, the aim of this framework is to focus the intervention on stimulating a new view of values and beliefs, the rethinking of goals and visions and the realization of motives and ways of engaging people.

7.3.3. CULTURAL PROCESS

The process should help to identify guiding principles, create visions of various futures and lead to an action plan. It should start by incorporating the views of the one that want to intervene in the system (e.g. a group of people) and the ones that work in the system (the ones needed to realise the intervene), seeking to change everyone of these people at the individual level, in the conviction that this can foster a culture that facilitates sustainable development.

7.3.3.1. Theoretical background

The cultural process responds to the need to incorporate ecological thinking at the global (in relation to system intervention boundaries) and personal levels, not only because the experts’ dialogues show the importance of individuals in a sustainability journey (Chapter 4) and the dialogues with organisations illustrate this (Chapter 5), but also because there is evidence that a positive approach can have a greater effect on empowering decisions at the individual level which has an impact at the level of the systems' behaviour, as suggested by Ibtissem (2010):
The individual adopts altruistic behaviours out of a feeling of moral obligation. Furthermore, the personal norms are determined by the individual's awareness of the positive consequences of the resulting acts and responsibilities. These two variables directly affect the behaviour (Ibtissem, 2010:130).

This position seems to embrace an anthropocentric vision and the process of the cultural path needs to contradict this by:

- presenting a paradigm rooted in ecological notions to avoid the conception of humans' superior role of in respect to natural limits and resource use;
- creating a sense of responsibility and awareness involving everyone equally (briefly suspending established hierarchies) in the co-design of new visions and actions.

The process seeks elements that allow new behaviour to emerge, not following any particular individual (e.g. personal view) but from the whole, aiming for a symbiosis of views and ideas.

These are the requirements for designing a process permeated with a sense of contribution and responsibility that instigates different behaviours. Senge (1999) points out three key elements for organisational learning about sustainable development which should inform the cultural process:

- shared vision and personal mastery (from a creative as oppose to a reactive viewpoint);
- team learning and mental models;
- systems thinking.

Therefore, this process needs to:

- involve people at the individual, personal level;
- offer different bases from which different decisions can emerge, increasing the potential for creating outcomes leading to sustainability;
- create the appropriate scenario (or environment) to express some goal-oriented process;
- help in developing ideas involving the whole of the business and its lifecycle.
In summary, the cultural process should follow the suggestions found in Bohm’s (2000) invitation to disrupt ways of doing which needs interventions in the messages that feed established ideas, and actions, and their continuous reinforcement, to allow new ways of doing to emerge. This process should invite coherence of action across the whole business and views of sustainable futures.

7.3.3.2. Process: Implement values → Create visions → Design actions

The cultural process shows components that interact in order to derive visions of possible sustainable futures, complemented by action plans and activities which put these futures into practice. This process is represented in two ways:

   d) one which informs the aim of the whole process – the *conceptual process*;

   e) and the linear process consisting of three stages involving eight elements.

The conceptual process proposes the following interventions in a system (e.g. organisation), as expressed in Figure 7.4:

   — diagnose the current set of values;
   — analyse the key elements framing ways of doing;
   — uncover new principles;
   — create interventions that will generate actions and strategies for sustainability.

Figure 7.4 - Conceptual process of the cultural path
The process is not a step-by-step action, instead is a sequence of iterative objectives, each contributing to the overall goal of uncovering visions, actions and activities for sustainable-futures oriented. Figure 7.5 shows the components of the cultural process.

Figure 7.5 - Process of the cultural path

The objective of this process is to expose people to a different paradigm in order to uncover new sets of values that will frame their views and actions.

This is done by introducing the nine principles, ending with the delineation of actions that promote sustainability. The next lines explain the components of the cultural linear process in detail.

The first objective presented is introducing a new paradigm (first circular shape of figure 7.5). This can be done in different ways. Chapter 8 explains how it was done under this research timeline, when SuCo was applied in two types of organisations, but as Figure 7.5 shows, it can also be done through an understanding of: focus, current situation, and inner potential. These can be summarised as:

a) Introducing a new paradigm though the principles. This can be done in different ways: the way followed in Chapter 8 revealed one principle at a time (e.g. one a day), prompting people to think about what each meant for them and what it would mean in the context the exercise was addressing (e.g. their department, organisation, etc). Later on, people were asked to discuss their choices in a group session.
b) Be aware of the context in which SuCo is being applied and the objective of the intervention: what do people want to integrate in their business, teams, departments, individuals? What is the drive to apply this methodology? What are people interested in, that has caused them to ask for/want this intervention? This enables understanding the focus (see second column of circles, first on top and Chapter 8 for examples) and setting an aim transversal to all the exercises which guide the discussion of the principles.

c) The discussion helps to understand the current situation and current potential. This is possible through the participants’ sharing of stories, thoughts and ideas of the participants as they discuss the principles (third and fourth circle of second column)

d) Following this first discussion, the next objective is to build bridges between the paradigm introduced and the existing one (illustrated on first circle on third column: identify levels of correspondence). Again, this can be done in numerous ways, such as introducing an exercise asking people to select a limited number of principles that resonate with them and that fit their context (e.g. their organisation, team, project), and to start extrapolating different ways of seeing the principles in that context. The ideas are then discussed and evaluated by all participants (this can be supported with the use of different types of templates to help to frame the discussion). The facilitator underlines key sentences and ideas. Finally, all the participants together are encouraged to start developing their own principles (this procedure represents the other circle illustrated on the third column: identify own principles). It may be simpler for the consultant or facilitator to analyse the results of the exercise alone and then discuss them with the group at the same or on a new session, rather than expecting the participants to be able to step back and analyse their own thoughts and those of others, which not everybody finds easy.

e) to accomplish the objective of visualising different futures (as expressed in Figure 7.5 fourth column circle), the workshop format can be used, with participants invited to apply the principles they have gathered/created in previous exercises against templates that, for example, explore what the value grounded in these new principles add to the different dimensions of sustainability and their key elements (see Chapter 8 for the template used for this exercise in organisations where part of SuCo was applied). The outcome of analysing this exercise shows not only how this group of people see the future in their particular context but also reveal small key actions or measures to help
to target these visions, thus achieving the last element/objective of this process: *action plans* (last column circle of Figure 7.5)

### 7.3.4. SECTION CONCLUSION

The cultural path as a whole challenges the current value system in place (e.g. in organisations) which is responsible for the understanding of and relationship with nature (Orr, 1994).

The main objective is to create the ability to intervene in order to rethink the ethical basis responsible for the use of natural and human capital by individuals, groups, communities, organisations and, more broadly, by society as a whole.

Thereby it delivers transformation at a behavioural level and allows sustainability to be embedded at the core (of organisations for example), enabling it to flourish from the inside out. This helps to build a path towards sustainability by encounter in the current identity correspondences with sustainability values (the nine principles).

The components of the cultural path (summarise in Figure 7.6) introduce different and contextualised sets of values that will impact on established priorities. This approach has great potential to influence what is produced and outputs across the entire value chain, transforming the business life cycle’s contribution to sustainability.

**Figure 7.6 - The cultural methodological approach: three elements**
7.4. OPERATIONAL PATH: CHARACTERISTICS AND COMPONENTS

The conversations with sustainability experts (see Chapter 4) demonstrated the link between creating sustainability and systems thinking; and the dialogues with sustainability consultants (also reported in Chapter 4) helped to uncover the need to make explicit existing connections and relations, which can have greater impacts in the journey towards sustainability, as provide a system approach.

The literature (see review in Chapter 2) refers to the importance of a different scale of intervention when, for example, seeking an F10 improvement. While ecodesign can effect changes at the product development level, interventions with the aim of F10 productivity requires innovative changes at the strategy, cultural and individual levels (Schmidtblek, 2000). Contemporary ecodesign interventions do not reflect strategic levels of innovation (Dewberry, 1996; Fuad-Luke, 2002; Birkeland, 2002). When looking at organisations as a living system (Swanson, 1995:57; Ricard et al, 2004) and outputs as part of that system, interventions towards sustainability should address the whole system and not only parts of it (e.g. production).

In this research, organisations are not limited to enterprises: they also embrace other human artificial systems such as teams, communities, governments, etc., that are responsible for creating and producing outputs.

Chapter 6 presented detailed information on OvOlution and AgreeCulture, two elements related to operations. Their position in the overall operational path is illustrated in this section.

OvOlution and AgreeCulture are essential to the discussion about relationships and interdependencies: a) the OvOlution presents the nested relationships that compose a system; b) the AgreeCulture presents the different dimensions of sustainability and their own parameters of action. Both help to understand practical interventions systemically and with that, shift the worldview to embed an ecological perception, as Capra (1996) states:

\[
\text{To understand things systemically literally means to put them into a context, to establish the nature of their relationships (Capra, 1996, cited in Sterling, 2003:274).}
\]

Thus OvOlution is the mindset of the operational pathway, while AgreeCulture offers a framework for action.
Rennings’ (2000) view sustainable innovation as a process for developing new ideas, behaviours, products and processes that contributes to a reduction in environmental burdens and reach specific ecological sustainability targets (ibid). The operational process provides guidance towards key important objectives aiming to create opportunities for innovation for sustainability. For this the process incorporates the OvOlution mindset (system of interdependency and scale) and the AgreeCulture framework (which provides sustainability lenses for value creation).

The elements of the operational path – the OvOlution mindset and the AgreeCulture framework and process – are illustrated below.

7.4.1. OPERATIONAL MINDSET: OVOLUTION

OvOlution (summarised in Annex 7.1) portrays a mindset which serves to implement systems thinking and, in doing so, increases the potential for new opportunities to emerge (e.g. in businesses, products, etc.) by exploring relationships in the value chain (i.e. the chain of activities and actors involved throughout the system’s (e.g. the business’ cycle). This involves understanding existing external and internal relationships in the system cycle over time.

OvOlution enables understanding a wide variety of existing operations that are not usually targeted in pursuing sustainability, allowing innovation to occur without jeopardising the system’s identity. This allows the system in question (e.g. an organisation) to easily absorb the innovation into its own structure and identity. Figure 7.7 illustrates OvOlution.

OvOlution aims to explore opportunities for co-development, co-operation and co-learning, by looking at different scales of intervention; moreover, it allows:

- the acknowledgement of a short, medium and long system’s life-cycle (e.g. of an organisation) and what is involved in it beyond product life-cycle assessment;
- the recognition of outcomes beyond the traditional view of products and services.
Figure 7.7 - Operational mindset: OvOlution
7.4.2. OPERATIONAL FRAMEWORK: AGREECULTURE

AgreeCulture, also summarised in Annex 7.1, is strongly grounded in a culture of dialogues. It has the characteristics of a framework as it brings different dimensions of sustainability (nature, people, trades and operation) to the dialogues previous to ideas generation and development (e.g. strategies). It characterises each dimension with key parameters, enabling understanding of how each dimension's parameters interrelate with those of the others to reveal opportunities for sustainable innovation: it provides sustainability lenses to create added value. Figure 7.8 illustrates AgreeCulture.

Figure 7.8- Framework of operational path of AgreeCulture

7.4.3. OPERATIONAL PROCESS

The operational path offers a solution to implement systems thinking at the level of opportunities in innovation towards sustainability (using the OvOlution mindset) and characterises the different dimensions of sustainability through key parameters which provide a framework to add value (using AgreeCulture). The operational process as a whole aims to generate future scenarios supported by an overall strategy for delivering sustainable outputs.

7.4.3.1. Theoretical background

The operational process aims to embed sustainability considerations (e.g. social, financial) but also to incorporate these in idea generation throughout research and development, embracing commercialisation, new business and organisation models as suggested by Charter and Clark (2007). Moreover, the operational process needs to address the value chain (like the value network - VN), considering:
...the need to develop sustainable supply chains addressing also the environmental and social elements for sustainable innovation. Key activities under this enabler should concentrate on expanding the traditional focus on the forward flow of materials, components and products to explicitly address the disposal, recycling, reconditioning and remanufacturing of used products. (Kocabasoglu et al., 2008 cited in Flores et al., 2008:282)

The use of the concept of the value chain instead of value network is because the first considers the whole system (e.g. businesses system) and its life-cycle, which invites a broad perception of outputs; while the term value network considers mainly the network around end products and services as suggested by Kocabasoglu et al. (2008, cited by Flores et al., 2008). This is important, as the aim of this methodology is to offer interventions for different types of human-created systems.

Furthermore, this process focuses on exploring new opportunities and presenting a simplified set of objectives by maintaining a similar approach to project development process followed by many disciplines such as design, engineering, marketing, and business strategy.

### 7.4.3.2. Process: Identify ➔ Understand ➔ Explore ➔ Create

The objective of the operational process is to allow people to approach problems and needs in order to seek solutions that will allow sustainable growth that remains competitive. The scale of interventions offered by this process opens up a range of possibilities: from changing a product’s attributes to restructuring organisational strategies and, at the scale of governance, creating new regulatory frameworks for example.

In this process the outputs, as illustrated throughout the dialogues with organisations in Chapter 5, go beyond what is produced. Outputs are the result of all the value chain interactions and show the relational potential to generate new outputs within and across the whole value chain. For example, Green & Blacks’ relationship with the community of cacao growers adds value in different dimensions of sustainability (i.e. people, nature, trades and operations) with a cohesive and innovative approach, which reaches way beyond the final chocolate product. At a conceptual level the process approach involves exploring the following key points in a context of sustainability (see Figure 7.9):

- data collection – understanding the chain of direct actors (e.g. collaborators) and indirect actors (e.g. communities where a production unit is installed);
— exploring value chains – deeply analysing relationships at different scales of operation to identify strong links, weak links and possible (future) links to value creation;

— creating scenarios of opportunity: exploring new and existing actors; identifying needs; analysing contexts of use (current and to be explored).

Figure 7.9 - Conceptual process of the operational path

The operational process, like the cultural process, presents an interactive sequence of key objectives: six portrayed in Figure 7.10.

Figure 7.10 – The operational process

The next lines explain the components of the Operational iterative process in detail.
Chapter 7

The first objective is to understand the subject of change: are we aiming to create sustainability at the level of attributes or at strategic levels? Thereby, the first step corresponds to:

f) define the *focus of interest* (point 0 on Figure 7.10): at what level does the intervention need to occur? e.g. a feature, product, services, product-service system, organisation, cooperative, government etc;

g) Secondly, it is important to *understand actors* (*identify* stakeholders around the subject of interest) and *understand Value Chain* (*identify* business relationships around the subject of interest) across the whole business; to understand existing relationships towards sustainability and identify those that have yet to be explored (the system of relationships direct and indirect – *OvOlution* is a good mental model to explain the interaction system);

h) identify the potential to explore external and internal relationships in order to increase the add-value to sustainability. This is represented by point 2. on Figure 7.10): *identify interexchange potential* (e.g. TyF intervention at the National park (ref));

i) find new exchange opportunities within the relationships of the system (e.g. organisation): *identify opportunities for inter-exchanges* (point 3. on Figure 7.10);

j) in order to develop these opportunities create a scenario-building approach to explore these opportunities that help promote innovation towards sustainability: *scenarios of opportunities for inter- and intra-exchanges* (point 4. on Figure 7.10);

k) the last step is presented as point 5. on Figure 7.10: *establish priorities* which rise to the surface when reviewing the most promising scenarios of sustainable innovation. To accomplish these last steps it is essential to delineate Key Success Factors (KSF) to evaluate results and delineate tasks, and be able to assess progress. These two elements should be determined through a group exercise to generate a multi-level participation perspective, create accountability, and transparent awareness and responsibility.

The strength of this approach rests on the fact that it exhaustively analyses the value chain and scrutinises it for connections that can foster innovation, strategies for sustainability, increased competitiveness and potential for cooperation and collaboration in order to add value to the sustainability agenda.
This broadens the perception in relation to existing and potential contributions to sustainability across the system of interactions over time (system life-cycle).

Figure 7.11: The operational methodological approach: three elements

<table>
<thead>
<tr>
<th>Mindset:</th>
<th>Understands the system of intra and inter relationships across the business cycle and across time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims to explore the different scales and relationships between the elements of the system.</td>
<td></td>
</tr>
</tbody>
</table>

| Framework:                    | - **Nature**: Procedures; Sources; Metabolisms  
- **People**: Government, Infrastructures; Culture  
- **Trades**: Human, Natural, and Commercial capital  
- **Operations**: Inputs; Transformations; Outputs |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainability lenses (Nature, People, Trades and Operations) characterised by key parameters.</td>
<td></td>
</tr>
</tbody>
</table>

| Conceptual Process:          | Key points to allow innovative outputs to be created  
1. Data Collection  
2. Exploring value-chains  
3. Creating new scenarios |
|-------------------------------|--------------------------------------------------------------------------------------------------|

### 7.4.4. SECTION CONCLUSION

The operational path implements different drivers to add value in the dimensions of nature, people, trades and operations concurrently in order to address outputs differently. It reframes opportunities and develops the capacity to approach problems holistically through systems thinking and the lens of sustainability.
Therefore the operational path is a strategic innovation process that proposes:

− longer cycles (e.g. business cycles) generating added value for all who are directly or indirectly involved;

− new models (e.g. business models) to establish competitive strategies for achieving sustainability;

− works the intangibility of a sustainability identity to achieve tangible differentiation by approaching sustainability from a perspective that helps to generate a system of outputs.

*System of outputs*, as used in this research, refers to, for example, the relationship of TYF (2006, dialogues) with the national park, which is not an end output of the business itself but relates to what the business seeks to achieve so it is nevertheless an output. It is the coherent relationship among the different outputs across the business that portrays the business’ strength in creating sustainability and establishes a differentiate market position. The outputs altogether create a system that echoes the business’ values.

### 7.5. CHAPTER SUMMARY

The SuCo methodology explores opportunities for growth that acknowledge ecological limits and the value of human capital (beliefs, ideas, creativity, knowledge and skills) as implicit attributes of an approach to sustainability. SuCo’s methodology presents two complementary approaches to embracing a holistic view: a cultural and an operational path, each of which comprises three elements: mindset, framework and process.

SuCo is an ideal methodology with which to start connecting a system’s inputs (e.g. values) and its outputs across the system’s life-cycle in a coherent manner. It helps to create sustainability and to start responding to F10 realities. Moreover, it defies design discipline in several ways:

− it challenges design view of itself inside its own community as it embraces a view beyond product development. SuCo challenges the discipline’s traditional frontiers by strongly addressing and valuing the capacity and capability of design as problem solver; integrator of different dimensions; and centre of the network of different disciplines, some of the characteristics of design mentioned by Papanek (1973), Ehrenfeld (2004) and Manzini (2005) for example;
− fosters mind shifts in industry and businesses cultures in different ways by acknowledging: the ability of design to forge a new path to sustainability; and design thinking, recognising this as the abilities shared by many people (not restricted to designers), which incorporates, understands and manipulates different forms of communication and language as mechanisms of intervention to stimulate the imagination and change – the cognitive side of arts and creativity.

This methodology provides a speculative path for the integration of strategies for sustainability which include outputs such as organisational and business strategy; external and internal communication strategies; branding and ethical strategy; human resources strategy; partnership strategy; stakeholders’ strategies and involvement; and product and service strategies encompassing urban design, architecture, systems, features and attributes.

People interested in using SuCo’s methodology can address cultural change or consider sustainability at the operations level. A methodology addressing innovation for sustainability such as SuCo is most effective when both pathways are incorporated together, as one reinforces the other.

The endpoint of a methodology such as SuCo is not a rigid response but rather uncover questions that intrinsically reflect issues and ideas related to the culture, people’s behaviour and the system in which they socialise and/or operate (e.g. of an organisation or a design team), as well as reviewing how they express their values, beliefs and motivation towards sustainability through outputs. In summary the outcome of this research, the SuCO methodology:

− provides solutions to incorporate long-term thinking, focusing on creating sustainability rather than managing unsustainability;
− develops creative interventions at the strategic level, integrating ecological thinking using design thinking;
− reveals the potential of visualising and creating platforms to explore F10 futures using qualitative approaches;
− offers a vision of how design can be utilised as a central figure in a network populated by different actors (e.g. value chain actors) and drives sustainability by exploring roles beyond product development.

Finally, the SuCo methodology suggests ways of integrating technocentric and ecocentric views by offering a more humancentric approach (e.g. understanding the
cultural and social context). This approach brings together different priorities and strategic and conceptual thinking to generate new aspects of behaviours to foster practices and outputs with a qualitative approach towards sustainability.

7.6. CHAPTER CONCLUSION

As revealed by Meadows (1997/99), the least effective leverage points to intervene in a system are those focused on numbers. Meadows (ibid) points out that the leverage points that can provide effective change are those at the level of the goals and mindset or paradigm of the system, where the capability to provide scope for creating sustainability increases as it enables rethinking current responses, beyond the technological fix and incremental improvements in resource efficiency (Ehrenfeld, 2004).

This chapter presents this thesis’ answer to the requirements expressed above in the form of the SuCo methodology – a multi-level approach creating interventions at the levels of the goals and mindset of a system, and by doing so delivering the potential to unlock opportunities for achieving sustainability.

As underlined in Chapter 2, F10 requires a reorganisation of how society engages with, uses and disposes of resources and energy. SuCo approaches both production and consumption equally as two paths that should be approached together. This joint approach allows initiatives that can start to reframe what people consume why they consume it and how they may consume it differently.

SuCo offers an approach to a softer side of F10 from the perspective of innovation for sustainability. It responds to the objectives of this research and the evidence collected from the dialogues by developing a concept linking appropriate values with actions that enable a shift in thinking towards F10 outcomes. SuCo is one of many paths that can be followed to create sustainability.

Chapter 8 presents the evaluation and validation process and its application in two organisations. It shows how SuCo requires the involvement of all system-cycle actors (e.g. business stakeholders) and strongly depends on their ability to be deeply aware of the goals of sustainability and what these represent at both the personal and the system level.
We take hold of a branch and think it is the whole tree. Through the knowledge of the part, we can never realise the joy of the whole (Krishnamurti, 1953)
This chapter presents the evaluation and validation approach and its influence on the development of SuCo

Evaluation and validation of the research findings is presented. An overview of the philosophical approach, method and process that framed and informed the evaluation and validation process to evaluate the findings is given. Every key decision is reported in this section, followed by the results that helped to form SuCo. The final part of the chapter discusses how SuCo methodology was applied by organisations as a way of evaluating its usefulness and scope for encouraging innovation to create sustainability

8.0. SUMMARY

This chapter presents:

- distinction between evaluation and validation: evaluation is carried out at a theoretical level (e.g. presenting SuCo) while validation was done on the practical level (implementing SuCo and testing its components);
- methodology chosen introduces the human centre as paradigm, narrative collage as method, the participatory design process, and consultative workshops as tool used for both the evaluation and the validation stages;
- evaluation stage and the organisations and individuals that participated in it;
- validation stage and the companies in which SuCo was applied;
- Impacts and influences of evaluation stage’s and validation stage’s findings on this research
Figure 8.1: Summary of chapter content
The main aim of this chapter is to communicate the evaluation stage of the research and in particular of SuCo, and its validation. The refinement of SuCo uses the validated stage, and this chapter reports the process of validation from its primary draft to the final proposal. The evaluation stage is confined to the final draft of SuCo by putting it into practice with different organisations, which also contributed to its improvement.

As Westerlund (2007:4) says: “People have two different theories for action, one espoused theory and one theory-in-use”. This helps to express the extreme difficulty inherent in pursuing the validation and evaluation of a product without using it in its proper context to fulfil a latent need. This problem led this research to take an approach that required the involvement of potential users at several stages of development of the product, SuCo, allowing feedback of reactions, comments and opinions to influence successive improvements in its design. The potential users of SuCo were defined as people who deal with issues of sustainability (inputs or outputs – see Chapter 2); are involved in areas that act upon cultures (understanding the levels of intervention - see Chapter 7 - as individuals, teams, management, leaders, organisations, communities, citizens, etc) or work to create or produce an outcome such as a new value-chains, product or a service: that is, they deal with any type of materialised operation (for example logistic systems).

The border target scope of potential users of SuCo instigated a quest to join several backgrounds and areas of expertise as well as both industrial and academic perspectives to participate in the process of further developing and refining SuCo from a co-creation approach whereby the insights of such potential users are integrated in the construction of SuCo through their feedback. By having a participatory process allowed active evaluation and validation. Within the evaluation process the search lay in the continual development of SuCo; while within the validation process the refinement of SuCo is reviewed by applying it in an industrial context.

SuCo is fit for propose, thereby this chapter only reports two examples of SuCo interventions and also presents examples of different elements of SuCo in action. The continuous feedback, together with a constant revisiting of the literature, helped SuCo to evolve to its final version (see Chapter 7). The process of using it over time also brought some of its strengths and weaknesses to light. This was informed by the
validation process, and particularly through applying SuCo in a number of contexts to demonstrate its potential

8.1.1. OVERVIEW OF THE EVALUATION AND VALIDATION

The process chosen resonates with the overarching view of the research: gather peoples’ views and experiences in the process of redefine and placing in practice SuCo. The focus here was on generating a system of feedback loops (see Figure 8.2) in which people’s insights are taken into account for the next phase of SuCo’s development, a method explored by Kostera (2006) which she calls the narrative collage method.

The main idea was to create two steps: the first for evaluation and the next for validation. By dividing the evaluation and validation stage of this research allowed the development of a learning flow within and across each, as Figure 8.2 illustrates. The evaluation step included three workshops and the validation step two workshops in an industrial context:

Evaluation stage: three workshops

- Workshop with Sustainable Design Network (SDN)
- Informal meeting with the steering group of the EPSRC - founded project: Design Dialogues
- Informal meeting with EcoDesign (EDC)

Validation stage: two workshops

- Workshop with EDC
- Workshop with Corus UK

The intention behind these two last workshops was to improve SuCo by exposing its approach to groups of people in organisations, as figure 8.2 illustrates. The network of interests and personal contacts made it possible to organise the three evaluation workshops, each with the objective of bringing new insights to the table that could refine the research outcome. At the evaluations stage:

- the first workshop utilised the Sustainable Design Network (SDN) as a platform for a presentation to more than 15 sustainability and environment academics and industrialists, to assess their interest in SuCo [draft 1] and draw out comments regarding its approach and implementation potential;
the second workshop was conducted within the steering group of an EPSRC-funded project, *Design Dialogues*, that included expertise from both academia and from industry and its main role was to test the robustness of the SuCo approach;

the third workshop was held in the Ecodesign Centre (EDC) in Wales. Where SuCo: draft 1 was presented. Feedback was given regarding the potential of SuCo to help EDC explore creating sustainability with its clients. A subsequent workshop was created with the objective of applying SuCo approach within EDC. Both workshops were attended by four people – the full EDC team at the time.

At the validation stage two companies were approached with different sizes and focuses to test the flexibility of SuCo:

the first workshop focused on applying SuCo with EDC as explained above and,

the second with Corus UK.

Although the strengths of SuCo come from its integrated cultural and operational approach, a context-wise approach picked and matched some elements of SuCo (explained later in this chapter) for each of the workshops.

This chapter presents the process and results of the workshops and their main influences on the development of SuCo. In summary, the following points are addressed in this chapter:

the systemic process followed;

what informed the methodology of this research stage;

the general process followed and the role of the workshops;

how each step of the evaluation and validation was carried out and their contribution to the refinement of SuCo;

major results and their value in the development of SuCo;

results of applying SuCo in ECD and Corus UK.
Figure 8.2: General process approach: evaluation and validation stages

- **SuCo 1st Draft**
  - First Workshop SDN
  - Feedback

- **SuCo 2nd Draft**
  - Second Workshop Steering Group
  - Feedback

- **SuCo 3rd Draft**
  - Third Workshop ECD Wales
  - Feedback

- **SuCo Final Version**
  - ECD Wales work session
  - Need: unspecific

- **Applying SuCo 1st Trial**
  - Challenges
  - Challenges
  - Challenges
  - Challenges

- **Applying SuCo 2nd Trial**
  - Challenges
  - Challenges

- **Corus UK**
  - Work session
  - Need: Social arena
8.2. METHODOLOGY FOR EVALUATION AND VALIDATION

This section presents the methodological approach for the evaluation and validation of the research findings. The objective of the workshops was always to capture people’s insights, deep opinions and views, therefore a methodology was chosen to meet these aspirations.

Below is an overview of all the elements that encompass the methodology used. Figure 8.3 presents this overview in diagram form.

Figure 8.3: Overview of the methodology used for the evaluation and validation stage

Figure 8.3 indicates the philosophical position, the main approach and the general process employed in the validation and evaluation stage of this research, creating a hierarchical relationship among the three elements: all the workshops were framed by the human-centred paradigm, the method was a narrative collage and the general process was consultative workshops.

8.2.2. HUMAN-CENTRED PHILOSOPHICAL APPROACH

Human-centred was the philosophical approach that shaped the validation and evaluation stages of this research: Human centred approach allows to capture a
richer understanding of the needs, contexts, knowledge and wishes of participants in relation to the focus of each workshop (Westerlund, 2007). Thereby this stage was a co-creative process centred on participant’s views, ideas and thoughts.

For many researchers such as Westerlund (2007), the human-centred approach is viewed as a method (as in human-centred design research), which allows participants to express themselves by talking, acting and constructing solutions to create a richer understanding of their needs and objectives in a specific context (Westerlund, 2007:4). However, in this research these principles shape the whole methodological approach, amplified by a participatory design approach to create an inclusive, collaborative and cooperative overarching methodology, influencing both the method and the process of the validation and evaluation stages.

8.2.3. NARRATIVE COLLAGE AS A METHODO APPROACH

The human-centred paradigm framed the choice of the narrative collage method, which encloses the perspective of participatory design. Workshops (see more on a methodological view of workshops in Chapter 3) are a recommended tool for exploring narrative collage and to integrate participants’ views within a world of possible solutions, as explored in the participatory design approach (Kostera, 2006; Westerlund, 2007).

The method needs to permit participants to give feedback, not only by offering the possibility of conversation but also by allowing the structuring and organisation of ideas according to reformulated templates (created in order to guide responses related to the aim (see Chapter 3)). This method is described as a participatory design approach (Westerlund, 2007) and is used to understand needs and desires in relation to the outcome presented, which helps to generate and construct new knowledge (Westerlund, 2007:3).

The general method followed encompassed narratives, as “we actively participate in the creation of culture by listening to stories and telling them, and we learn about culture through stories” (Kostera, 2006:7).

Narrative collage was seen as a useful method: decrease the difficulty of establishing contact between people and potentially create closer relationships, generating strong possibilities for feedback (Kostera, M. 2006); This method centres on having “participants jointly generating ideas, creating prototypes and [showing] examples of meaningful use” (Westerlund, 2007:4).

This choice of method is related to its ability to integrate the insights of potential users throughout the design process (Westerlund, 2007:3), in this case from different
fields (education, industry and consultancy). Nevertheless, the act of participating in the process of the design of SuCo did not dictate a rigid path but rather took some risks (Westerlund, 2007:4) in order to refine it to encounter real contexts.

Later in this chapter, parts of the workshops are reported, allowing further understanding of how these thoughts were captured and the implications of feedback in the development of SuCo.

8.2.4. A CONSULTATIVE WORKSHOP FOR THE GENERAL PROCESS

To complete this methodological perspective a consultative workshop process was indicated to generate an appropriate context in which to address new and emergent problems seeking professional, reliable solutions (Levers, 2003:3).

Every workshop followed the some strategic approach: the consultative workshop as a qualitative inquiry (Levers, 2003:25). This type of workshop is based on providing cutting-edge information within a process suitable for solving problems and sharing exciting knowledge (Levers, 2003:6). It provides potential for expanding the knowledge base by uncovering questions which would otherwise be less recognisable (Levers, 2003:24).

The consultative workshop is a legitimate systematic inquiry for research, according to Levers (2003:24), requiring the presence of certain minimal characteristics:

− the data need to be captured naturalistically, that is from experts with strong knowledge of the context in which the data are being presented, which this investigation respects;

− it requires a planned, deliberate and intentional workshop with a pre-determined research outcome goal; this is also embedded within this research, as expressed later in this chapter;

− the nature of the process requires interaction and the capacity of such interaction to be cyclical (repeating itself), allowing new knowledge to emerge. It is critically important to create a highly reflexive process for both researchers and participants, and this is true of the whole process of this research stage;

− it should create an immediate feedback loop for participants’ responses during the workshop; this requirement was followed at each workshop.

The workshops had these characteristics at the core, which was revealed as a key attribute because it helps capture participants’ reactions and views, thus giving
greater insight into how SuCo could be further developed and made more applicable for practitioners.

Visual data was also a key feature across all workshops. Chapter 3 exposes the value of visual data in this research and the importance that they acquired. Chapters 4 and 5 report on the data collection and how cognitive maps helped to analyse the data. At this Evaluation and Validation stage of the investigation this view did not change; each workshop was surrounded by visual data, from the presentation of SuCo to how the feedback was collected and registered, images, diagrams, drawings, schemes and templates were widely used (this chapter will present examples of the visual data at following sections). Towards the end of the evaluation and validation images transmitting SuCo’s highly important concepts were used (see Chapter 7 which illustrates the elements of SuCo). By using visual data allowed communicating complex ideas and helped to illustrate a different paradigm (see the communication poster for Seeds of Change – the nine principles in Chapter 7). The procedure at each session followed the same general flow. Variations in each workshop are addressed later in this chapter

**Evaluation stage: Process flow across workshop**

The general flow of each session used workshop techniques with the same workshops structure at their core.

First, the background of the research was introduced with more or less detail according to the objective of the workshop. This background is related to SuCo and its aims:

− moving from ‘reducing unsustainability’ to ‘creating sustainability’;
− the need for a paradigm change;
− the importance of individuals’ values, principles and motivations in building a coherent path towards sustainability.

The different elements of the outcome were also shared by the use of a PowerPoint presentation.

Afterwards a think tank of experts was set up where participants from a variety of knowledge bases were invited to share and synthesise information from their own professional understanding to further define the SuCo:
all the material had been prepared by the researcher previously; templates were created to record feedback and guide exercises, and a flow process created to follow at each session. The researcher had also prepared a facilitator’s document to guide each exercise. Prior to the workshop a structured document was developed in order to assure the same level of outcome from each break-out group. This document was presented and discussed at a meeting of all the facilitators’ prior to the workshops.

participants were moved into breakout groups to consider the material presented against the predetermined templates, generating iterative ‘outcome-building’ (Levers, 2003:22).

splitting the group into manageable smaller groups involved organising a considerable number of participants, thus there was a need to find people willing to act as facilitators at some of the workshops. Other fellow researchers were very helpful and took responsibility for maintaining their group’s discussion focus and for collecting their main thoughts and ideas on the templates. This allowed more inclusive and deeper feedback.

during the workshop the break-out groups worked together (after being presented with the new information) to address the identified foci of conversations. This procedure, as underlined by Monika Kostera (2006), is a powerful data collection tool and was a rich learning experience for all the attendees (Kostera, 2006:6).

After collecting feedback from the break-out groups, the results were shared and discussed within the larger group; this allowed immediate feedback, bringing the discussion to another level of richness for the construction of SuCo.

Conversations were summarised according to main subjects. This improved the outcome. This process uncovered key issues which were integrated in the further development of SuCo, which was applied at each stage of the process reported in this chapter (see section 8.3).

The above process, which was crafted for the evaluation process was used as well in the validation stage. In the validation process, SuCo was implemented with EDC and Corus UK, and this process broadly comprised the key elements presented above with some slight differences as follows: material was sent to participants in advance with key individual exercises. The result of these exercises aimed to be shared in the workshop session.
The material was the nine principles of *Seeds of Change* (see Chapter 7). Further, during the session participants reported the results of their individual exercises inspired by the nine principles.

The processes of the workshop session and the expected outcomes of each stage were sent in advance to each participant. This allowed managing expectations and underlined the purpose of each exercise and their overall contribution to the session objective. During the session the participants were split into smaller groups to allow more informal and inclusive discussion:

- smaller groups are, as pointed out earlier, easier to manage than a large group and allow the generation of creative dynamics. Each exercise is described in section 8.4. Facilitation was also key to SuCo’s application as the exercises needed to be presented; the session process explained; break-out groups guided; main conversations registered; and templates filled out.

The results of the exercises were shared with the larger group by exposing key issues that emerged during the exercises and the results of the exercises

- this generated rich discussion and increased the value of the exercise as new solutions and ideas flourished.

Analysis of the key conclusions of exercises was carried out by the researcher and offered to the participants and their organisations.

- after each session the results were analysed by the researcher, highlighting guidelines for action. This was possible because the individual results of exercises were organised and ideas unified.
- the whole workshop process revealed insights about the organisation and its ability to create sustainability. These results were shared and framed the analysis.
- each participant received the results of the analysis by email and further feedback was also collected by email.

The next section of this chapter describes the evaluation and validation in more detail, adding examples of what was reported above.

This investigation may appear to treat evaluation and validation separately but that is not the case: the first part focused more on evaluating the outcome, but validation was also taking place at the same time. However, the primary objective was not to
validate the outcome: it was to evaluate the content. To embark on determining the degree of validity is easier when the outcome is tested, which was not done at the evaluation. The second stage of the process of validation and evaluation was more occupied with validation and putting SuCo to use, but evaluation was still happening as improvements to SuCo’s content were taking place simultaneously.

The evaluation workshops increased the content value of SuCo through interaction, while the process of validation was more in tune with understanding SuCo’s applicability.

The workshop related to the evaluation step is presented below, including the material used; the main process; key feedback; and what these represented in SuCo’s evolution. The SDN workshop is reported first, followed by the workshop with the EPSRC founded project the Design Dialogues Steering Group.

8.3. EVALUATION WORKSHOPS

The section below focuses on the co-creation process of taking on board participants’ feedback in order to develop SuCo further. The section presents the three workshops that helped with the evaluation of SuCo and built up an understanding of the different phases of further development required.

8.3.1 SUSTAINABLE DESIGN NETWORK

With the aim of “bringing together like minded people interested in Sustainable Design” (quoted from SDN website), the SDN, originally an EPSRC funded network, was established to create an inter-industry, interuniversity, multidisciplinary research network focusing on issues of sustainable design with the main focus on methods, tools and techniques for implementation of subjects related with sustainability (inspired by SDN website). This network was chosen for the first round of workshops to evaluate the first draft of SuCo. The choice lay in the fact that SDN provides interaction with experts of different profiles and backgrounds and allows contact with a reasonable number of people with a common interest – sustainability and design – in just one seminar.

This SDN workshop provided an opportunity to present and discuss SuCo’s foundations for the first time.
First stage: SDN workshop

The SDN workshop was part of the 11th SDN seminar ‘Sustainability: A need to think differently’. Attendees were stimulated to participate in workshops in order to give feedback on the presentation of the primary results of this investigation. These results were presented at a half-day workshop of three hours, which was included in the morning session of the one-day seminar.

The aim of the workshop was to present the mindset shift towards acknowledging ‘limits to growth’ and the opportunity for human potential to positively influence sustainable activity. This was done by sharing what had emerged from the analysis of conversations with experts and organisations (Chapters 4 and 5). These dialogues informed an approach to innovation; one that works towards the generation of outputs embracing greater resource productivity.

As stated before, the choice of submitting the evaluation of the primary research outcome at the SDN workshop allowed the capturing of perspectives from participants with different backgrounds. Table 8.1 presents a flowchart of the workshop and the materials used. In summary, these included the materials sent previously, an agenda for the day, an abstract of the EPSRC Design Dialogues project, A0 templates, documents for facilitation, tape or digital recorders, notebooks, Post-its and pens. A PowerPoint presentation was also prepared. The process followed included a reminder of the agenda for the day and an explanation of the session and its objectives, the premises of the investigation that shaped SuCo and a presentation of SuCo’s first draft, which included only the three elements presented in Chapter 6: OvOlution, Seeds of Change and AGREECulture. After a coffee break that provided an opportunity to prepare the room for the breakout groups, exercises were presented highlighting what was expected from each; a general debate followed in which all participated, ending the workshop.

<table>
<thead>
<tr>
<th>Material presented</th>
<th>Previously-delivered materials:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>− Agenda for the day</td>
</tr>
<tr>
<td></td>
<td>− Introduction to the background of the research</td>
</tr>
<tr>
<td></td>
<td>− Documents to guide the facilitation of each breakout group were also previously distributed</td>
</tr>
<tr>
<td></td>
<td>− An abstract of the part of the seminar in which SuCo was to be shared under the Design Dialogues EPSRC research project had previously been sent to the list of SDN contacts to attract</td>
</tr>
</tbody>
</table>
participants to the seminar.

— A PowerPoint presentation with four levels of information:
  
  a. general context of the project;
  
  b. quotes from key conversations;
  
  c. the three elements resulting from the analysis;
  
  d. how the above interact.

— A0 templates for the workshop were created to capture and organise ideas (fig XX); Post-its of different colours and colour markers were distributed

— Cassette or digital recorders were installed on each group’s table

— Notebooks and pens were placed on each table and given to two facilitators to capture general conversations across all groups

Process

— The agenda for the day for those who registered for the SDN seminar of (about 20 people)

— Presentation of the key foundations of the investigation to set the context: Why thinking differently is important. This was introduced by the researcher in three key points:
  
  e. creating sustainability as opposed to reducing unsustainability
  
  f. the need for a different paradigm
  
  g. the importance of peoples’ values, beliefs and motivation to act differently

— This was followed by an introduction of the business organisations that had contributed to the data collection and what distinguishes them from others.

— Presentation of Agreeculture, Seeds of Change, and Ovolution (see Chapter 6 for detailed information of these elements; Chapter 7 gives a more synthesised view of them). Space for questions.

— After a coffee break, the main objective was the interaction of the attendees, who were split into smaller groups. Three exercises were presented. Figure XX presents the templates used for each exercise with key questions for facilitators to help them to guide the exercises.

  1. The first exercise focused on capturing first impressions of SuCo
  
  2. The second sought evaluation of the helpfulness (green light);
need for improvement (yellow light); or need for avoidance (red light) regarding:

— usefulness, focusing on: i) why this guide would be of interest; ii) how/where it could be used; iii) how easy it would be to integrate it with current processes (of management/innovation/operation/education…)

— communication, focusing on: i) ease of understanding; ii) whether the key elements are expressed effectively; iii) whether the language and visuals used are appropriate

— the overall impression, seeking to understand: i) what the guide adds to the current portfolio of tools/methods… (or those known); ii) how the guide distinguishes itself from what already exists (specific focus/elements/what it aims to achieve/…); iii) how it could be improved (specific elements, focus, outcomes…).

3. The last activity seeks to register points for improvement and a summary of the key important elements of the discussion

— All groups were invited to share the results with the larger groups and key notes were taken.

— End of workshop.

Table 8.1 flowchart of the workshop and the materials used

It is important to consider the following guidelines to start placing SuCO in action, such as:

— be aware that SuCo has a hidden starting point: people who are already concerned about environmental, social or ecological issues;

— suit the purpose by giving proper examples that do not suggest anti-economical drivers – what is the added value for business?

— SuCo’s holistic methodology should be underlined; and it should be made clear that SuCo is not, and does not defend a specific process or a step-by-step process;

— set a comparison among existing tools, processes and methodologies that positions SuCo and learn ways of communicating with existing tools, processes, methodologies;

— expose the maximum of information and instructions about SuCo by creating a learning platform (a website, for example), and enable such a platform to
collect impressions. This allows people to use SuCo independently and without external intervention;

— communicate at a glance or find ways to instinctively recognise the interrelations among elements and illustrate them while applying SuCo: ‘where you are standing’. This could be explored only if SuCo is labelled a path and if this study had time to engage in marketing development and commercial packaging of this methodology;

— find a way to share and explore stories to illustrate the potential of SuCo, perhaps on the website or a blog. If SuCo is seen as needing a facilitator it is important to have a way to share stories that can be use to illustrate ways of using it to suit different contexts – this path could only be explored if time allowed;

— acknowledge the dangers and advantages of narrowing the audience. The awareness of this choice in critical with the advantages and disadvantages that comprehends. This fact is further discussed in Chapter 9 under Strengths and Weaknesses of SuCo:

  a) the danger lies in limiting use of SuCo to people who have enough time to understand, engage with and learn it, as the language can be hard to understand when not specific. Moreover, SuCo defends multidisciplinarity and conversations

  b) the advantage is that not specifying one or more targets avoids having to use discipline-oriented content and technical language that would limit SuCo’s use and might not follow the multi-disciplinarity that sustainability requires (and is defended in this investigation);

— explore the idea of a high-level audience of managers at different levels and CEOs of organisations: what will change? It is attractive enough in the way that is already presented: i.e. in the language used and its clarity.

The templates used for group discussions helped to focus the feedback from the small groups, with conversations and key ideas handwritten on paper or Post-its. Figure 8.4 shows three images of the templates used.
Figure 8.4: Templates for capturing and conducting the feedback session
Participants’ feedback is shown by presenting the results of the exercises done within the work sessions. These results revealed the following matters for concern:

— a lack of interrelation between *Agreeculture, Ovolution and Seeds of Change* (note: these elements are now related in the SuCo methodology, following this and other interactions with participants);

— the clear focus of the applicability of each element presented is arguable;

— a need to make clear the practical side of each element;

— interrelations among the different elements were not perceived;

— the elements seemed disconnected and unclear at about their intervention level;

— it was difficult to understand the individual objective of each element;

— more elements needed to be presented in order to better characterise each dimension.

Such informed opinions and perspectives had implications for the further development of SuCo. The key information provided by the feedback was that certain basic elements of the methodology need to be revisited if the objective, to provide an appropriate methodology to approach sustainability, is to be met. Therefore prioritisation was given to:

— generating a hierarchy between the elements;

— understanding the level of approach of each elements;

— further developing the interconnectivity between the several elements and appropriate their applicability according to their objectives.

This feedback allowed other elements reported in Chapter 7 to be uncovered and required a second look at the literature in order to understand how to incorporate, for example, and hierarchy between the elements (*Agreeculture, Ovolution and Seeds of Change*). The dialogues with experts and organisations were analysed once more according to the results of revisiting the literature. Table 8.1 presented detail information of this workshop.
The session results allowed a guided approach to further development of the three elements which, enlightened by the workshop, are now seen as the basis of a product, although still incomplete (i.e. SuCo characterised only by some basic elements). This determined the next search in this research (Chapter 6 underlines the framework that shaped the following approach to the data and the literature, looking for deeper lines of continued development).

Below, the next stage of evaluation is presented. This stage involved a workshop with the steering group, the target chosen to collect other, more focused feedback. SuCo had already softer alterations in order to respond to the feedback of SDN workshop. At this stage the steering group was asked for feedback on an outcome already within the present parameters of SuCo as reported below (Chapter 7).

**8.3.3 STEERING GROUP**

The steering group was created to help guide the course of the Design Dialogues project in relation to its academic and industrial contexts. This control was related to seeking guidance and feedback from highly-positioned academics (a professor of sustainable engineering, a senior lecturer whose main interests and experience are in creating resilient systems for sustainability) and an independent consultant working for the Design Council and involved in the implementation of sustainability in this organisation. Their contributions identified issues related to communication problems. In addition, the steering group helped to identify key potential targets for SuCo.

At the steering group meeting, the latest developments of SuCo (previously represented only as Agreeculture, Ovolution, and Seeds of Change) were presented to the committee. The content, including the new elements, was addressed in more detail in order to construct a holistic approach to sustainability and underline the importance of thinking differently.

The three-hour session followed the format of the SDN workshop but with a smaller group of participants, which enabled the SuCo methodology to be discussed in depth. Both academic and industrial contexts were addressed according to the different frameworks (engineering, systems thinking, design) and experience of attendees.

As SuCo was already well-developed the focus of the feedback was on how SuCo is communicated and the language used to do so; its target audience; what is needed in order to start using SuCo; how it is positioned in relation to what already exists; and a new definition of SuCo that would outline its potential better. Lunch was offered allowing conversation to continue.
The conversation covered the following points for improvement:

— some of the metaphors used, such as *Agreeculture* and *Seeds of Change*, could be misleading because SuCo could be interpreted as coming from an ecological standpoint rather than being a tool for thinking differently about sustainability;

— the definition of SuCo (i.e. as a journey, a path, a process, etc.) should be made clear, alongside its potential audience/users;

— the language used; the current use of terms such as ‘limits to growth’ could be interpreted as anti-business-oriented. Use of more organisation-oriented (economics) language was suggested;

— whether SuCo needs to be facilitated by an outside expert/consultant because it is an overall approach to thinking differently and proactively about sustainability which is sense to be difficult by insiders;

— the benefits of looking at existing methodologies to see how they communicate their potential and how they ‘sell’ themselves, as well as who uses them and how;

— linking existing tools to elements of SuCo to enlarge the potential for ‘hooking’ SuCo onto what people already know;

— how SuCo was delivered (at that time) should follow the principles integrated in the SuCo methodology: examples given were transparency, independence, co-creation, etc. A transparent approach, for instance, could increase the potential for companies to understand it without help and raise interest in SuCo, although they may need help to apply it;

— the need for a general overview: SuCo appears to be holistic, coherent and rich but its communication is to detailed to understand at a glance. An overview would let people know in what they want to focus, when applying it, and where the path is taking them;

— when promoting and disseminating SuCo beyond the academic context there may not be such a strong need to defend the findings. Therefore using stories might be a more effective way to help organisations understand SuCo and its potential rather than, for example, justification of the nine principles presented in *Seeds of Change*;

— ideas could be made more accessible by narrowing the audience to make SuCo more available (e.g. for designer, for consultants).
The general impression was that SuCo was designed to provoke management change in order to create sustainability, but this is not clearly addressed.

— the implications of this feedback showed that the focus should be on the communication of SuCo itself; its potential; and its outputs. The language used was underlined as a key element in communicating its content. The marketing side of SuCo was strongly focused on.

The session materials and processes are explained further in the in Annex 8.1 following the same logic as table 8.1 represents.

Figures 8.5, 8.6, 8.7 present a response to the steering group’s suggestions to: a) compare SuCo with existing tools, processes, and methodologies; b) communicate SuCo’s content at a glance; c) express SuCo’s essence as a flow process. The first Figure (8.5) explores different types of services that can be exploited using SuCo. While it is not an extensive exploration, it gives an idea of SuCo’s commercial potential.

**Figure 8.5: A non-exhaustive exploration of SuCo services**

<table>
<thead>
<tr>
<th>Short term</th>
<th>Medium term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inputs</strong></td>
<td><strong>Outputs</strong></td>
<td></td>
</tr>
<tr>
<td>Introducing sustainability: What it means for me?</td>
<td>Strategic re-orientation. Drivers for sustainable development</td>
<td>Contributing with nature: Resources and energy view</td>
</tr>
<tr>
<td>Team building: Training for change</td>
<td>Brand managing. Communicating and Creating coherence</td>
<td>Contributing for communities: Social value</td>
</tr>
<tr>
<td></td>
<td>Focusing on the future: Projecting new horizons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Audit of sustainability: Where am I?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sustainability from the Core: Here can I start?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ethical decision making: Different priorities</td>
</tr>
</tbody>
</table>

Figure 8.6 compares SuCo with existing tools, processes and methodologies according to focus of action (vertical axis) and the dimensions that incorporate such action (horizontal axis). It can be seen that SuCo offers and integrates approaches in the dimensions of ethical and organisational strategy incorporating the social, cultural, environmental, and economic arenas.
Figure 8.6: Comparison of SuCo with existing tools, processes, and methodologies

Figure 8.7 (next page) presents a way to visually communicate the whole essence of SuCo and the interdependency of both paths, but also the ability of each path to act alone. The diagram in the figure presents the parameters of short term vs long term; and inputs vs outputs.
These new insights helped to see unexplored opportunities along other paths of development of SuCo beyond the development of its content as a methodology, and facilitated identification of ways to apply it, as reported in section 8.4.

To compare SuCo with existing tools, processes and methodologies (figure 8.6) an extensive search of secondary information (e.g. company reports ....) was carried out in order to understand these other approaches to sustainability and their core aims. The researcher’s professional experience and revisiting the dialogues with experts and organisations were key in determining key points to incorporate in SuCo in order to present its potential services (Figure 8.5).

The following leads to the third workshop of the evaluation process, which addressed the application of SuCo for the Ecodesign Centre, Wales.
8.3.4. EcoDesign Centre workshop

EcoDesign Centre (EDC) is a small government-funded ecodesign support agency in Wales that responded positively to an invitation to be part of the evaluation process, which later evolved to include participation in the validation process too. This invitation resulted from the identification of the following requirement by the steering group: focus on a potential user of SuCo, particularly a consulting organisation.

The key point taken from EDC’s feedback can be summarised in its emergent interest in understanding whether they could use SuCo with their clients. The process that provided this feedback is described below. This manifestation of interest, which led to submitting the EDC to the validation stage of this research (applying SuCo) is addressed below.

The Ecodesign Centre’s website states: “The Ecodesign Centre (EDC) is an applied research organisation that aims to build capacity and capabilities to enable effective ecodesign. [EDC] is recognised as the ‘voice’ of, and knowledge base for, ecodesign in Wales.” EDC is part of the Welsh Assembly’s commitment to sustainable development, aiming to proactively inspire “public sector organisations and education to enable effective ecodesign in industry” (ibid).

EDC showed interest in staying in touch with this research during its course, and gladly accepted the challenge to evaluate SuCo by allowing improvement of it using their valuable contribution due to the business perspective that this would offer.

This was a special meeting, as EDC was at that point a start-up company with four members, with the centre director the instigator and leader.

The main brief was: “We want to experience SuCo and understand if we can use it with our clients.” The materials used and process followed were similar to those used at the steering group meeting: the agenda for the day had been sent ahead and a PowerPoint presentation was used. Notes were taken during the meeting to capture participants’ views. The implication of the research was already revealed: ‘Let’s experience it’, taking this stage of the research to another level: the level of validating SuCo by testing it in the real world.

The meeting was held at the EDC office in Wales and lasted approximately two hours. The improvements underlined at the last meeting had not yet been integrated into SuCo, as there were only a few days between the meetings. Nevertheless, EDC wanted a comparison of SuCo with existing DfS and environmental management
tools, and was not clear about whether SuCo is a process or a tool or how to use it; the same concerns pointed out at the previous meeting. The word ‘methodology’ can be understood as theoretical or abstract in comparison to a tool or a process. Luckily it was easy to meet these queries verbally; however, it would have been better if the improvements had already been incorporated in the material presented.

The meeting’s process was identical to that with the steering group (see 8.3.3). It was a quick encounter and the feedback given led to scheduling a new meeting, this time to implement SuCo. This objective was of great interest and a major opportunity for this investigation. The Validation process (8.4 section) reports another workshop with EDC this time applying SuCo.

8.4. VALIDATION WORKSHOPS

In order to understand the limitations and strengths of SuCo it was important to apply it in different contexts. As with any other product, it was vital to understand whether SuCo would functional when people interacted with it, and use it.

It is important to acknowledge that SuCo was used under restrictive time limits which meant that it could not be tested in its entirety using Seeds of Change (the cultural part) and Agreeculture (the operational part) as introduced in Chapter 7. Nevertheless, the contributions of EDC and Corus UK to the validation stage increased understanding of SuCo’s potential strengths and weaknesses (further explored in Chapter 9 under ‘research limitations’).

Both applications were carried out as one-day workshop activities. Preparation for the workshop was needed and material was sent as ‘homework’ to all participants. This homework was presented during the first part of the workshop, integrating elements of the first exercise and useful as an ice-breaker. The material gathered in the workshop required subsequent analysis in order to share the results and deeply understand the results of the activities and exercises due to confidential issues they are not presented.

Below, details of the process followed and the materials used are described. First, an overview of the session and the general process:

Overview of working session

Table 8.2 summarises the SuCo driver for EDC and Corus UK; what part of SuCo was used; the duration of the workshops, and the results.
<table>
<thead>
<tr>
<th>Organisation</th>
<th>SuCo application</th>
<th>SuCo output</th>
</tr>
</thead>
</table>
| **EcoDesign Wales:** a small government-funded ecodesign support agency in Wales | Speculate about the future of EcoDesign Wales | **Methodology:** Seeds of Change – cultural part:  
  a) introduce a new paradigm: the nine principles were sent previously to the session;  
  b) understand current conditions: from material sent by the centre and informal conversations previous to the session;  
  c) understand potential: analyse the core business and where sustainability can be strongly explored  
  d) levels of correspondence between the sent nine principles (Seed of Change) and EDC: Exercises 1, 2, 3, and 4 applied at the beginning of the work session;  
  e) identify own principles: corresponds to Exercises 5 and 6 done applied at the beginning of the session;  
  f) visioning futures: corresponds to the exercises applied in the second part of the session;  
  g) strategic focus point: corresponds to the exercises applied in the last part of the work session |
|              |                 | **Result: 1-day workshop**  
  - Uncover internal opportunities for collaboration by developing and intersecting interests and capacity of the company and team  
  - Create future strategic path for business development and service delivery  
  - Expose core principles responsible for organisational culture |
**Table 8.2: Summary of validation workshops**

| **Corus UK:** a multi-national steel manufacturer owned by Tata International | **SuCo methodology:** Seeds of Change and Agreeculture – a mix of the cultural part and the operational parts  
Cultural  
a) introduce a new paradigm: the nine principles sent to the session previously;  
b) understand current conditions: from material sent by Corus and informal conversations previous to the session;  
c) understand potential: analyse core business and where sustainability can be strongly explored beyond Corus’ environmental mindset;  
d) levels of correspondence between the nine principles sent and Corus’ social assets: exercises 1, 2, 3, and 4 done at the first part of work session;  
e) identify own social assets principles: corresponds to Exercises 5 and 6 carried out at the beginning of the session;  
f) visioning futures for social asset application: corresponds to the exercises carried out in the second part of the session;  
Operational  
_define concrete actions for social assets and establish priorities:_ exercises corresponding to the last part of the work session  
**Result:** 1-day workshop  
- Uncover the capacity for exploring the social value of Corus’ activities  
- Design sustainability strategies to implement activities to integrate social value  
- Create a framework with social assets at the core |
Seeds of Change was applied in a concentrated version, and Agreeculture was very focused on arriving at action-driven solutions.

A summary of the general process taken

The workshops followed the same methodological approach and focused on narratives and applying the consultative workshop techniques as detailed in the first pages of this chapter. They touched on the following points:

Prior to the workshop: preparation required by participants:

- on each of the nine working days prior to the workshop each participant was sent an email explaining one of the nine different principles of Seeds of Change (see Chapter 7);
- posters visually depicting each principle were emailed to each participant with the intention that they should be displayed in their workplace;
- each workshop participant was asked to read and to reflect on each principle and what it meant to:
  - him/herself;
  - the organisation.
- participants were asked to decide which principle best reflected them and their relationship to and hopes for their organisation. Having picked a principle they were asked to find something that would help them to articulate the essence of that principle at the workshop – for example a photograph, a picture, a quote, a product – and to bring it to the session. They were also asked not to discuss their choice with other participants or colleagues prior to the workshop;
- a questionnaire was sent to the organisation prior to the workshop through the person representing the organisation and championing the application of SuCo, with a request that it was sent back at least five working days before the workshop. The aim was to collect information about the organisation’s key clients, partners and projects etc to be used in an exercise that would help to contextualise and focus the results.
The preparation for the workshop took about a week and can be summarised as follows:

- prepare of a document with a summary of resources and activities were sent to the organisation’s champion driving the application of SuCo for reflection about the length of the workshop. This document contained information about types of exercises; specific session outputs; specific objectives; minimum number of people required; activity summary; activity details, and time required;

- develop texts to accompany each principle and detailed information (sent via email), conceptual posters designed to illustrate each principle;

- develop of the flow of exercises and design the templates for each (see 8.4 for examples of the exercise flow and the templates for some of the exercises used);

- study the specific industry in order to understand its past and present contexts and possible futures (e.g. what are the big avenues of investment?) and thoroughly understand the organisation and department (or team) in which the workshop is to be held (past, present and future expectations, activities and strategies taken towards sustainability);

- study general trends (meta movements recently taken) in the social/cultural, technological and economic/market spheres – develop templates synthesising this information to help in visualising futures with an anchor in the present);

- analyse direct and indirect competitors: develop of a template comparing competitors’ positions vis-a-vis the organisation in question;

- develop ways of evaluating and prioritising the results of each exercise to facilitate decision making – exercises to depend on the results of previous activities.
The agenda for the session followed these general steps:

- Morning session:
  - Icebreaker – exploration and expression of the principles.
  - Exercise 1 – drawing out the organisation’s own principles.
  - Exercise 2 – seeing the future NOW: strategic directions.
- Lunch.
- Afternoon session:
  - Exercise 3 – strategic leverage points: drawing out priorities and classification.
  - Group reflections – summary of the workshop, impacts and comments.
  - Next steps – understanding the impact of exercises results on the participating businesses.

The next pages look at the two workshops that applied SuCo with first, EDC and second, Corus UK.

8.4.1. WORKSHOP WITH EDC

The workshop with EDC focused on testing SuCo from an EDC client’s viewpoint; that is with EDC role playing ‘a client’. A final exercise helped extrapolate some services that EDC could offer using SuCO alone or in conjunction with other familiar methodologies or tools.

The session’s objective was to speculate about the future of EDC Wales. The SuCo process focused on the Seeds of Change element to ensure what was tested (and experienced) could bring useable results for EDC.

Workshop development

As previously introduced, each principle of Seeds of Change was sent to EDC workshop participants in advance, alongside instructions of how to interact and use each principle.

Principles were sent daily until the day before the workshop. The principles were sent with an illustrative image (material develop by the research and dialogues’ team), affording the opportunity to generate a visual language. Each participant was asked
to choose a principle to which they relate more, and bring an object (or a sentence, or a book, or an image) to show what their choice principle represents to them. This participant’s ‘homework’ activity was utilised in an icebreaker exercise opening the workshop.

Pre-workshop questions were sent to the director of EDC that focused on key information about the organisation and its goals and expectations (e.g. mission, vision of the business and scope of activities). The results from these questions helped focus the preparation for the workshop and the material needed such as: trend study and a study of direct and indirect competitors, allowing to provide input for some of the exercises in the second part of the workshop (‘desired futures’).

The following pages illustrate the dynamic of the whole session, which was divided into three stages, each composed of several exercises.

**First stage of the workshop**

The first stage comprised six exercises that aimed to uncover the key principles of EDC regarding sustainability. This then shaped the whole application of SuCo within that session. The exercises that followed are viewed against this first-stage output.

The exercise opened up a discussion of the sustainability culture within the organisation. How sustainability is reflected by an organisation is a key finding that appears in the form of EDC’s own sustainability principles. These fed the next stage of the session, ‘desired futures’.

**Figure 8.8: First-stage workshop flow**

![Diagram of First-stage Workshop Flow]

*Diagram showing the flow of the first stage of the workshop with six exercises, each followed by specific activities and outputs.*

*1st exercise: Group exercise: discussion of “The Guide” principles and individual principle selection*

*2nd exercise: Individual’s motivations summarised by Design Dialogues*

*3rd exercise: EDC motivations summarised by Design Dialogues*

*4th exercise: Group exercise: conversations around emerging ideas*

*5th exercise: Groups exercise: emerging themes grouping statements according overlap/congruence*

*6th exercise: Design Dialogues analysis: Reflecting on first approach of EDC principles*

*Individual elected principle*

*Team selected for key group motivations*

*Team selected what they found to be the most important EDC motivations*

*Open discussion first approach to EDC principles*

*EDC principles final proposal*
Second stage of the workshop

The second stage took the previous result (own EDC principles), and put it into action by shaping the ‘desired futures’. This addressed what the team desired for themselves in the organisation and how they envisioned the organisation’s future based on their own principles (outcome of the first stage of the workshop).

Within this stage, previously to start the exercise, a SWOT analyses was shared to be completed by the EDC team and start dialogues around ‘desired futures’. To have richer dialogues, more information based on the pre-workshop research was shared: a study of trends that could have an impact in EDC business and team was shared and an exploratory study was also presented of EDC’s direct and indirect competitors. These served to contextualise the exercise of the ‘desired futures’ by engage, inform and instigate the dialogues. The step that followed served to contrast these ‘desired futures’ with:

- existing or potential business partners;
- the value chain;
- clients (current and desired);
- internal organisational capacity and ability.

Figure 8.9: Second stage workshop flow
Third stage of the workshop

After an analysis in situ (grouping similarities, involving participants’ conversational feedback, and identifying the key themes), the session highlighted five ‘desired futures’. The final stage of this workshop defined, evaluated, prioritised and developed an understanding of the key elements needed to refine the desired futures.

The result was positioning the EDC ‘desired futures’ according to the views of the whole EDC team – passing from individual ‘desired future’ to a collective wants. These collective wants involved:

− the need to develop strategic focus points: to understand how futures are prioritised and analysed in light of trends, business capacity and ability, business strategy and the value chain;
− the need to provide clear information about activities in the short, medium and long term to bring the desired futures into achievable reality;
− the need to introduce information that could further influence EDC’s strategy;
− the need to provide sufficient data to enable EDC to offer feedback about the impact of the workshop and of SuCo.

The flow of this last part of the workshop is expressed in Figure 8.10

Figure 8.10: Third-stage workshop flow

- A document explaining the analyses process of the “wish future” emerging
- A document was sent with the “tree exercise” for participants to fill
- EDC “tree exercise” answers
- Design dialogues direct/first analyse

- 1st exercise: Inform EDC and make the “wish future” a transparent process arising from each individual idea shared at the workshop
- 2nd exercise: EDC return the “wish futures” of “tree exercise” filled in
- 3rd exercise: Design Dialogues direct/first analyses
- 4th exercise: Summary of results: short-, medium, long term activities; dependencies and expected outcomes
Comments by participants

Table 8.3 presents general feedback from participants divided into two parts: feedback about how SuCo was applied and feedback about the commercial aspect of SuCo. The latter emerged from EDC’s requirement for an approach to marketing SuCo:

<table>
<thead>
<tr>
<th>SuCo’s application</th>
<th>Comments about commercial side of SuCo</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘The principles exercise was really good. It gave me an understanding of the others’ interpretation. Sharing and understanding, rather than output (our own principles) was helpful for me.’</td>
<td>‘Half the way between academia and industry. Have you worked out how to package it for when you approach companies? It is very important to tell them what is in it for them.’</td>
</tr>
<tr>
<td>‘How would you get it to an engine manufacturer that does not know anything about eco-design? I am interested in the transference process.’</td>
<td></td>
</tr>
<tr>
<td>‘Interesting; challenging; good to draw out ideas’</td>
<td>‘Scale; intensity; and transferability’</td>
</tr>
<tr>
<td>‘It would have been nice to have time to think about the principles (our own)’</td>
<td>‘You seemed to have spent quite a long time preparing for this (background data, trends etc.) How much time did you use, because we would have to justify this to a client, e.g. to spend 2-3 man weeks on preparation.’</td>
</tr>
<tr>
<td>‘First half of the day was best (before lunch). The day should have been cut into two half days, as it was a lot to take in on one day.’</td>
<td>‘The benefits of using this need to be clear (packaging).’</td>
</tr>
<tr>
<td></td>
<td>‘How do we assess what parts of the guide we need to use with a client? – e.g. select the right part?’</td>
</tr>
</tbody>
</table>

**Table 8.3: Feedback from EDC team during the work session**

How EDC used the results of the SuCo workshop afterwards was not monitored.

The next section presents the workshop with Corus UK, a multinational organisation interested in exploring the integration of social assets in the work of its Environment department. This was the second part of the validation process.
8.4.2. WORKSHOP WITH CORUS UK

The Corus Group is “a customer focused innovative value-driven company that manufactures processes and distributes steel products and services to customers worldwide” (Corus Group website). Corus UK belongs to the Tata Steel Group and is a multinational company.

Corus UK presented a strong need to explore the social assets of its organisation.

The Corus Group is strong on applying environmental measures, but felt the difficulty of exploring the social arena which, by definition, is seen as more subjective and less quantifiable, something which was out of their usual domain.

Initial contact was made with Corus at the Sustainable Innovation ‘06 conference ‘Global Challenges, Issues and Solutions’ in Chicago. There, a person representing Corus’ Environment Department expressed an interest in the Design Dialogues research project and in developing a further understanding of the project in relation to Corus’ activities.

Later a proposal was made to Corus to take part in the implementation step of the creation of SuCo together with a table of resources needed, time required and activities to be integrated within the session. A meeting was held with our Corus’ champion to discuss the process and Corus’ expectations in detail. At first a two-day workshop was proposed, but this changed to a one-day program.

The Environment Department of Corus UK was interested in exploring the social arena, which individuals had been intuitively perceiving as a need and which had been slowly pursued by the department as an important focus for Corus’ future.

Therefore Corus UK embarked on a journey to implement social assets (e.g. the value to society provided through steel products) at the core of the organisation with the support of SuCo.

Corus UK was asked to invite key people to the workshop including those who had:

- relative influence in decision making;
- internal knowledge of Corus and its strategic drivers;
- a personal interest in sustainability issues beyond the environment.

Corus was told that some of the findings would help to:

- understand the core principles of Corus’ social forces in order to explore a longer-term contribution to their department and organisation;
− link such principles to new relationships and opportunities for Corus;
− coalesce ideas and strategic directions for Corus over the short, medium and long term to implement social assets across the different business of the group.

SuCo methodology for this session utilised elements of Seeds of Change, and Agriculture, finding equilibrium in a mix of the cultural and the operational approaches. As expressed in table 8.2

Six people from Corus’ Environment Department attended the one-day workshop, which was held at their offices in Sheffield.

The challenge at this workshop was the language used, as a definition of sustainability was already installed at Corus that was measurable by direct and quantifying means as their driver was to reduce or eliminate impacts on the environment. Therefore talking about a different scope of sustainability from a qualitative perspective was a novelty. Nevertheless the need for a deeper social approach to sustainability was felt in the department. This was the first challenge for the workshop: to help create early steps in an approach to social assets for the Environment Department.

During the workshop the main activity focusing on break through the daily paradigm of the team, which it uses to respond effectively – as they are trained to do and are good at – to measuring and reducing environmental impact of their business. This was necessary because in the exercises they were expected to create different futures outside their safety zone.

Considering the above, the main feedback from some participants highlighted exactly this: the difficulty of thinking outside the box.

**Social Arena view**

Corus UK’s motivation for applying SuCo was mainly focused on the possibility of exploring the social dimension of sustainability. According to the view of this research, sustainability should not be addressed as detached from all the other areas that sustainability embraces such as economics, social, cultural and the environment; that is, sustainability should not be divided into: environmental sustainability, social sustainability, cultural sustainability, economic sustainability. Nevertheless, any area can serve to trigger a path towards sustainability integrating all the other areas. In the case of Corus UK the need point out to re-thinking on the social dimension and the add value Corus could explore, although this need was triggered by the
environmental dimension. Thus material was prepared to present this research position in relation to the social view of sustainability involving the involvement of all areas of sustainability. Figure 8.11 presents part of the position of this research shared during the session.

A presentation was given highlighted the importance of approaching the dimensions of sustainability all together, and not separately. This position helped, among other things, to present the view that Corus’ history of environmental strategies and actions cannot be ignored and provides a valuable background and an opportunity to pursue a broader view of the social dimension, as an excellent background in sustainability has already been constructed. This background can start to include the social dimension by taking on board other lenses different but complementary to the ones they use to their environmental approach.
Figure 8.8: This research view of the social dimension

at different levels
Process of the workshop

The workshop embraced the key elements of the process used at the EDC workshop (see 8.4.1). Any changes made aimed to simplify certain exercises (yet maintaining the flow), and to allow greater interaction between the analysis done in situ and the participants’ collaboration in the process. Further, following EDC feedback, a focus on the exercises and language simplification was made. This simplification was done by focused on communicating each exercise through examples and underlining what was expected.

Uncovering some results

Confidentiality was a pre-requirement of Corus UK to participate within the adventure of applying SuCo.

What will be shown is one example of a result of SuCo intervention at Corus UK. This example is an illustration of the possibilities revealed by relating key messages (aims) and the different activities found within SuCo arenas (People, Trades, Nature and Operations). This allows generating systems of action.

A system approach to activities increases the potential of the individual action due to its importance within the whole system. Furthermore, the capacity to diversify is increased and a multiply-actions approach when introduce them in a system. Therefore, the different actions were analysed not individually, but in an attempt to understand what systems were uncovered by the different actions. This relative inter-dependency of action operated towards the system main objective, helps in designing collaborative approaches.

However, the main benefit of approaching the results from a systems view is the possibility of prioritising actions, in order to create an action plan. It is easier to see actions that cross all systems, same systems, or belonging only to one system. Such a process reveals the leverage points, as they are the actions that cross the most number of systems. The next Figure (8.12) illustrates how this concept was applied to the analysis of the Corus UK results.

Later on, such leverage point actions could be classified as short, medium or long term (Figure 8.13 suggests a way of approach such path), as well as being evaluated according to their relevance and level of difficulty of implementation. An activity that is a leverage point is central to pursue the transformation needed, being a priority.
Figure 8.12: Systems of actions
Figure 8.13: Determining leverage points within a system view that relates individual actions created under the work session.
SuCo’s EDC and Corus workshop was a very important step in this research: it revealed the capacity of SuCo for adaptation to different contexts, to respond to a concrete need and to approach such a need from a holistic viewpoint. Furthermore, it revealed the importance of a commitment across the whole organisation, and revealed the importance of a top-down and a bottom-up approach simultaneously. It was felt that SuCo needs to integrate the management level as it was seen as having a highly strategic driver.

Applying SuCo in a small organisation and in a large corporation revealed SuCo flexibility, moreover both workshops covered different focus of SuCo which highlighted its ability to adapt to different needs.

The next section explores the main outcomes of the whole validation and evaluation process, exposing the key learning points, based on the feedback system that followed each step of this process and that allowed the development and refinement of SuCo.
Everyone is busy working in the business, not on it. It took me a few years to
get to a position of not earning but working on the business... and now it is
clear that the more I do that, the more successful the business is. TYF, 2006

The above quote highlights one of the main outcomes of this chapter: SuCo needs
the strong commitment of all participants involved in its application; one or two
champions to drive it are not enough. Further, it needs a high level of commitment
from company management. This is because SuCo focuses on inner transformation,
on the business’ culture and the way it operates (trading, activities, solutions,
results), therefore it is a methodology for rethinking the business itself in terms of
internal transformation (i.e. ways of being a business); and external ways of reflecting
the business (e.g. products or services – the customer interface).

The validation and evaluation process built an understanding of the different aspects
that helped the flow of the investigation:

— SuCo is not well-suited to a half-day workshop, as it is not a workshop tool.
Workshops were chosen as the interface tool to apply parts of SuCo as they
offer a possibility for activities and for attendees to express their creativity
(see Chapter 3 for more workshop characteristics).

— SuCo is a methodology that responds to the need to continuously solve
problems from a sustainability approach (i.e. from a holistic view). SuCo
requires a starting point – a problem, a need.

— SuCo is not a tool for quantitative measurement or a ‘quick fix’ for cultural
situations (it is strongly related in the business strategies for example); or
problems with products (e.g. what material to use). It can be seen as a
consultancy tool.

— time is needed to implement SuCo according to the changes sought. It is not
a sticking plaster – it requires time to flourish and the involvement of all
participants and management.

— the results are not instructions or a solution, but paths to explore within a
different mindset in order to resolve a problem or address a need. From
these, guidelines are created to operate accordingly, incorporating a holistic
approach to sustainability.
— development of content is the focus of a process different to the development of SuCo’s applicability (e.g. the exercises in the sessions with EDC and Corus). Content design focuses on developing the methodology itself (i.e. every element of SuCo), while applicability design focuses on the interface between SuCo and the user. This research focused deeply on the development of the content and it was important to test this, which implies designing it applicably. The design of the exercises and workshop flow are largely anchored in the professional experience of the researcher.

— the development of applicability is the focus of a process different to the one followed by the intentions of this research thus from SuCo.

Some points uncovered during the process of validation and evaluation were left without reaching a strong and conclusive answer. The development of commercial packs as described above was one of these points, together with the following:

— determine an audience or target: even if SuCo is more aligned with consultancy use and its applicability is more easily instigated using facilitation, this research did not explore audiences or develop work to correspond to a specific audience for the following reasons:

1. it is not discipline-oriented: the choice of a multi-disciplinary scope was made bearing in mind the risks and difficulties involved. Some of these are: a) not allowing a definition of concrete outputs; b) not addressing a concrete language; c) not focusing on a specific number of problems. Nevertheless, this methodology was created to follow and integrate fractal system characteristics (see Chapters 6 and 7), to potentially embed: an unlimited problems and a wide range of levels in different dimensions, allowing a diversity of backgrounds and experiences of people to use SuCo. This allows different conversations to happen among different people, breaking down the custom of departmentalisation of relationships and exchanges in organisations;

2. communication, focusing on use of language. According to Chomsky (2005), besides ‘genetic factors’ other factors in the growth of language are experience and principles of efficiency computation. Experience relates to an ability to use language, while efficiency computation relates to the capacity for linkages and the emergence of new ways of language (N. Chomsky, 2005). This view offers a broad perspective of what language is. This is important, because the feedback underlined the difficulty of comprehending SuCo at first
glance (also because it is different from existing tools). This difference is deliberate, because one of the main intentions of this research is to offer a means to provoke change: it proposes a different paradigm for acting towards sustainability. Language is part of a paradigm (Fitch, Hauser and Chomsky, 2005). Using ‘old’ paradigm language to communicate the ‘new’ paradigm in a more understandable way seemed contradictory and ineffectual. Words should be used in such a way that they reflect the desired change. If the objective is to introduce a different paradigm, different language should accompany it. SuCo is a language, and therefore it is not easy to ‘read’ it with the naked eye. Although adaptations such as to the context of use (as in an organisational context) should be taken into account, the key message should not be adulterated.

Addressing the creation of sustainability using SuCo’s approach will bring up questions that intrinsically reflect issues and ideas connected to the culture of people and their organisations, as well as revising how they communicate and express themselves externally through their outputs. SuCo ideally builds coherent bridges between the inputs (values, beliefs and behaviour) and the outputs (across the business cycle).

The following section gives an overview of the key points of this stage of the research and the impacts evaluation and validation had on SuCo in terms of its development and refinement, revisiting both the strategic foundations of this study and the characteristics of SuCo, with a focus on actively creating sustainability.
The validation and evaluation process was developed from an exploratory perspective. *Human-centred* methodology was chosen to shape the whole approach together with *narrative collage* and exploratory *consultative workshops* as a means to collect feedback. This allowed feedback from potential users and experts to be utilised to further develop and refine the methodology for the innovative creation of sustainability – SuCo – the outcome of this research.

This process was organic in terms of the relationship between the feedback and further advances in SuCo. The whole process comprised two stages: the first focused on evaluation of SuCo and the second instigated the validation of SuCo; however, elements of evaluation and validation were present throughout both stages.

Workshops were the interface utilised to present the results of the research and provoke conversations in order to collect feedback. Specific templates guided the sessions, making information easier to manage, capture and analyse.

Fifteen people from the *Sustainable Design Network* (SDN), all with different backgrounds and profiles, collaborated in this study. The results point to the need to define SuCo better in order to effectively communicate its scope to a broad and diverse audience. Following this feedback, deeper investigation was undertaken that allowed SuCo to be shaped into a holistic methodology for sustainability from an innovation perspective.

The Steering Group from *Design Dialogues* project gave focused feedback from both the industrial and the academic perspectives. SuCo was presented to the steering group at a more complete phase of development and with its content almost complete. The main feedback drove this research to refine the way SuCo’s potential was presented, communicated and explored. It also pushed the researcher to pursue a consultative path. Applying SuCo to real-world situations added value to the research.

EDC was responsible for putting SuCo into action for the first time. With this experience, different paths of development become clear: SuCo’s content application, marketing potential and commercial exploration. For this study it was important to select and prioritise the focus on application and opportunities to create awareness of SuCo’s basic strategic positions (e.g. multi-scale and multi-target).
Corus UK’s application of SuCo played a significant role in this stage of the research: it demonstrated SuCo’s versatility and flexibility by confirming the possibility of pursuing a view, an approach and results from a holistic perspective in response to different need: in this case to uncover Corus’ social assets. The workshop sessions helped to test further different types of exercises and guidance and to explore other ways of analysing and presenting the results.

The feedback system used instigated conversations and led discussion that fed the development of SuCo. This option was revealed to be risky, since presenting SuCo before it was fully developed made it difficult to receive meaningful feedback as the majority of the feedback pointed out shortcomings due to its non-completion. However, there were also many advantages: it was an interactive, efficient and effective way to evaluate and validate SuCo, shaping it according to the input of potential users and experts on the subject. As a result SuCo is constantly being aligned with the main concerns of key people. Further, evaluating and validating SuCo in this manner helped to discover SuCo’s limitations by uncovering new paths to be developed in the future (see Chapter 9).

8.7. CHAPTER CONCLUSION

The current chapter presents the Evaluation and Validation stage of this research as a creative journey involving participants’ ideas, experiences and thoughts, which helped to refine SuCo and encouraged the rethinking of the choices that frame it. This approach was chosen because it generates an appropriate environment for dialogues and conversations, allowing the collection of feedback during the stages of SuCo’s development.

Even though it was approached collectively, the evaluation was largely accomplished during the first part of this stage when three workshops contributed to the refinement of SuCo, and the validation was fully approached in the last part at the EDC and Corus workshops at which SuCo was applied. This research strategy gathered different types of feedback while developing SuCo’s content, allowing the co-creation of an outcome aligned with experts’ views in the context of the needs of potential users.

This essential stage of the study helped to:

- generate the whole concept and content of an approach (in this case, SuCo’s methodology with all its elements);
Chapter 8

- create awareness of use of language and ways to communicate (audience, contexts, interface, etc);

- comprehend the commercial side of SuCo in order to explore and transmit its potential.

Although SuCo is a complete methodology it is far from perfect. Chapter 9 presents insights into its future development, some of which originated from this evaluation and validation stage, as some of the feedback helped to define avenues for future research.

Chapter 9 constructs a discourse around the implementation of the research, the methodology and the literature review, in order to firmly relate them to each other and this research findings and outcome. It explores the implications of the research findings and discusses its the limitations. It summarises how the research aim and objective were met, examines contributions to knowledge and indicates how this research answered the literature gaps.
Is it possible to be responsible for the whole of mankind, and therefore responsible for nature? (...) To respond totally to that, one must know what it means to love (Krishnamurti, 1974).
9. DISCUSSION AND CONCLUSION

This concluding chapter highlights clear contributions to knowledge and potential paths for further research after presenting the research foundations, achievements, and limits as a synthesis of this study.

The current chapter presents the findings in terms of the implications and limitations of this investigation, grounded in the individuals and organisations that participated in this research; furthermore, gives an overview of the data analysis and research observation principles; research output development and its implementation anchored in the chosen research methodology to highlight limitations and strengths; and finally, summarises this research responses to the literature gaps.

9.0. SUMMARY

This chapter:

— gives an overview of the fundamental research theories and development;

— revisits decision making in the discussion section and proposes a fresh view of future research;

— indicates the different contributions to knowledge made by this study.
Figure 9.1: Summary of chapter content

Research path

Achievements

Contribution to knowledge

Foundations

Limits

Recommendations for future research
Chapter 9

9.1. INTRODUCTION

This thesis describes the journey to understand the \textit{Hows To} create sustainability. It gives an overview of key concepts of ecology, holism, system thinking and the relationship with sustainability, serving as ground base to defining the view of this thesis about sustainability.

It follows an historical overview about the different forces (political, social, economics) that shaped the view and practices of sustainability over time.

The research gives an overview about the position of design and main concepts related with sustainability and presents critics such as: majority driven for incremental approaches; focused on different stages of product development; not strategic enough, and trying to reduce unsustainability rather than creating sustainability.

Under a dialogues approach, experts and consultants defined the focus of this research on values, believes and motivations of individuals to create sustainability, together with the urgency of investigating organisations to understand how the relation between values and the outputs is constructed.

Findings lead to understand innovation for sustainability as a leap on current ‘busyness-as-usual’ paradigm, and the strong connection between the inputs and the outputs.

The need to apply what was learned pushed this research to create a model based on the elements needed to construct a model to be a \textit{systems methodology} (SuCO) which are: a minset; a framework, and a conceptual process.

This journey finished with the collaboration of two organisations in where this research deliverable (SuCO) was experimented and comment.

This chapter gives an overview of the key findings and their potential together with the applications explored during this study, together with discussing the findings (9.2), the research strengths and limits, stressing the successes and difficulties of the research process (9.3), and the section of conclusions (9.4) shows the contribution to knowledge of the research as a whole, indicating where its originality arose, and final recommendations.
9.2. DISCUSSION

The next line propose some key considerations and offers an overview of the journey taken and choices made leading to the findings; it provides a storyboard of the course of this study and, as any story, represents an individual perspective.

The Researcher Observations subsection sets out the study overview objectively, giving personal insights in relation to additional findings and referring back to existing literature, and is based on empirical experiences that emerged from the study when applying its outcome - SuCO.

A summary of the fundamental theoretical bases and hypothesis of this research is presented, along with the importance of dialogues with experts, consultants and organisations, and the constructivist grounded theory interpretative paradigm, reflecting on how the objectives of this investigation have been met.

9.2.1. RESEARCH OBSERVATIONS

While working in industry as a Services and Product Strategic Innovation consultant, the authors understanding of business systems grew as well as the developed of insights into missed opportunities in the views of innovation and product strategy caused by current approaches driven by marketing and economics; technology and science; and cultural and society needs (or instigating needs). Therefore the tendency is to rely on inducing needs at the expense of acknowledging other, greater opportunities presented in a whole-system view where existing interrelationships beyond (but not excluding) market views are yet to be explored.

The advent of sustainability as a concept and practice within the company enhanced the researcher perception. However, its potential remained, at that time, unrealised, being ‘sustainability’ used merely to provide incremental improvements to pre-existing products and/or services in a pre-existing ‘business-as-usual’ framework. In order to realise the full potential of sustainability, it was consider the need to question what is being produced and why, and the essential aim of the business concerned.

There are different ways to innovate beyond what is traditionally seen as innovation (incremental, technological or marketing-driven, for example): ways more in tune with a view embracing collaboration, where different value chains of different businesses can start to operate together, providing solutions (that support individuals, communities and the overall population).
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The researcher interest for sustainability thematic is born from the experienced difficulties of getting businesses to engage with sustainability firsthand, and later on, when applying SuCO in the organisations that participated in this study, this difficulty was felt once more. However, the challenge lies beyond merely engaging business with it. The method of application of sustainability needs to be confrontational, and this requires a different system with different objectives and values in order to create sustainability and shape prosperous (desirable) futures.

This view indicates a gap between:

— a) the different views defended about what is and what encompasses sustainability from different starting points; and b) existing tools that focus on singularities such as branding; production; logistics; systems; services; product features (e.g. the environmental impacts caused by disposal (waste), materials applied, energy use, patronage activities, lean manufacturing, etc);

— b) the emerging need to install a new paradigm in which sustainability is the mindset employed to create, implement, develop and evaluate any initiative; and,

— c) understanding that the final objective of any tool should be to create sustainability rather than diminishing unsustainability as described by Ehrenfeld (2004) in Chapter 2.

9.2.2. RESEARCH AIM

Emerging questions without satisfying answers such as:

— the feeling of limits, scarcity and finitude following Factor 10 predictions (i.e. the need for a 10-fold increase in efficiency, energy, and material and resource use - see Chapter 2;

— the sense of the unexplored potential of dialogues and what they can bring to light;

— the devaluation, misunderstanding and misuse of people's creativity (i.e. human capital), seen as labour, for example; and,

— the fundamental idea of radicalness (not extremist, but encompassing opposition to the established paradigm) are the key elements that framed this research to address the implementation of new ways of delivering pathways towards sustainability and to construct possible futures that
embrace the philosophical views of Factor 10 (the softer side: shifts in perception - see Chapter 2).

The aim to contribute to ways of dealing with the above was revealed to be anchored in viewing design beyond its discipline boundaries, taking a strategic role through its intervention in organisations’ sets of values, strategies, structures, systems, processes and actions (e.g. visions, objectives, activities, results, solutions). This occurred because the outputs of the organisations that participated in this research were proved to be strongly intertwined with inputs, providing, early on, a strong orientation for this investigation. Therefore the objective was to understand how design thinking can be used by organisations to incorporate and implement interventions that enable transformation from unsustainable to sustainable business practice in the context of a Factor 10 improvement.

Why, if design is central to this investigation, focus on business? Design is a discipline responsible for creating business output (mainly products or products’ attributes) and, according to Dewberry (1996), it generally responds directly to a briefing document. This briefing is mandatory: it lays out companies’ strategic directions. If transitions in the outputs require interventions at the level of inputs (briefings) – e.g. different business motivations – businesses’ visions, strategies and objectives are the target to modify the briefings made for designers. This reflects a key idea of the late theoretical physicist Bohm (2000), who considered that radical changes in the way we do things require changes at the level of thoughts and ideas. Figure 9.2 maps the persistent disconnectivity existing in the majority of business arenas compared to the aim of this research: to instigate connectivity in relation to values (inputs) and solutions (outputs: products, services, processes, systems).
9.2.3. MAIN RESEARCH FINDINGS

The first giant step of this study was to understand from a different perspective design and sustainability; therefore discouraging the view of sustainable design (a design activity that sustains itself), and reinforcing a view of design for sustainability as designing flourishing futures, as pointed out in Chapter 1:

Designing (design thinking) lies on the decisions and considerations which establish the parameters of what is going to be created. Decisions and considerations which involve wider notions of connectivity and contextualisation towards the integration of social, cultural, economical, environmental realities that critically frame the manifestation of design prior to its existence (Manzini, 2005; Wylant, 2009)

Flourishing is about opening, uncovering, setting free and discovering new perspectives on values and evaluating and validating choices; planting seeds of knowledge to create better options; acknowledging the dynamics of the living system and the importance of the individual; the human imagination and the limits of acceptance and comprehension.

Futures represents the network of individuals and/or organisations bound together by visions, goals, motivations and aspirations which, by interacting, interrelating and accepting their interdependence, are able to construct new intertwined (and not isolated) lifestyles towards an ecological meta-goal.
Chapter 9

Research foundations

The simple and yet complex notions above require authenticity and commitment, and the key ideas that inspired such view include the following:

— Ehrenfeld’s (2004) statement that sustainability is not the opposite of unsustainability. As presented in Chapter 2, sustainability and unsustainability are categorically different: while unsustainability is measurable, provokes reductionism and induces an incremental path; creating sustainability is not the same as reducing unsustainability: it is aspirational, translates the idea of open paths to the opportunity of flourishing in the future (Ehrenfeld, 2004);

— the initial and pioneering work of Manzini (1992, 2005), which challenges the designer’s role of designing things better, emphasises the potential to be a central piece in a multidisciplinary arena constructing new social systems aiming to achieve sustainable futures;

— the central ideas of Papanek (1972) in respect of the relationship between design and the designer’s responsibility regarding environmental damage and social degradation (in values and needs);

— ideas of living systems from the notable work of Miller and Miller (1994), opening avenues for systems thinking, which is viewed as a fundamental to approaching sustainability by Senge (1990);

— the great importance of the key fundamentals of the first report of the Club of Rome, The Limits to Growth (Meadows et al; 1972), of which Factor 10 is an articulation. The Factor 10 Manifesto (Schimidt-Bleek, 2000) argues that Western economies need to become 90-95 per cent more efficient in their use of materials and energy by 2050;

— Gaia Theory (Lovelock, 1986), whose ecological view scales to the planet and solar system in comparison to a popular scale which encompasses the environment as an externality to lifestyles;

— finally, and as stated above (Chapter 1, 2, and 3), Bohm’s (2000) main thoughts about the need for interventions in order for change to occur: radical transitions in action require radical transitions in thinking. This overarches the whole investigation.
Chapter 9

**Interventions disconnected from behaviours**

The first stage of data collection was collecting the thoughts, ideas and motivations of people, conversations with sustainability experts; these experts covered ecodesign and environment-related practices; ecological economics; corporate responsibility, and business strategies (see Chapter 4). The dialogues were approached at a very individual level for a deep understanding of these experts’ perspectives.

These conversations uncovered the importance of personal commitment. It was pointed out that without such commitment any approach to sustainability loses impact due to its failure to fully explore individual accountability and creativity potential. Personal motivation was also seen as imperative in individuals’ engagement with sustainability.

The key lesson learnt from these first conversations indicated the need to engage with individuals in order to produce radical change together with the strategic level by which changes need to happen: one embracing Earth’s capacity to sustain unlimited growth.

Figure 9.3, below, aims to synthesise the status quo relative to the various activities emerging, which focus on reducing unsustainability, as the majority of initiatives do not seek to create sustainability. Such finding is a case base of this research as it framed the need to understand how sustainability can be created.

**Figure 9.3: Disconnectivity between the inputs and the outputs of a system**

The focus on reducing unsustainability was addressed not only through conversation but also by looking at existing tools (see Chapter 2 and Chapter 7).
In light of the above, the need to look at organisations already embedding sustainability’s values and having outputs which reflected those values, i.e. creating sustainability is uncovered. Six companies were investigated in depth selected according to their external communications, identity and values (see Chapter 5). Conversations revealed the dependency of business’ values on the personal values and beliefs of key individuals. This dependency was also connected with how these values are applied in the corporate whole.

Due to their strong dependence on key people’s values, the driving force of these businesses is anchored in their human capital: staff and their creativity, motivation and willingness. Human capital is responsible for putting into practice the notion of natural limits of growth on a daily basis, both in the business itself and framing, from an ecological viewpoint, their actions and impacts. The findings show that the above is related with acknowledging one’s own responsibility and the impact of one’s decisions on the whole ecological system, both inside and outside the organisation.

To inform individuals’ decisions towards sustainability these organisations embraced some or all of the following:

- structures adaptable to business, staff and actors across the value-chain needs, including the needs of communities and the natural capital;
- leaders acting as facilitators for decision making;
- a perception of business and its stakeholders and their interdependency that goes beyond the chain of business actors and shareholders;
- self-management to accomplish objectives, instigating empowerment;
- the implementation of systems thinking to encourage greater innovation on the local and global scales;
- sharing, learning and relating, by providing an open culture and acknowledging opportunities arising from cooperation and synergies.

**Emerging guidelines**

The outcomes of both the dialogues with experts and organisations started to shape the key guidelines of the research findings:

— experts insisted on motivation on an individual level in order for interventions to fully utilise the potential of sustainability. Within the organisations, such motivation was seen as the values framing the business and therefore the
decisions taken. These two views combined indicate the need for intervention at the level of conduct of actions (i.e. values) which should be expressed in strategies, translated into objectives and finally completed with coherent and systemic related actions.

- it was understood that both experts and companies have their own ways of deeply questioning the established (i.e. business-as-usual), and, by doing so, are capable of opening up avenues for engagement at different scales of intervention. This suggests the act of asking different questions at the conceptual level, potentially produces interventions at different scales in order to create sustainability.

Both the guidelines expressed above indicated views intrinsically related to innovation because they constantly challenge what people know and do. De Bono considers this fundamental to innovation (1995). The different dimensions of performance at the organisational level should also be explored, as defended by Drucker (1988).

**Developing the Thesis deliverable - SuCO**

This study’s journey outlined findings which influenced the deliverable of this research: innovation and the different scales of intervention.

- having the driver of innovation at the core of the sustainability challenge. The literature of sustainable innovation (SI) (Chapter 2 and 6) concludes that SI does not challenge the current business value-system as the sample in this investigation does. The literature looks at environmental strategies that can be used to guide product success (see Hart, 1995) and reinforces the aspiration to create different market demand and add value to products, as suggested by Anderson (2004: 3). If market demand alone governs activities, the potential to create sustainability will be limited to what people know today (Dewberry and Monteiro de Barros, 2008). Thus this perspective offers a clear avenue of thought to be followed by SuCO: to challenge the current business value-system and what people know and do.

- the diversity of interventional scales, uncovered by the analysis of dialogues with organisations, is seen as offering potential for broadening the scope of innovation beyond eco-design and product development processes. This provided the foundations of the model for innovation for sustainability that SuCO follow. Nonetheless, it was found that a strategic change in the culture
of organisations will be necessary in order to bring about greater levels of sustainability and to explore different interventional scales.

These parameters, selected after intensive analysis of the conversations, framed the next stage of the research:

Create a holistic model to innovation for sustainability, embedding radical innovation and linking what is currently fragmented: 1) organisational responsibility – values, beliefs and motivations; 2) the outputs associated with the operational processes and product development and improvements, to provide a view of how to intervene in order to achieve radically different outputs.

Chapter 6 portrays SuCO’s development path, guided by the key findings mentioned above together with living systems theory, which recognises both abstract systems and concrete systems (Bailey, 1995:85-86; see Chapter 6); and simultaneous application of the different development stages of SuCO by a network of interested people (SDN network) and two other organisations (see Chapter 8).

This journey helped to uncover a central meta-aim of this investigation anchored in understanding a holistic model to innovation for sustainability as a challenge to the current focus on market demand and the economic bottom line. SuCO needs to open up the potential of governments, organisations, teams and individuals to take a leap in their patterns of behaviour which will not only reflect the conclusions of the data analysis but also provide feedback on emergent concepts in biology.
Nottalle (2007:206) defines a ‘leap’ as a gap in evolutionary development (i.e. linear behaviour) provoked by turbulence. This perspective illustrates a new and exciting understanding of innovation towards sustainability, as it highlights the need for a paradigm change provoked by turbulence (e.g. external turbulence: scarcity of resources; internal turbulence: change at the value-system). The new paradigm should embrace a sustainability culture in order to open avenues to frame sustainability-oriented futures differently such express in figure 9.5.

Figure 9.5: Research view of innovation for sustainability: Provoking an evolutionary leap for radical demands (e.g. F10)

The objective of this research deliverable – SuCO - encompasses the ability to generate sustainable cultures and operations (i.e. SuCO: methodology for innovation for sustainability). The intention of SuCO is anchored in helping to create sustainability by exploring the potential of social interactions and cultural change together with actions that connect and work in harmony with these. In summary, SuCO seeks to provoke such a leap for radical demands (e.g. F10 demands)

The next section presents the weaknesses and strengths of this research followed by presenting the limits and strengths of the use of dialogues and Lastly, an overview of the same elements regarding this research delivery: SuCO methodology.
9.2.3 CONTEXTUALISING THE RESEARCH FINDINGS

This research findings and delivery find resonance with other contemporary research work that have as umbrella understanding systems innovation and radical innovation for sustainability.

The first research work belongs to Jaco Quist (2007) aiming to understand decision-making that drives socio-technical systems to change. The second investigation work by Hanna Hellman (2007) explores radical innovation to understand how and what makes organisations adopt radical paths from a technology point of view. The third research work from Robert Van Den Hoed (2004) looks closely to processes of change regarding: how technological innovations emerge, how large firms react to them, why some manage to break through and are commercialised, and the role of governments in pushing radical technology from begging to end towards sustainability goals.

The next lines will establish a discussion between these investigations and this research.

9.2.3.1. Decision-making for systems change

The nature of Quist (2007) work aims to understand decision-making that drives socio-technical systems to change. In terms of world view, comes from a socio-technical position. This research comes from another point of view, strongly grounded in ecological writings (ecocentric) and sociological.

Strong communalities can be stressed between the work foundations and key findings of Quist (2007) and this thesis, such as:

- the notion that existing systems rules cannot solve complex and persistent problems related with sustainability;
- the need for different rules in the system to allow new mechanisms to emerge;
- the importance of a multi-actor approach (participatory and interactive);
- the need for multi-level approach and intervention;
- considering multi-aspect (system thinking);
- short-termism decisions are incrementalistic and anti-innovative (Pesh and Quist, 2011:17);
- long-term system orientation is key;
addressing social change;

the notion of desirable future for possible system innovations for sustainability;

process of intervention: envisaged first (desirable futures); identifying what steps need to be taken to bring about that future (possible futures);

visions are shaped in a decentralised bottom-up;

Quist work looks at constructive elements from decision making such as: Stakeholder involvement (collaboration among a wide range of actors), learning (holistic perspective and involving the individual), and long-term perspectives (future) such as mention in the article of Pesh and Quist (2011:2,4,5).

Form the research work reported on this current document, the view of stakeholders involves more than the collaboration of actors, it involves communities, and individuals across the whole business cycle, as well as nature and ecosystems. Further the view of individual differs from an element that forms a collective participation to seeing individual as key for everyday solutions where the individual values are key.

Relates new ways of doing with learning, thereby concerns changes on behavior (Pesh and Quist, 2011::12), but it does not refer the importance of having an interventional way of relating both such this research does.

Lastly, the focus of Quist (2007) research is on decision-making towards sustainable technologies and innovations, while this research involves creating sustainability at different scales and fields, beyond technology innovation, aiming for establishing a strong relationship on the disconnection between production and consumption towards a different society and life-styles.

9.2.3.2. Early adoption of radical technologies

The research work of Hanna Hellman (2007) explores radical innovation in the light of how and what makes organisations adopt (in early stages) radical technologies and the factors that are determinant for it. The nature of this work comes from a social economic world view: focuses on a radical innovation technology acceptances (in terms of unfamiliar to market and actor internal and external) related with disruption of supply chains; uncertainties (about if and when market is ready due to the novelty it brings); and experimental logic and continuous learning. (Hellman, H.; 2007:94)

Radical innovations are associated with concepts of probing and learning in order to be embedding by organisations (Hellman, H.; 2007:91). This process is described as “an
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interactive process of multiple experimental and feedback loops” (Hellman, H.; 2007:90) which is related with a probing and learning process overtime (ibid:91).

Commonalities between Hellman (2007) and this research lye on the way Hellman (2007:86-87) characterises radical innovation:

— process that involves multiple intermediate and parallel development comparing to a single development towards a final result

— experimental logic and learning dominance in reference to analytic assessment of available

— opportunities identification towards radical innovation involves continuous learning between all interest parts, rather than from an understanding and meeting costumers needs

— related with the capability of absorb uncertainty and anticipate opportunities

— explores strategic decision making and organisational learning as elements that are closely related with probing.

— relates radical innovation with continuous learning. (Hellman, H.; 2007:94)

Although differing in the nature of world perspective that frames the investigation, this research also relates innovation to the act of dynamic learning. An important commonality is that radical innovation, by being associated with the process of probing and learning overtime requires a different mindset, a method and a process to be embedded and achieved. By As the author refers: “needs an entirely new product development methodology” (Hellman, H.; 2007:93) and reinforcing the idea that the key question lays on the “how”, Hellman (2007:93), and this investigation goes into companies to gather the HOWs TOs of probing and learning towards sustainability.

The two different approaches to decision making around radical innovation (one more operational (Hellman, H., 2007), the other more at the values set and behavioural stage- this thesis) are complementary. Both treat different factors around decision making but equally at strategic level beyond product development.

9.2.3.3. Processes of change regarding technological innovations

The van den Hoed (2004) work comes from a technological economics world view which ends by relating findings with behaviour. The difference of this thesis view and the van den Hoed (2004) can be summarised in that the latest work can be seen as focusing on the hard side of F10 in where radical technology represents a shift in the
technological paradigm (van den Hoed, R., 2004:6) while this thesis focus on the soft side of F10. Further.

Van den Hoed (2004) work studies the process of change (van den Hoed, R., 2004:258) to understand: how technological innovations emerge, how large firms react to them, why some manage to break through and are commercialised, and the role of governments in pushing such paths towards sustainability; while this research aims to provide an approach to provoke change. Both views are complementary.

Some commonalities can be underlined:

- incremental steps will not suffice to achieve sustainable development, and that more radical change is required (ibid:4)
- it indicates actors (people) as key to drive technological changes (ibid:56).
- It is point out that a barrier for radical technology is acceptance (ibid:58), which can be looked at through the lenses of organisations change behaviour towards innovation for sustainability.
- one factor that is determinant for an organisation to pursue a radical path (e.g. adopting a radical technology), is their culture which influence their decisions (ibid:78).
- In the network of actors, internal factors as motives are referred as a key factor for organisational acceptance of early stages of a radical technology (van den Hoed, R., 2004:88).
- dialogues, conversations, and discussions as essential sources of change across the different levels of influence (ibid:244).

The research work of van den Hoed (2004) describes different models of organisational behaviour for decision making: rational actor model, economic model, institutional model and cultural model. Although people are taken in consideration, the individual is not underlined as this thesis does. Values commitment is seen as a collective acceptance (ibid:69).

In addition, the work of van den Hoed (2004:65) refers to values; the notions of values differ from this research. The values from van den Hoed (2004) study can be seen as a moral framework related with preferable behaviours dictated by, for example, organisations or institutions. Under this thesis view, values are not a moral framework, but what is valued beyond financial achievements. Further, van den Hoed (2004)
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defends firms size as important to adopt radical technology (among other factors); this research by applying part of the deliverable of this thesis (SuCO) to both a large organisation and a SME, defend that a paradigm change does not relates with firm size but with the values-set of people (and not organisations only).

9.2.3.4. Transversal commonalities

These three investigation works together with this research have strong similarities and arrived to similar findings, mainly:

— Identify the importance of paradigm intervention: short-termism (Quist, 2007); radical innovation associate with a different mindset (Hellman, 2007); shift in the technological paradigm (van der Hoed, 2004).

— Look at sustainability for a boarder perspective: rules to provoke changes in socio-technical systems (Quist, 2007); concepts of probing and learning to change the system (Hellman, 2007); organisations change behaviour (van der Hoed, 2004).

— recognise the importance of the individual: Participatory approaches (Quist, 2007); internal and external actors in the path of acceptance (Hellman, 2007); network of actors (van der Hoed, 2004).

— Strategic interventions: long-term system orientation (Quist, 2007) explores strategic decision making (Hellman, 2007); change in behaviours (van der Hoed, 2004).

— Innovation perspective: vision desirable futures for systems innovation (Quist, 2007); radical innovation involves continuous learning between all interest parts (Hellman, 2007); Cultural and behaviour (van der Hoed, 2004).

— Multi-level and multi-scale: Multi-actors and multi-aspects (Quist, 2007); multiple intermediate and parallel development (Hellman, 2007); different factors of change (van der Hoed, 2004)

The next section will refer the strengths and weaknesses of the research, underlying also the strengths and weaknesses of the research deliverable (SuCO), and the limitations and strengths of the use of dialogues.
9.3. RESEARCH STRENGTHS AND LIMITS

This research involves many different fields. This characteristic plays an important role on defining key strengths but also weaknesses that are expressed on the following table:

<table>
<thead>
<tr>
<th>Strengths of research</th>
<th>Limits of research</th>
</tr>
</thead>
<tbody>
<tr>
<td>It places Design in the context of Sustainability and not the other way around as it does traditional views of eco-design and the general focus of design discipline: on product development. Chapter 2 – table 2 – shows findings in literature in where sustainability is one of many elements to deal with on the process of product development, traditionally targeting materials and on the last decade, product life-cycle.</td>
<td>According to the findings of the SDN workshop - reported in Chapter 8 - designers and product development experts reported an uncomfortable sense with the findings of the research because: (1) it challenges the discipline boundaries; (2) propose design to be more strategic and intervene beyond product development to act towards sustainability; (3) and points out to a focus on the system that generate outputs (e.g. products as a possible outputs) rather than trying to focus on a unit improvement (such is a product) or a feature of a unit (e.g. material).</td>
</tr>
<tr>
<td>It embraces the strategic side of design and the ability of design to deal with complex problems to create solutions. <em>Design thinking</em> is suggested as the focus that should be followed. The role of <em>Design Thinking</em> is to create sense of the different elements and issues associated to (a) context(s), priority to start designing solutions. The objective is to integrate several dimensions simultaneously (e.g. temporal, historic, social, cultural, economic, environment, etc.) of a given context.</td>
<td>Does not offer a tool, process or method ready to apply on a product development methodology</td>
</tr>
<tr>
<td>Multi-disciplined oriented in that it deals with different subjects commonly seen specifically through a discipline perspective, such as, for example, cultural change which is perceived to be a matter of sociology.</td>
<td>Not discipline focus; it makes difficult resonance with a discipline, thereby difficult to apply the research findings directly without previous interpretation and specific adaptation.</td>
</tr>
<tr>
<td>It presents a creative approach to methodology bringing together methodologies from outside the normal domain of design research in order to create a view of dialogues as a methodological approach to understand design and</td>
<td>Does not go deeply into the disciplined oriented traditional usage of the methodology applied on this research</td>
</tr>
</tbody>
</table>
### Table 9.1: Summary of the research strengths and limitations.

<table>
<thead>
<tr>
<th>Description</th>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges notions of innovation for sustainability</td>
<td>Does not go deeply into innovation theories</td>
</tr>
<tr>
<td>The research promotes a more qualitative perspective of the Factor 10 concept</td>
<td>Does not quantitatively evaluate the Factor 10 perspective of the research</td>
</tr>
<tr>
<td>Refers to the goals of Factor 10 as the future context of business and industry</td>
<td>Factor 10 may be considered an out of date concept and not as topical as the low carbon economy or climate change.</td>
</tr>
<tr>
<td>Extensive overview of a number of philosophical approaches to sustainability in and outside design</td>
<td>Does not present a deep criticism of each concept (e.g. Cradle-to-Cradle)</td>
</tr>
<tr>
<td>Proposes a way of thinking towards sustainability and design</td>
<td>An ambitious philosophical agenda that might limit interest in its practical application</td>
</tr>
<tr>
<td>The research body of literature is highly populated with ecology writings, and concepts and ideas considered from the ecological field; relating Holism as part of the ecological world view, defending a perspective of sustainability that encapsulates both through systems thinking, trying to focus on the roots of unsustainability - the whole - rather than in specific problems brought by unsustainable practices (e.g. waste management).</td>
<td>Risks being seen as theoretical or in opposition to economics and technology, as well as too abstract.</td>
</tr>
<tr>
<td>Suggests a different view of sustainability by detaching it from sustainable development</td>
<td>Challenges the mainstream perception of sustainability, strategically and practically</td>
</tr>
<tr>
<td>Apart from delivering valuable findings and recommendations, such findings served as foundations to create an output (i.e. SuCO) to start intervene in systems and create sustainability.</td>
<td>Can limit the reader to conclude that this research is about SuCO (research output). The research findings illustrate the process and outcomes of a dialogues based methodology. It was an investigation built by following the different research findings. Such constructive journey let to the development of an approach to innovation for sustainability: SuCO methodology.</td>
</tr>
<tr>
<td>It integrates design thinking into cultural, organisational transformation</td>
<td>Makes a reference to the importance of cultural transformation and existing approaches for business change, but does not deeply explore theories of change and transformation.</td>
</tr>
</tbody>
</table>
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The table 9.1 gave an overview of the key elements that are, at the same time, ambivalence as represent both limits and strengths of the research. To complete this critic evaluations, it is necessary to also analyse the strengths and weaknesses of the research process.

9.3.1. RESEARCH PROCESS STRENGTHS AND WEAKNESSES

The strength of the research process can be summarised as following

— A key strength of this research is the foundation in expert’s contribution and organisations contribution. Additionally, SuCO had a process of validation and evaluation that included experts’ and organisations’ feedback, and finally, SuCO, was applied twice within industrial settings.

— Along the same lines, deep conversations were employed as the backbone of this investigation, bringing a depth of understanding to the study.

— The findings are not the sum of the elements the data uncovered: they are a synthetic view of the main factors that help to create sustainability.

— SuCO was constantly modified, adjusted and applied, embracing people and organisations feedback in the validation and evaluation stage of the research. This interactive process is a strong factor in the validity of the findings.

The limitations of the research process can be seen as the followings:

— This study employed only a small sample of individuals as participants. While enough data was generated to construct a broad view of creating sustainability, the size of the sample relevance can be subject to criticism.

— Although using different businesses of different sizes resulted in a valuable outcome in terms of how it proved SuCO’s generalizability (under section 9.4), it also created a more abstract result by not being specific to any type of industry or organisation, profile or discipline, problem or problematic, etc.

— The human centred approach using the narrative method brings advantages in terms of richness and creativity but is risky, as expressed in Chapter 8. The risk lies in the continued exposition of the unfinished outcome, which may jeopardise the credibility of the research: people expect to see results and not to be actors co-creating the result themselves by participating in a
small part of a systemic process designed for that purpose whose end is uncertain.

— Furthermore, this research is framed in a non-traditional methodological path focused on dialogues, which enrich the process and the results but is strongly dependent on qualitative data, which although ‘rich’ in nature, is not appropriate to draw representative findings from in the context of this research.

— The multidisciplinarity embedded in this research can bring problems of understanding, as words and concepts tend to be used differently across disciplines.

— The bias of the author (personal interests, background and professional experience), even if it could be considered a strength, was responsible for driving this research in certain directions [as with all doctoral research].

— The participants’ bias regarding how they saw and perceived this investigation and how they perceived and conducted the dialogues are also limitations in this research.

In order to reinforce the critical view presented here, the next subsection aim to uncover the strengths and weaknesses look at form this research methodological use of dialogues, in which will follow a view about the same elements regarding the research deliverable.

9.3.2. STRENGTHS AND WEAKNESSES OF DIALOGUES

As already explored in chapters 2 two and chapter 3, dialogues can be used as a methodological approach. This is mainly recognised as narrative methodologies that provide a deep understanding of peoples’ views, motivations and beliefs where the use of these methodologies helps to start a transformative process (Mitchell, M. and M. Egudo, 2003). The use of dialogues, narratives and story-telling has been intensively reviewed in organisational literature in Chapter 2 for example by Stephen Denning (2006, 2007, 2010) who emphasises narratives as a method for transformative and radical management. Ferrier (1998) also concludes that the narratives/stories gathered from the use of dialogue-based methods are a:

Contextual construction of meaning and the validity of multiple perspectives; knowledge is constructed by people and groups of
people; reality is multiperspectival; truth is grounded in everyday life and social relations; life is a text but thinking is an interpretive act; facts and values are inseparable; and science and all other human activities are value-laden. Ferrier (1998 in Mitchell, M. and M. Egudo, 2003:7)

Dialogues embodied the way thoughts, beliefs and motivations were collected through this research project and were used to:

— capture transformative journeys, such as those discussed by Bohm (Bohm et al., 1991);

— explore the characteristics of dialogues described in Chapter 3, and

— align with ideas of narrative methodologies in which “stories told within their cultural contexts to promote certain values and beliefs can contribute to the construction of individual identity or concept of community”. (Mitchell, M. and M. Egudo, 2003:8).

Dialogues contributed to data analyses in the different stages of the research and to validate findings (e.g. dialogues with experts to validate literature findings and guide literature focus; dialogues with consultants to validate findings of dialogues with experts and re-direct literature). Dialogues as data analyses were also useful in the process of constructing the output of this research (a methodology to create sustainability from an innovation perspective) by engaging organisations in a series of dialogues in workshop contexts.

Table 9.2 presents a summary of the different application of dialogues within the research methodology, underlying key weaknesses and strengths.
### Strengths

#### Data collection
- Rich data - Personal views, deep thought and strong opinions
- Detail intensive

#### Data analysis
- **Contribution for data narrowing**
  - Time efficiency on distinguish important from less important data
  - Validation of ideas with stories that illustrate the concept (conversations with experts brought some conceptual ideas into light that were validated by consultant’s dialogues which populated these ideas with stories of their experience)

### Weaknesses

#### Data volume
- Detailed data
  - Intensive preparation pre-dialogues
  - Challenging focus maintenance during dialogues.
  - Difficulty to record without technological support

#### Time intensive
- Dependable on others (interviewees) willingness to share and openness to deep conversations as well as time.

### Contention measures

- Use of literature to guide conversations and capture essential data
- Use of games to construct a relationship and make it easy the share of personal thoughts, opinions, views.
- Use stories to illustrate difficult to express thoughts, opinions, values

- Scope of literature review included diverse fields besides the design and sustainability field underlying: ecology; biology organisational change; corporate sustainability, systems theory.

- Use of literature to construct framework for data mapping

### Table 9.2. Summary of limits and strengths of dialogues usage
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It has been reported that the use of narrative methodologies have been limited to disciplines such as psychology, sociology, anthropology, linguistics, organisation studies and history normally in an attempt to provoke change, understand culture, identity and tacit knowledge transfer (Mitchell & Egudo, 2003:3)

This thesis shares these intentions to provoke change, understand culture, identity and transfer tacit knowledge, to new fields focusing on the Hows Tos: within an organisation’s sustainability culture as well as understanding what a culture towards sustainability involves in order to further develop design thinking interventions that help to create sustainability, being this a contribution to knowledge.

The next subsection presents the main characteristics of SuCO and points out its weaknesses and strengths.

9.3.3. STRENGTHS AND WEAKNESSES OF RESEARCH DELIVERABLE

Like any methodology, the deliverable of this research (i.e. SuCO), aims to ensure commonalities in: a) mind frames; b) approaches; and c) processes). It also aspires to provide guidance about how to create sustainability by helping to (re)connect the inputs with the outputs of a system (e.g. organisation). In conclusion, its goal is to present a cohesive journey that enables a 'leap' in paradigm, as expressed above.

9.3.3.1. Potential of the research Delivery

Intertwining paths

In order to define the requirements for a paradigm change relative to the inputs and the key decisions for the development of outputs, SuCO was designed to provide a common journey and language towards sustainability. It encompasses two complementary yet independent intervention paths comprising different scales of activity:

— one path focuses on behavioural (cultural) changes in which SuCO implements a frame of reference (paradigm); elements for an approach to develop innovative strategies; and guidelines to redefine and implement action;

— the other path embraces operations to generate different perspectives on outputs, where SuCO provides new lenses through which to view interconnectivity, the development of new relationships across the whole business cycle and key points that translate the above into concrete outputs.
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When SuCO is fully applied it addresses innovation for sustainability from a radical perspective at different scales of the organisation and its business cycle. It promotes an approach to growing sustainable organisational strategies, structures, systems, processes and outputs in a framework that operates under ecological limits.

**Strengths and weaknesses of SuCO**

Both experts and organisations indicated that communication is a weak point in relation to sustainability in practice, in that they had difficulty transmitting its value. By approaching the act of creating sustainability using a common *methodology* (i.e. SuCO), communication becomes easier. This advantage relies on the fact that the practice of sustainability and communications about it gain coherence with the use of SuCO as an umbrella.

**Strong attributes**

A common methodology helps to share a structure language by, for example: 1) agreeing on the focus; 2) having a discussion platform around key elements; 3) pursuing the same objectives during the process and 4) transmitting desirable and potential outcomes. SuCO helps to embrace a common articulate and structured language.

In essence SuCO explores a broader view of design for sustainability (DfS) than a traditional view by challenging the DfS focus on improving what exists to develop understanding of its potential to create different sustainable visions, and thus sustainability. SuCO succeeds in painting a broader picture of the scope of DfS by providing a mindset, framework, and processes that explore design thinking and not focus exclusively on product development.

Where SuCO was applied, independent of whether the starting point was *operations* or *behaviours*, interaction with SuCO always brought up questions intrinsically reflecting issues and ideas related to what Meadows (1997/99) calls the goals of the system and the mindset or paradigm. SuCO provides flexibility alongside the levels of intervention, being those related to: a) cultural or operational driven; b) starting points (e.g. from attributes to strategies or from individuals to society); c) mindsets, frameworks and/or processes. Each SuCO element can be used individually, and the same is true to the pathway of intervention chosen (cultural or operational). This flexibility, synergy and (in)dependency are unique features of SuCO.

SuCO follows this research central foundation: sees individuals as responsible for creating sustainability. For this reason, the ‘target’ is not discipline-oriented; instead
SuCO targets the different scales of problem that encompass its several elements (Chapter 6 and 7). Creating sustainability is for everyone, and this openness represents the necessary intertwining of multilevel and multidiscipline approaches. Thereby SuCO is democratic methodology, i.e. available to the broad masses of people.

**Detected faults**

The abstract way in which SuCO was built reinforces the perception that it is ambiguous. However, SuCO is not a tool; it is a methodology potentially embracing a variety of tools. These tools are selected according to the objective of each step highlighted in the general process. SuCO can be seen as inaccessible and therefore requiring explanation and teaching if it is to be used.

Although ambiguity is not welcome in today’s business context, it is a characteristic that embraces a view of sustainability regarding time and slowness (e.g. Fuad-Luke, 2002), and potentially functions as a trigger for change in the business paradigm.

The fact that this research neither indicates specific tools and nor provides a tool as its outcome can be taken as a weakness, as, too, can the lack of a specific process defined in clear steps. SuCO’s real fault is that there are no key indicators or parameters to pursue to monitor and report progress.

Some of these voids in SuCO are addressed in the section on recommendations for future research, but first, the next section refers to other substantial findings of this research.

### 9.3.4. FURTHER FINDINGS

SuCO is not the only deliverable of this research. Conceptual models were constructed that present a new view of sustainability (see figures 2.2, 2.3 and 2.4, in Chapter 2). A look at sustainability from a systemic point of view is delivered by the conceptual model shown in Figure 2.2, which offers a historical perspective, intertwining the general views about sustainability with those pursued in the design arena. The second conceptual model (Figure 2.3) expresses the dynamics along the increase scale of focus in design over the decades, arriving at what is known today as ‘design for sustainability’.

Another conceptual model presented in Chapter 2 (figure 2.4) offers an interpretation of the history of design and its relationship with the environmental, social and political contexts. This conceptual model is important, as it brings together the different ways by which design addresses these different contexts. Madge (1993) underlines how
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"changes in terminology, for example, can sometimes indicate changing values and priorities, although they can also disguise continuities". These changes occur due to social, economic and/or political influences and external pressures.

This study has uncovered some gaps in the literature. Although SuCO is built with awareness of these, it is important to provide a new view of these gaps to show how the research addressed them. Table 9.3a and 9.3b present a summary of those gaps and consequent responses.
<table>
<thead>
<tr>
<th><strong>Literature gaps</strong></th>
<th><strong>This research response</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The literature shows design entailed in a discipline view of product development and stylist. Sustainable design still takes this view: it focuses on the attributes of existing or new products, embracing the old concepts of the throwaway society.</td>
<td>This study offers a different way of seeing and utilising design that embraces the capabilities of design thinking. It involves design in a deep relationship with motives to act and visions about a society we want to live in, as well as with the products, services and systems that design can generate.</td>
</tr>
<tr>
<td>Other levels of intervention have been suggested, that do not include design interventions, but integrate design into production and post product consumption areas (disposability problems).</td>
<td>In this research disciplinary boundaries are dissolved and bridges between them are suggested to respond to sustainability. An ongoing dialogue between individuals is proposed, beyond their particular backgrounds, in order to bring to change in strategic decision making in organisations.</td>
</tr>
<tr>
<td>The use of design to sustainability follows the business perspective which frames design as focusing on products, ignoring its strategic potential. Awareness of design thinking is not prominent.</td>
<td>This research transmutes design to a strategic role that operates as leverage to sustainability at a context base, to visualise scenarios towards factor 10 ith meaningful activity and action</td>
</tr>
<tr>
<td>Businesses struggle to incorporate sustainability: the majority try to incorporate sustainability elements in a departmentalised and separated way</td>
<td>This thesis proposes an approach combining different profiles and types of knowledge in order to design systems that operate ecologically.</td>
</tr>
</tbody>
</table>

*Table 9.3a: Summary of the research responds to gaps in the literature.*
<table>
<thead>
<tr>
<th>Literature gaps</th>
<th>This research response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation for sustainability is seen as incremental with different levels of improvement focus in the output. It is enclosed in a frame that difficultly integrates organisations’ ethics, visions and strategies.</td>
<td>A holistic view of innovation for sustainability is delivered in this study. The objective is to embrace and combine different views which together can deliver broader insights. The foundations of this study and of SuCO correspond to this principle.</td>
</tr>
<tr>
<td>Sustainability attempts to incorporate a framework of innovation although it operating under the traditional business paradigm</td>
<td>This research offers a new look into innovation for sustainability, and a radical methodology for sustainability under an innovation perspective which aims a paradigm leap.</td>
</tr>
<tr>
<td>The existing views, theories, methods and processes discount the individual, allocating responsibility to existing or future structures, systems, services or products.</td>
<td>Dialogues uncover the individual as leverage for driving sustainability practices. Values, beliefs and motivation provide the foundations for decisions, thus individuals play a central role in provoking and embodying the change required.</td>
</tr>
<tr>
<td>Sustainability has been locked into a view of sustainable development where financial achievements dictate the path of opportunities to innovate</td>
<td>This research sees economics as a systemic way of trading. It looks to symbiotic relations for inspiration to create, maintain or reform what exists. Economics is key to ecosystem generation.</td>
</tr>
<tr>
<td>The ecological paradigm often discharged from the existent approach to sustainability. Ecology tends to be minimised to mean environmental care, where problems are seen as requiring resolution through economic and management negotiation promoting unlimited growth.</td>
<td>The breakthrough is seeing ecology as an auto-sustainable system and a framework for any action or activity. Systems thinking is inherent in ecology influencing this investigation. The outcome of this research aims to help creating ecological systems of outputs towards sustainability.</td>
</tr>
</tbody>
</table>

Table 9.3b: Summary of the research responds to gaps in the literature (cont).
Before concluding this subsection it is important to address whether the research objectives were met.

Even though the project was conducted organically, the study has embraced and addressed each of the research objectives (see Chapter 1):

1) the key factors that enable design to influence and contribute to the decision making process in order to create sustainability were uncovered;

2) SuCO delivers an approach that offers a context for industry and businesses shaped by the requirement for Factor 10;

3) design thinking was fully explored within the intervention developed to guide people, organisations and design towards sustainability practices;

4) design thinking was utilized within this thesis to introduce systems thinking; recognise the old paradigm; establish a new paradigm; and build paths and relationships between the old and the new paradigms.

The next section summarises the Discussion section together with Contextualising the Research Findings and Strengths and Limits of the Research of this chapter, preparing the context for the conclusion of this thesis.

9.3.5. RELATING FINDINGS WITH RESEARCH QUESTIONS

This sections summarises the connections between the research questions and the different chapters that answer those questions. Presents a table (9.4) fully detailed in Chapter 1 (table 1.1).

<table>
<thead>
<tr>
<th>RESEARCH QUESTIONS</th>
<th>CHAPTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Identify the key aspects which enable design to influence and contribute to decision making towards sustainability.</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>- How can design thinking be used to achieve sustainability; influence/inform decisions towards sustainability; and intervene to enable sustainable outcomes?</td>
<td>Chapter 4</td>
</tr>
<tr>
<td></td>
<td>Chapter 9</td>
</tr>
<tr>
<td>2- Understand what approaches will lead to a future context for industry/business requirement to increase an energy and resource utilisation by 90% or F10.</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>- Can an intervention in decision making via design thinking achieve a radical or incremental approach to F10? Can both</td>
<td>Chapter 4</td>
</tr>
<tr>
<td></td>
<td>Chapter 5</td>
</tr>
</tbody>
</table>
Chapter 9

<table>
<thead>
<tr>
<th>Types of approaches be concurrent?</th>
<th>Chapter 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3- Acknowledge, adapt, design and develop new approaches, methods, processes and tools to guide organisations’ decision making towards sustainability.</td>
<td>Chapter 5.</td>
</tr>
<tr>
<td>- How can approaches, methods and tools to be used in decision making towards creating sustainability be developed, helping to incorporate and implement interventions towards sustainability?</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>Chapter 7</td>
<td></td>
</tr>
<tr>
<td>4- Understand how an intervention in guiding decision making can: introduce system thinking; help to recognise the old paradigm; establish a new paradigm; and build paths and relationships between the old and new paradigms.</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>- How can the perception of sustainability as seen (mainly) as an ‘environmental attribute’ be shifted and systems thinking incorporate?</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>Chapter 7</td>
<td></td>
</tr>
</tbody>
</table>

Table 9.4: Summary of the research questions and the chapters that contributed to construct answers

9.3.6. SECTION CONCLUSION

An overview of the key decisions taken and a synopsis of the research outcome have been presented, revealing personal perspectives on what triggers certain foundations that frame this investigation, as well as transversal discoveries that provide the framework for this research.

This research findings and deliverable is place in context by understanding similarities and diversities in relations to other research works about systems innovation and sustainability.

The above section also explicitly indicates the strengths and limits of this research, together with a critical view about the use of dialogues and presents of SuCO from the same critical perspective and other findings uncovered by the research.

The research findings have helped to prove the need for a connection between the values pursued and the outputs emerging from any system of development (from the individual to society as a whole, including organisations) to create sustainability. SuCO offers an alternative path by which to create sustainability with design thinking at its core. It embraces a unique perspective on Factor 10 and considers a reorganisation of how society engages with, uses and disposes of the complete range of its natural resources.
SuCO offers ways of rethinking current business responses to sustainability beyond the quick technological fix that often results in only incrementally reducing the unsustainability of current practices and outputs. Outputs (e.g. products) that aim for sustainability do not really explore the act of creating sustainability unless within the context of a business already embedding sustainability values. This study has made a valuable discovery: the approach to sustainability focus on product life-cycle should continue to be embraced, nevertheless it is not the only thing to be addressed; any decision about products and processes needs to be made within the context of the whole business-cycle and its own connection to ecological limits and social wellbeing.

The original contributions of this research are addressed below, including its contributions to knowledge, followed by and its successes and limitations. Finally, recommendations for future research are made.

9.4. MAIN CONCLUSIONS OF RESEARCH

This section considers the originality of this work’s unique perspective on design, sustainability and innovation, and its contribution to knowledge and generalisability.

The strengths and limitations of the research outcome have been summed up above; in this suggestions for future research are made under an internal and external view, ending by presenting planed publications.

9.4.1. ORIGINAL CONTRIBUTIONS OF THE RESEARCH

By understanding how businesses can use design to foster sustainability this research offers a fresh view about:

— approaching sustainability from a view that sustainability is a threat for businesses, instead of seeing it framing growth as a positive and fulfilling way of delivering a new ecological society, is another contribution of this research;

— design that breaks a mindset of focusing on product development to achieve environmental benefits

Moreover, this study views Factor 10 (F10) from an uncommon viewpoint that embraces the individual and her/his strengths to provoke changes to meet its demands: the soft-side of F10. F10 is seen, from this research perspective, as a new paradigm that needs to be introduced into today’s ways of being and doing.
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Another key original contribution is the way innovation for sustainability is characterised: A leap towards a different culture encompassing other values, beliefs and motivations.

In addition, the deliverable of this research is original in the academic and industrial/business fields related to: 1) the design current parameters of action (e.g. broadens the view of design); 2) sustainability arenas of intervention (e.g. joins two approaches, currently separated, the operational and the cultural) and 3) innovation perspective of sustainability (e.g. challenging the current value-system).

To conclude, the way this research embraces uncertainty and the risks taken during the research process bring originality in serious, rigorous research.

The next section underlines the study’s contribution to knowledge, suggests directions for future research and concludes this thesis.

9.4.2. CONTRIBUTION TO KNOWLEDGE

The following presents three ways in which this research contributes to knowledge more generally. These three parameters are suggested by Webb (2006:230): “The first, by means of the research process developed and utilised, is methodological. The second, in terms of the conceptual model derived, is theoretical. And the third, with reference to the content and findings of the thesis itself, is substantive” (ibid).

Methodological Contribution

This research has a particular view of dialogues, which is its strong contribution to knowledge from a methodological perspective. In its fresh look at dialogues this investigation embraces dialogues capabilities in as a philosophical approach; method; process; concept; and solution. It has provided evidence relevant to this study and has profoundly engaged in descriptive narratives of all the individuals who participated in this investigation. Further contributions relate to:

— The use of dialogues methodology in the discipline of design: as a tool to capture the motivations that frame actions,

— and on the field of sustainability: as a tool to understand the values and beliefs that are related with sustainable thinking and acting.

Theoretical contribution

The study’s contribution to knowledge from a theoretical perspective lies in the continued creation of conceptual models following the process by which this research
Chapter 9

was conducted. The process is based on an ongoing feedback loop: (1) collection \(\rightarrow\) (2) reflection \(\rightarrow\) (3) action \(\rightarrow\) (1a) collection \(\rightarrow\) (2a) reflection \(\rightarrow\) (3a) action etc. The models it originates are seen as valuable for both exploratory and deductive research stages when collecting data, making sense of data and exposing findings. The contribution of visual models (including the cognitive maps) allowed capturing the richness and deepness of data, helped on a systemic approach to data analysis and conclusions, allowed to transmit results visually. Further, SuCO was strongly ground on the use of conceptual models.

**SuCO contribution**

SuCO offers a methodology that provokes a paradigm change by connecting inputs (culture) and the outputs (operations) in a system (e.g. business). It is the practical application of the ideas defended within this research. SuCO looks for ways to solve problems and to guide the search for solutions under the umbrella of sustainability. It offers a language by which to approach and guide the instigation of questions to develop solutions. SuCO makes this search replicable, increasing its value for business usage, for example, as business seeks continuity of results and replicable lines of development to ensure results as against ‘inspirational’ results that risk not being reproducible and scarcity of ideas.

**9.4.3. GENERALISABILITY OF FINDINGS**

This thesis presents findings about changes in thinking and changes in action, therefore, because it scopes out an abstract process rather than a step-by-step process not focusing in specific field or discipline, it can be adopted by other disciplines dealing with change at: organisational, individual, community levels for example, the findings present a way of adopting different thinking and ways of acting, reflecting the need for a change in current actions and thinking, to address sustainability.

This research provides a backdrop of what a change-action of creating sustainability could look like (Ehrenfeld, 2004). This understanding can be adopted by disciplines that need to understand, from a practical point of view, how to link theory with action in this context of sustainability. For example, in the field of change theory Fullan, (2006) identifies a requirement to provide not only a theory for change, but also a change-action (ibid:8).

Further, the findings and outcomes of this research begin to answer the process of radical change practices shifting perspectives concerned with reducing
unsustainability to those aligned with creating sustainability. This starting point follows a process of understanding the relational potential of the innovation landscape presented at different scales of a system. This understanding is usefully translated to other fields that need to implement a radical change in current practices such as education, politics, and justice systems, or equally to organizational cultural change for example where there is a need to design and adapt innovation landscapes currently grounded in existing value-systems.

This research uses different sectors and different organisation sizes to gather data, and also to apply the research deliverable (SuCO), revealing that these research findings and the SuCO methodology can be applied to different sectors, industries and different organisational scales.

Finally, the approach this thesis took in using dialogues as a methodology can be transferred to other research processes that aim to seek a deeper understanding of personal views, opinions, and thoughts.

Recommendations for future work are divided in two views, a) relating this research with other fields of work – 9.4.4.; b) and pointing out what could be improved within the research deliverable – 9.4.5.

**9.4.3.1. Transferability of specific key findings**

In this section key points of the research are reviewed that are transferable to other disciplines, fields of action or sectors.

This research focuses on creating sustainability from a strategic design perspective. It addresses how design can act in organisations and start building paths towards sustainability. The key findings expressed below, are points that can be transferable to other disciplines (e.g. communication), different fields of action (e.g. politics), as well as other applications (e.g. technology intensive). This is due to the fact that the main outcome – the process of SuCo:

- proposes a different way of looking at design (design thinking)
- underlines the importance of values, beliefs and motivations
- points out the importance of the individual’s values, beliefs, and motivations to drive sustainability transformations
- helps create, relate and act in the context of a bigger picture of sustainability
- introduces the concept of whole business cycle
and characterises the sustainable business paradigm

The nature of these findings can be transferred, as mentioned above, regarding:

1) Creative processes of development (some examples)
   - can be adopted to be included in creative processes such as communication or marketing;
   - can be embedded in an existing innovation process that did not regard sustainability;
   - can be implemented in urban planning or rural planning.

2) Fields of application – for example fields that share a humanistic view or interest, where individuals are key elements:
   - sociological fields that focus on change (e.g. change theory);
   - organisational fields for change in strategies, structures, processes and/or outputs;
   - political fields to drive change in the regime of governance.

3) Sectors of application - These sectors share an intensive pressure to be sustainable; deal with culture and outputs altogether (e.g. transports deal with mobility culture and products to transport people or cargo), are a reflection of lifestyles. For example:
   - Transport/ mobility sectors: example - to re-think mobility in the context of guiding society to have sustainable-life-styles;
   - Construction sector: example - intervene to create communities (rather than individual housing) that share key facilities (e.g. waste management or energy generation);
   - Agriculture sector: example - decentralise food production (micro-generation) and create agriculture systems that function as ecological systems (e.g. permaculture).

**9.4.4. FUTURE WORK**

The results of this thesis can be looked at through the lenses of Transition Management (9.4.4.1.) as the research findings underline the need for transitions in cultures towards sustainability.
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There are also some similarities with research in the areas of Implementing Change (9.4.4.2.) and Change Theory (9.4.4.3.), which complement these research findings about managing change and measuring its impact.

Regarding system innovation and sustainable innovation, the outcomes of this thesis are very timely in helping to populate an emerging innovation landscape that begins to make sense of the differences, similarities and currents of thoughts, and by doing so, provides useful indicators of future work (9.4.4.4).

9.4.4.1. Transition Management

Transition Management (TM), evolved from sociological studies to understand or influence social transition (Fischer-Kowalski and Rotmans, 2009), is being adopted in the organisational field to help transitions in thinking (Dijk, M. et al., 2006).

Transition Management from a sociological view

The sociological view of TM has two key approaches. One - Viennese sociometabolic transitions approach - more analytical in which the timeframe of study is at the macro-scale of decades and centuries, and addresses the phenomena of radical change in societies and the relationship with nature; and the other - Dutch societal transitions management approach - more practical in scope in which the timeframe of study is decades, aiming to drive systems innovation, as explained by Fischer-Kowalski and Rotmans (2009:1). These two views are going to be looked at because they represent the two most important schools of thoughts in TM. By understanding both, it is possible to point out future work that relates this thesis to TM.

The view of TM from both schools of thought share understanding that complex and radical paths lead to transitions. Changes are chaotic, complex, and very dynamic, as transitions concern interactions across multiscales or multilevels. (Fischer-Kowalski and Rotmans, 2009:2-3). This principle is common ground to the findings of this study. Another shared point is both areas of research acknowledge that social transitions, independent of the scale of study or interference, are connected to the way society relates with the environment (ibid:4): when the social regime changes (e.g. from agrarian regime to the industrial regime) so to the relation of the society with the natural system changes (Ibis: 5). This thesis builds on this understanding of the social sphere and the natural sphere as interdependent metabolisms (Chapter 2, Figure 2.2: From an economics-dominant framework to an integrated framework present this position).

Future research could usefully incorporate the view of radical change at the level of socio metabolism, to enrich the model this study presents (SuCo methodology) by:
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(1) helping to identify the historical changes and the key elements in the system of intervention at a macro level; (2) being able to identify the patterns of change to understand the future potential changes the system can cope with.

Further, by linking this study’s findings with the notion of social metabolism regimes the understanding of innovation for sustainability can be pushed further and potentially be explored from the perspective of an approach that helps transitions from the dominant industrial regime dependent on fossil energy (Fischer-Kowalski and Rotmans, 2009:7) to a more resilient regime embracing an ecological social metabolism. By doing so, it brings the notion of meta-level of influence (mainly under Viennese approach) to an innovation for sustainability concept.

The Dutch approach, due to its practical side, deals with persistent problems deeply embedded in our societal structures; these are difficult to manage and interpret and involve a variety of actors and agendas (Fischer-Kowalski and Rotmans, 2009:8). The body of work presented in this thesis provides an additional perspective to look at the interventional perspective applied by this school of thought. These interventions aim to provoke a change at the structure, culture, and practice of society. It includes a deep understanding of collective values, norms, perspectives, and paradigms, involving also the individual scale. Such elements are similar to the ones explored in this thesis. Further, the Dutch perspective also underlines the importance of “radical change in incremental steps” (ibid:11). This principle is placed in practice and this study will benefit if embedded in some of this practical work.

**Transition Management from an organisational field view**

From an organisational perspective, TM - called: Transitions Action Perspective - helps to deal with the existing tensions between the two opposed thinking – short-term thinking and the long-term thinking – by building a relationship between the goals of the short-term and the goals of the long-term and synchronizing them and then relating back to the goals (Dijk, M. et al., 2006). Transitions Action Perspective by being more action driven and following a more process oriented, deals with uncertainty and complexity, and relates (1) multi-domain, (2) multi-actor, and (3) multi-level. These three points can bring to this research deeper understanding of its outcome and a process orientation (step-by-step) to deal with a cultural and paradigm shift that has been fiercely defended.

The findings of this research such as the need for paradigm change, and the shift from a reductionist perspective (reduce unsustainability) towards an ecological and innovative view to create sustainability, could be enriched with what TM under an organisational perspective aims to: fostering long-term social transformations.
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Because this investigation builds a path driven by a re-orientation of the value-system in place to create sustainability, rather than developing a quantitative approach that cannot easily express the complexity involved in sustainability and its multi-scale issues to be addressed, a deeper understanding of the different type of transitions, notions that are the domain of TM, can increase the value of this study results.

Furthermore, the way this study defends an action driven behaviour (embedded in an approach that focuses on simultaneous inputs and outputs of any type of system) can be enriched by a vision of transition that embraces an overall approach (both in the behaviour and operations) without compromising any opportunity (ibid).

The process embodied in the application of the cultural side of SuCo, has similarities with the TM process. For example the usage of a learning approach, rather than imposing a change; the use of visions; the use of images (as creation of a language); the development at different scale levels; and inter and cross-disciplinary perspectives, helps the transition and the design of a different opportunity for innovation. These similarities act as facilitators to explore these research findings and results through a TM approach.

Finally, this thesis result can also provide to TM a base for a practical approach by including an innovation perspective towards sustainability.

9.4.4.2. Organisational change

Organisational Change explores, for example, the need to change (Lanning, H., 2001), the motivation to change (Van Den Hoed, R., 2004), the pressure to change (Van Den Hoed, R., 2004), the ability to change (Hellman, H., 2007). Organisational change is not solely a matter of organisational studies; it requires a multi-disciplinary approach due to the diverse factors at play. (Lanning, H., 2001:10)

This study is grounded on findings that emphasise the need for change and present a possible way to start implementing change, mainly in organisations. By looking at the diversity of elements and factors in organisational change, and building bridges between those different elements and factors, a more tacit and action driven understanding can be employed to emerging requirements to deal with complex change.

Implementing Change requires a systemic approach regarding: (1) individual impact of the necessary change – the emotional side of change; (2) effective communication strategies; (3) participatory processes to implement motivation; (4) tools and
capacities to think differently; and (5) the effective exchange of information between people and processes (Victorian Quality Council, 2006).

This research provides an understanding of change implementations and management and describes an approach through the SuCo methodology. It will benefit from being looked at from a perspective of change implementations that have a more step-by-step approach.

9.4.4.3. Theory of Change

Theory of Change is populated with different models. This research can be looked at through the lenses of the different models in order to achieve greater levels of detail in terms of the interventions of the inputs and the interventions of the outputs in the SuCo process.

Lewin's model illustrates the effects of forces that either promote or inhibit change: driving forces promotes change; restraining forces makes change difficult. When the combined strength of one force is greater than the combined strength of the opposing set of forces, change happens (Kritsonis, A., 2004-2005:2). The findings of this research relate to this model in terms of the need for a radical innovation to occur in the mindset of the individual in order to comprehend the external context of unsustainability. The Lewin's model can help identify when tensions in worldview are generated, in order to transmit and contextualise the urgency of change from unsustainable practices to practices that create sustainability.

Lippitt, Watson, and Westley's seven-step theory focuses on the role and responsibility of the change agent. It reinforces that information needs to be continuously exchanged throughout the process of change (Kritsonis, A., 2004-2005:3). This process has similarities with the cultural process of SuCo, and therefore complements and adds some specifics that haven't yet been included in this research.

Prochaska and DiClemente have created a spiral model to represent the stages of change in a cyclical and non-linear manner: precontemplation, contemplation, preparation, action, and maintenance (Kritsonis, A., 2004-2005:4). This model shows the importance of the individual in orchestrating effective change. Similarly, these issues are explored and defended throughout this thesis. However, the different stages of change are not contemplated in this current research, therefore future work could seek to understand these findings in the context of these diverse stages of change.
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The Social Cognitive Theory is the one that most focuses the attention on the individual. It deals with individual perceptions and behaviours and underlines the importance of self-efficacy to individual change. This theory helps inform a variety of social learning approaches involving: attention processes, retention processes, motor reproduction processes, and reinforcement processes (Kritsonis, A., 2004-2005:4-5).

Future work can improve this research delivery by looking at the more process oriented framework embedding in the Social Change Theory which can improve in detail this research approach to paradigm change.

The theory of reasoned action and planned behaviours can be seen as: (1) including the beliefs of their peers and perceptions as well as the individual's for change to occur; and (2) perceived control over the elements that facilitate change such as: opportunities, resources, and skills (Kritsonis, A., 2004-2005:5). This position in relation to change finds more echoes with this research, not only because it involves beliefs and motivations, as vital elements for change to happen, but also because it provides validation to the findings of this study. The complementarity of this theory and this research could be evaluated in future work to understand points of transferability.

9.4.4.4. System innovation and sustainable innovation

This thesis, as point out previously on strengths and weaknesses, did not enter deeply into theories of systems innovation neither into different process of sustainable innovation. Establishing bridges on the work generated between this thesis and the thesis of Quist (2007) can generate new theory(s). Quist (2007) work, explores the different notions of futures (likely, possible, desirables), and distinguishes why some are more appropriate for sustainability interventions than others. This current thesis explores the notion of desirable futures, and a process similar to that of Quist (2007) to uncover them. The difference it that Quist arrives at a process by an intensive search on current practices, which can be seen as complementary to this thesis

Future work could effectively focus on understanding the outcomes of this thesis from a perspective of backcasting in order to understand the key principles followed and the ones emerging through the process of this research.

Hellman (2007) centres her PhD thesis on understanding the influence of different factors around probing and learning concerning how radical innovation can be managed overtime to minimise inherent risks. This involves an understanding of decision making. In this thesis, decision making regards not the process itself (overtime), but the mindset within which decision making around sustainability has
been approached. Future work could contribute through building a richer approach to decision-making: one to apprehend and change the mind-set on the automotive sector, the other to incorporate notions and factors of change.

The way these two bodies of work understand radical innovation and decision-making at a strategic level can be combined to achieve greater confidence to innovate radically and implement such innovations in the context of decreasing uncertainties.

Further, the similarity between Hellman's (2007) thesis and this work suggests that a key question lays in the “how”. In Hellman's (2007) work the focus involves understanding the how; this investigation also investigates organisations to gather a better sense of the how tos of probing and learning towards sustainability. This emphasises the potential interest for future work.

Van den Hoed (2004) in his PhD thesis indicates different technological cycles (2004:54), while this research mentions business cycles. Future work could establish relationships in these concepts to characterise more precisely business cycles in contexts of creating sustainability.

Future work needs to explore the relationships between the five factors of change: 1) exits/entries leading to power shifts; 2) external crises; 3) new technologies or technological progress; 4) the introduction of a new organizational practice; 5) shifts in market demands (van den Hoed, R., 2004:78), and the propositions of this research work regarding interventions at the operational side of SuCO, is made. This could identify insights into the systems of influence (ibid:248) and complement the process of change by identify possible sources (points) of change.

The complementary derive from the difference in context of origin and key propose whereas of these three thesis (Quist, 2007; Hellman, 2007; van der Hoed, 2004) and the current thesis, can be looked at for transferable points and interconnections altogether in future work, aiming to create paths of intervention in sustainable innovation towards different outputs, and change in behaviour to achieve greater levels of improvement in decision making.

9.4.5. RECOMMENDATIONS FOR FUTURE RESEARCH FOCUS ON SUCO

A research process is always contextualised by many parameters. These elements focus the study, leaving other elements aside. Making recommendations for future work is an opportunity to outline some of these elements in an attempt to give an overview of paths that were not followed within the investigation.
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Additional work focusing on SuCO:

— SuCO can be used as a foundation from which to create step-by-step processes (i.e. detail guidance) and detail the specificity of parameters when approaching different focus (e.g. products or a strategy). This favours starting to investigate accurate tools and expected actions for the SuCO processes (cultural and/or operational). These opportunities have not yet been explored.

— It would be of great help to include ways of measuring progress by designating, for example, key indicators. Future research could take up this suggestion.

— Finally, SuCO is the first step for a holistic methodology, yet presents only two dimensions: operations and cultures; a third dimension is missing. This dimension potentiality embraces a more systemic and thus more powerful and complex view of both cultural and operations (Figure 6.9). These third dimension (axis Z) could be as abstract as Time. This raises the question: what elements define time within Operations and Cultures?

Figure 9.6: SuCO’s explored and unexplored dimensions

9.4.6. PUBLICATIONS

The next table (9.5) presents the strategy for publications in order to disseminate this research.
### Publications

<table>
<thead>
<tr>
<th>Journals/conferences</th>
<th>Planned publications 2012-2013</th>
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<tbody>
<tr>
<td><strong>Journal paper:</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Conference papers:</strong></td>
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</table>

Table 9.4: Summary of the dissemination strategy – plan publications
9.5. CHAPTER CONCLUSION

This chapter summarised this research, allowing a global view of what it encompassed and why. Nevertheless, this chapter is not complete without addressing the practitioners who will potentially read this document.

There could be a long list of advice to practitioners, but one recommendation provides an umbrella for all the rest not mentioned here: practitioners should understand innovation from a radical perspective not only dependent on technological advances. While categorising innovation can be theoretically useful it is not very practical in use. It is best to find ways for people to innovate by, for example, identifying the key elements that can lead to innovation. The same goes for sustainability: a proliferation of definitions confuses the mind. The key to understand innovation from a sustainability mindset, always remembering that is sustainability which frames innovation and not the other way around. Sustainability offers the paradigm; innovation the way to leap into it.

9.6. THESIS CONCLUSION

Earth change awareness is key to reframing thought and action. If we focus on one element of this change – on climate change for example – our activities will be diminished in value. It has been highlighted in this thesis the need to approach problems from a systemic view, but this is applicable also to poverty, resources scarcity, etc. For example, poverty is related with resources scarcity and with climate change, the three relate to each other in a synergetic way, and it is this interconnectivity that need to be acknowledge and addressed under a same view and strategy for better decisions to be made in relations to the trade-offs pursued. If we don’t want to become the new dinosaurs it is imperative we evolve with the changes to the Earth’s systems in order to adapt, progress and contribute to a smoother transition from what the human-ecological relationship has been to what it is becoming.

This research is not a complete answer. It is a first step on a journey that encourages us to understand our unique place in the natural system and to innovate new ways of being, producing and living on the Earth in the long-term.
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ANNEXES
ANNEX: CHAPTER 4
ANNEX 4.1 PRESENTATION LETTER FOR THE GAME

Dear -------------

First of all, I would like to thank you for your availability and willingness to participate in these dialogues.

Secondly, I would like to share with you that starting dialogues is exactly the objective of the conversation that will take place soon between us.

These dialogues are of great value for the PhD and the project in which I am involved, where an intervention is required at a more strategic level of Design – in order for sustainability to be integrated more effectively within design management and practice.

The motivation for instigating conversations with a range of people is that there is a lack of secondary resources that records what people really feel about sustainability and how they communicate it. The other point is, due to the different fields where sustainability is being applied, it is difficult to recognise the quality and value of available information, because it is so dispersed. Therefore, primary resources (such as these conversations) are essential to achieve a better understanding of the language and scope of sustainability.

After this introduction, I am glad to tell you that the objective of this letter is, in fact, to deliver you a present!!!

This present aims to prepare you for our conversation.

But, it isn’t a normal present, it is more of a game, which allows you to do whatever you think is best, where there are no limits for your imagination!

The objectives of the game are:

Make sure you enjoy it!

Present you with the context for the dialogue which is friendly, relaxed and enjoyable.
Get to know what you think about Sustainability, and the words you use to communicate its values.

Understand your personal views towards your feelings about sustainability - the way you think about it.

Therefore, it would really benefit our dialogue to take a few minutes of your time to explore this present. Above all we ask that you have a mind set of playfulness when approaching this and trust your intuition and feelings in completing the game.

In this email, apart from the introductory letter, you can find two more files attached:

one called: Game part 1_Tetrahedron
and another called: Game part 2_Five geometric shapes

Both files are part of the game; you just have to follow the instructions written on each one to play them.

The ♡ represents a Secret Box (That will take shape after, of course being constructed) where you will place your Precious Things, represented by ☓ ✷ △ ▼ □ , to make sure they are SAFE! ☓ ✷ △ ▼ □

The rules are very simple: No rules! 😊. There are no right answers, just do it! Don’t spend too much time thinking about it;

You can add more Precious Things, colour it or even work in a more abstract level and not even construct it. It is up to you!!!

The Secret Box and the Precious Things are going to open our dialogue. And I will appreciate if I can have a copy (or the original) of the final result of the game, which basically means the words that you place in each geometric form and any other creative intervention that you might have done.

I do hope you enjoy it as much as I enjoyed the process of creating and preparing it for you.

Best wishes,

Margarida
ANNEX 4.2 GAME TEMPLATES

The Tetrahedron ----> The Secret Box

Objectives:
This first part of the game was created to understand and get to know with what words you communicate sustainability and its values.

Rules:
>>> Enjoy

Material needed:
>>> Scissors
>>> A pen
>>> Patience

Instructions:
>>> (1) The Tetrahedron is composed of 5 sections in total. In each section write a word that you use to communicate the value or way of thinking of Sustainability.
   Remember that the square is the base that sustains all the other forms around it – it’s the foundation
>>> (2) Cut the main shape following the path.
>>> (3) Please note that the line place inside of the triangles is to be perforated as well.
   Instruction number (4)
>>> (4) Close the tetrahedron by placing each tab inside of the next triangle (in the perforated line), placed on the left side
>>> (5) You have described Sustainability from your perspective, thank you. Please go to the next part of the game.

Five Geometric shapes ----> The Precious Things

Objectives:
This second part of the game is to understand how you feel and think towards sustainability. There are no wrong answers; it is up to you to place words, sentences, quotes that have relevance for you. We have used symbols to represent different perspectives on Sustainability. We would like you to use this as a guide when playing this part of the game. The symbology is described below.

Rules:
>>> Enjoy
>>> Keep in mind:

Material needed:
>>> Scissors
>>> A pen
>>> Patience

Instructions:
>>> (1) Symbolisms:
   • Represents your Big Picture of Sustainability
   • Represents your Ethics – connection between Thoughts and Action
   • Represents your Vision of Sustainability
   • Represents how this Vision is translated into Actions
   • Represents your Personal Motivation toward Sustainability – your foundation
>>> (2) Write in each figure your feelings and own perspective about sustainability keeping in mind what each geometric shape represents
>>> (3) Cut out each figure
>>> (4) Place it inside the Secret Box. We hope you will be happy to open this box and share and explore it and its contents with us as a beginning to our conversation
>>> (5) Thank you for thinking about these issues and participating in the game.
ANNEX 4.3. REMOTE INTERVIEW STRATEGY

Dear ---------------

Thank you for having agreed in participating on my research project, I am very glad to be able to include your thoughts and perspectives as base of my investigation.

Because of practicalities we have agreed that remote interviewing will be the best to pursue with our dialogue. Therefore, in this email, I aim to explain you a proposal of how this remote interview can be done, and if you agree, we can start our dialogue journey.

The process in which I think is the best to perform the type of dialogue that I want to establish with you, is divided in 6 steps:

The first is this email, which informs you about the proposal of the process that I will be using to follow a remote dialogue with you;

The second is, as well in an email format, where will be send to you a “Present”. This “Present” is the starting point of the journey towards sustainability; consists of a letter, which serves as introduction and explains the intention of it and has, as well, a game that is divided in 2 parts.

The third step will have the format of a phone call of about 30m to chat about the “Present” and the result of each part of the game. So, by them, it will be fantastic if you have already played with the game.

The fourth will be a small questionnaire with maximum of 5 to 6 questions that will be sent in an email. The questionnaire tends to reflect on several subjects raised on the previous phone call, key points that emerged from the dialogue.

The fifth step will be in an email format as well, where I send you the summary of the topics and important achievements of our dialogue until so far. This way we can have your feedback and comments. Joining to this email I will attach another template which was design in a way that you need to complete it. It will be of great importance if you can send us back this template with your comments, as soon as you have it filled.

The sixth and last step is a last email with the final analysis of our dialogue and the final conclusions, in which we ask for your validation.

Below you will find a summary of the 6 steps of our remote dialogue process. In pink you will found what might be require to you to do:
I hope this brief explanation about the remote interviewing process was clarifying and, if further information is needed, please do not doubt in contact me.

Hope to hear from you as soon as possible; confirming that this process goes well with your schedules and, as well, your information on when is best to start according to your availability.

I do really appreciate all this time that you are whiling to spend on talking about sustainability and Design. You are part of the foundations of my research project. These first dialogues with different key people from different key areas will be nurturing a future paper. I intend, as well, to send you all the data collected from the dialogue established with you, not only for your validation but because it can also be useful to have your thoughts recorded somehow.

Once again thank you for your time,

Yours sincerely,

Margarida Monteiro de Barros
ANNEX 4.4 OPEN-ENDED FORMAT QUESTION

− Can you share with us your involvement with sustainability?

− In your perspective what were/are the key instigators and elements that allowed the birth of sustainability (your area of practice)?

− What are your feelings in relation to the current practice of sustainability?

− What thoughts do you have about an incremental approach and a radical approach? (sustainability and unsustainability)

− Do you feel there is a close relationship between practices towards sustainability and theories and philosophies behind sustainability? Do they inform each other?

− Could you give us an example of a sustainability oriented project and describe how you approached it and the outcomes that resulted from it project? (understand Past, Present and Future presence and importance)

− In your opinion what comprises a sustainable approach? And what are the opportunities or barriers to applying it?

− What are your thoughts towards the triple bottom line? Do you feel it captures the essence of sustainability?

− To achieve sustainability do you feel there is a need to challenge the current perceptions of development, growth, welfare, wellbeing, profit…? (a paradigm change)

− What are your thoughts about the relation between design and sustainability?

− Do you think Design for sustainability should have a more strategic approach? If so, how do you feel about generating an intervention in decisions making processes?
## ANNEX 4.5A JOHN ELKINGTON DIALOGUE FINDINGS

<table>
<thead>
<tr>
<th>Informant</th>
<th>Background</th>
<th>Central idea</th>
<th>Visions</th>
<th>Main approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Elkington</td>
<td>Environmentalist and economist</td>
<td><strong>Corruption</strong> — is about myopia, the inability to think about the long-term — not looking to long-term implications which affect the decision-making processes. Corruption is getting in the way of real development.</td>
<td>Business landscape shifts very fast. Asia will define the way for real innovation towards sustainability. <strong>Discontinuities</strong> make people think more creatively about future opportunities. <strong>Social enterprises</strong> are coming to grasps with entrepreneurship just by looking to a completely different business model — in 10 years or so, they will present a much more <strong>radical innovation</strong>. It is all about proper scale. I do not think the majority of the work done is risky enough and surviving depends on risking.</td>
<td>Humour — project huge confidence — helps to break through. Show <strong>different angles</strong> of looking at and thinking about problems (opportunities). Have an <strong>ethical approach</strong> — truth and transparency. Build trust — do not be judgemental, saying what people should do from outside. <strong>Frighten people</strong> — like “The consumer guide”. Use <strong>images and visuals</strong> as a way to get into people’s minds. Tell stories — true, simple stories which make people say ‘we can do that’</td>
</tr>
</tbody>
</table>
ANNEX 4.5B FLETCHER AND SMITH DIALOGUES FINDINGS
<table>
<thead>
<tr>
<th>Informant</th>
<th>Background</th>
<th>Central idea</th>
<th>Visions</th>
<th>Main approaches</th>
</tr>
</thead>
</table>
| Kate Fletcher | Fashion designer with PhD in Design for Sustainability                     | **Time is a luxury** - In business speed is a critical component (e.g. product/service cycles); and time offers an opportunity to understand and think about sustainability. Ecological futures have a strong spiritual dimension | Visualise ideas of better futures – ecological futures – depend on the diversity of people and approaches to promote them  
Local manufacturing – developing things for the community, producing relevant stuff.  
Sustainability brings business differentiation and can be seen as a competitive driver.  
In 50th years time, business will be following an ecological path | Rarely use the word sustainability; it is misunderstood, but show gorgeous examples of the potential and beauty of things  
Make people feel comfortable with uncertainty  
Implement new way of thinking – describe ecosystems |
| Mark Smith    | Biology PhD in Green Design                                                 | **Stimulate environmental futures** – invite people to look at things in a different way                                                   | Introduce design thinking in business strategy – new ways of addressing needs - new businesses  
Sustainability is related to ethics resource use and locations, and economic aspects, comes to give a social lenses and a radical new way of looking at economics | Confidence – start with something small and demonstrate that it is possible – something cheap, simple, not massive  
Appeal to the financial antenna – show other ways of doing business  
Understand people’s knowledge base – to empower them.  
Backcasting – you need to abstract and ask indirect questions to make people think further |
## ANNEX 4.5C LUZ AND MCALOONE DIALOGUES FINDINGS

<table>
<thead>
<tr>
<th>Informant</th>
<th>Background</th>
<th>Central idea</th>
<th>Visions</th>
<th>Main approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ricardo Luz</td>
<td>Business Masters in Sustainable Design</td>
<td><strong>Ethics</strong> is being on the level of what is happening, being on the top of the game -&gt; is <strong>context base</strong> - &gt; which shapes your actions. There are no perfect decisions; you decide according to the information you have – <strong>decisions are about ethics.</strong></td>
<td>Isolated economic perspectives build <strong>unhappy societies</strong>&lt;br&gt;Sustainability has been distanced from its <strong>simplicity</strong>&lt;br&gt;More <strong>possessions</strong> = more <strong>anxiety</strong> because they make the moments of decision harder -&gt; more elements (possessions) in your life ask s for a life simplification.&lt;br&gt;‘Being satisfied with decisions taken, and understanding what make us happy, and redesigning life according to this.’</td>
<td><strong>Personalise the dialogue</strong> - Transform abstract ideas into concrete things/situations – find a common communication channel&lt;br&gt;Sustainability is a way of thinking –&lt;br&gt;a) business opportunity – differentiations;&lt;br&gt;b) opens vision - gives a more systemic view and shows different perspectives&lt;br&gt;c) challenges what already exists (creativity and courage)&lt;br&gt;To influence decisions, address the leaders and share visions&lt;br&gt;<strong>Understand the public</strong> – try ideas and see reaction</td>
</tr>
<tr>
<td>Tim McAloone</td>
<td>Lecturer and course director&lt;br&gt;PhD in Industrial applications of environmentally conscious design</td>
<td>‘Ecodesign is very much about cleaning the past, make things better towards the end-of-life, whereas sustainability is more about planning for future generations, for future goodness’&lt;br&gt;– <strong>Sustainability = Future oriented</strong></td>
<td><strong>Develop to deliver delight</strong>- access to quality of life&lt;br&gt;<strong>Foster simplicity</strong> – looking at needs rather than materials</td>
<td><strong>Systemic</strong> way of thinking to foster simplicity, based on principles (e.g Demi principles)&lt;br&gt;<strong>Empowering</strong> people – bottom up thinking&lt;br&gt;<strong>Dimensions of sustainability</strong> – Society (needs context); Industry (how to supply for future); Personal (individual, spiritual)</td>
</tr>
</tbody>
</table>
### ANNEX 4.5D O’CONNOR DIALOGUE FINDINGS

<table>
<thead>
<tr>
<th>Informant</th>
<th>Background</th>
<th>Central idea</th>
<th>Visions</th>
<th>Main approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank O’Connor</td>
<td>Ecodesign and PhD</td>
<td><strong>Intelligent marketing</strong> (coherent speech) is related to transmitting <strong>values that will create a sustainable brand</strong>, moving branding towards simplicity which will build confidence, involving business communication, personality of the business (e.g. characteristics), business forms and business performance. “Far from being an empty and pure act of constructing an image”.</td>
<td><strong>Ethic</strong> behind sustainability is about people <strong>acting together, sharing and communicating</strong> – Cultural identity &amp; society; honesty, integration, responsibility and social useful&lt;br&gt; Governments and businesses <strong>lack vision</strong> – changes in vision go parallel to budget – it is important to integrate desires and needs, not only to focus on economics&lt;br&gt; It is important to <strong>address needs</strong>, base of consumption –Design for real needs&lt;br&gt; <strong>Perceptions</strong> are fundamental basis of purchase decisions: desires - field of sociology and psychology&lt;br&gt; Good design requires much more than an eco-view</td>
<td>Try to <strong>change peoples’ minds</strong> – language is important, depends on who you are speaking to; and act according to the audience – be passionate and enthusiastic&lt;br&gt; <strong>Move away from the guilt</strong> feeling – people are intelligent: positivism attracts a bigger audience&lt;br&gt; <strong>Show the weight of legislation and policies</strong>&lt;br&gt; <strong>Do not focus overmuch on environmental impact</strong> – puts some people off -&gt; businesses tend to look for cost reduction: balance your arguments&lt;br&gt; <strong>Construct a vision</strong> about where we want to be and what we want to achieve</td>
</tr>
<tr>
<td>Informant</td>
<td>Background</td>
<td>Central idea</td>
<td>Visions</td>
<td>Main approaches</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Seaton Baxter</td>
<td>a) Agriculture sector – ‘Design for animal welfare’;</td>
<td><strong>Old paradigm:</strong> Ecodesign functions from a scientific <strong>reductionist</strong> vision of the world that seeks to understand how things function;</td>
<td><strong>The design discipline is responsible for designing new tools to communicate and act in this new paradigm.</strong> Change approach by challenging what is designing, take a step back and approach the problem in a more holistic way from an level above of the present system</td>
<td>Design as a way of thinking – <strong>design thinking</strong> – embraces new holistic sciences</td>
</tr>
<tr>
<td></td>
<td>b) Education</td>
<td><strong>New paradigm:</strong> <strong>Holism,</strong> embraces all the new sciences, Gaia theory, chaos and complexity etc.</td>
<td></td>
<td>Change paradigm – acknowledge the old paradigm; visualise the new one and understand it; establish relationships between the two</td>
</tr>
</tbody>
</table>
| Richard Douthwaite| Economist – working directly with Irish government                          | **Parallel Universes** – we need radical changes which will only happen when the current system collapses (i.e. present system manifests failures), then people will want other types of answers – which means **space for radical solutions** – ‘for this we need to have enough people aware of the problem to shape perspectives of the future solution when people (the masses) look for it’ | ‘**What type of society do we want?**’ – build visions and policies to enable them; agree how to meet such visions  
‘Management has to share the design vision because the outputs of their enterprises are in fact the result of this share vision’  
‘ We need to **design political systems** that enable decisions to be made, and thereby arrive at new forms of democracy’ | Arriving at a solution together – challenging the concept of growth without acknowledge Earth’s limits, and focus in a sustainable economy- understanding that investments should be made within one’s own community |
## ANNEX 4.5F MAXWELL DIALOGUE FINDINGS

| Informant       | Background                                                                 | Central idea                                                                 | Visions                                                                 | Main approaches                                                                                   |
|-----------------|                                                                           |                                                                              |                                                                       |                                                                                                                                                     |
| Dorothy Maxwell | Twenty years’ professional experience in Environmental Sciences          | **Combining both production and consumption** makes our **view level higher** – as opposed to in isolation. It enables **understanding the system** and how we produce and consume what we produce, as well as how we consume and how we can produce what we consume. | **A systematic approach** relates to a mind-shift and a planning process, dependent on a strategic design role – to practice sustainability, unless there is a power driver (legal policy forcing the practice) a **shift in the mind** is needed to **change the framework**, and this requires a **change in how success is measured**. | **Measure** the applications of sustainable actions - how we measure our success in creating values in the human dimension by offering good and equal quality of life for people and the planet. Sustainability seeks to achieve value (human quality of life). Seeing the **problem** and finding its **solution** is key, and this can be associated with **production and consumption**. Part of the solution to achieving sustainability is in this dynamic                                                                 |


## ANNEX 4.5G FUAD-LUKE DIALOGUE FINDINGS

<table>
<thead>
<tr>
<th>Informant</th>
<th>Background</th>
<th>Central idea</th>
<th>Visions</th>
<th>Main approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alastair Fuad-Luke</td>
<td>Ecologist and environmental scientist</td>
<td><img src="image" alt="Diagram" /> Sustainability rethinks connections between the tangible and the intangible and between man and nature; facilitates a life of meaning, reveals the meaning of life. It is related to sustainable entrepreneurs and designer entrepreneurism – responsible for creating new systems.</td>
<td>Our big mistake - separating ourselves from nature. Looking outside the individual and deeply questioning our own personal system – behavioural change is needed. In design there is an historical debate about the Other (consumer/user) not of the Self (involving the individual self). The self generates new design capacities therefore opens up access to new solutions. Design facilitates cultural acceptation. It is an agent for change towards wellbeing: Individual, societal, environmental and economic wellbeing help us to re-evaluate our value system</td>
<td>Act towards sustainability: Should raise awareness; Provide and encourage access; Rage design to fulfil its capacities Unlock industrial and professional ability Translate and transform what we have available (e.g. materials, resources, society, etc) into wellbeing Cause a new action</td>
</tr>
</tbody>
</table>
### ANNEX 4.6. PERSONAL MOTIVATION TOWARDS SUSTAINABILITY - SUMMARY OF THE THEMATIC CODING

<table>
<thead>
<tr>
<th>Desirable Futures</th>
<th>Uncovering New Possibilities</th>
<th>Constructing a path</th>
<th>Behavioural</th>
<th>Strategic Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Altruistic perspective</td>
<td>Human oriented</td>
<td>Market</td>
<td>Approaching</td>
</tr>
<tr>
<td>perspective</td>
<td></td>
<td>oriented</td>
<td>oriented</td>
<td></td>
</tr>
<tr>
<td>Peace of mind</td>
<td>Quality of life</td>
<td>More health</td>
<td>More niches</td>
<td>Raise awareness</td>
</tr>
<tr>
<td>Adapt and Survive</td>
<td>Futurity → a future</td>
<td>More nourishment</td>
<td>opportunities (opposed to threats)</td>
<td>Foster simplicity</td>
</tr>
<tr>
<td>Dynamic →</td>
<td>Quality of life → people</td>
<td>More diversity</td>
<td>Not limiting</td>
<td>Creativity</td>
</tr>
<tr>
<td>approaching</td>
<td>and planet</td>
<td>More intelligence</td>
<td>options</td>
<td>Dialogue</td>
</tr>
<tr>
<td>way of living</td>
<td>Safe long term world</td>
<td>More abundance</td>
<td>What we can achieve</td>
<td>Conversation</td>
</tr>
<tr>
<td>Harmony</td>
<td>Equity: society, trade,</td>
<td>Philosophic</td>
<td>Small changes</td>
<td>Learning</td>
</tr>
<tr>
<td>Peace, Silence,</td>
<td>spirit</td>
<td>way of life</td>
<td>inside a</td>
<td>Provide and</td>
</tr>
<tr>
<td>Slow, Calm</td>
<td></td>
<td>→ reveals</td>
<td>system can</td>
<td>encourage access</td>
</tr>
<tr>
<td>Companionship</td>
<td></td>
<td>the meaning of</td>
<td>make a big</td>
<td>→ empowerment</td>
</tr>
<tr>
<td>Right Living</td>
<td></td>
<td>life</td>
<td>difference</td>
<td>Complex &amp; systemic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compassion</td>
<td></td>
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</tbody>
</table>

- Quality of life
- Futurity → a future
- Quality of life → people and planet
- Safe long term world
- Equity: society, trade, spirit
- Where we want to be
- Good quality & equal → people & planet
- Giving → something positive
- Human and natural equity
- Society wellbeing
- Stimulate environmental futures
- Economic wellbeing
- The potential for contributing for the happiness of society
### ANNEX 4.7. WAYS OF COMMUNICATING SUSTAINABILITY: SUMMARY OF THEMATIC CODING

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Adjectives</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interdisciplinary</td>
<td>Creative innovate</td>
<td>Connectiveness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enhough (consumption)</td>
</tr>
<tr>
<td>Balance</td>
<td>Participation</td>
<td>Complex</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logic – Common sense</td>
</tr>
<tr>
<td>Connectivity</td>
<td>Life Style</td>
<td>Diversity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connecting</td>
</tr>
<tr>
<td>Fun</td>
<td>Co-evolution</td>
<td>Essential</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relationships</td>
</tr>
<tr>
<td>Fairness</td>
<td>Adaptive</td>
<td>Metabolisms’ components</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Responsibility</td>
</tr>
<tr>
<td>Equity</td>
<td>Replenishment</td>
<td>Buddhism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lightness</td>
</tr>
<tr>
<td>Needs (lifestyles)</td>
<td>Holistic</td>
<td>Love</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compass</td>
</tr>
<tr>
<td>Inclusive</td>
<td>System</td>
<td></td>
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</table>
ANNEX 4.8. CHARACTERISING THE RESPONSIBILITY OF ORGANISATIONS

The responsibility of organisations in a journey towards sustainability is reflected in the way experts saw organisations: They saw it as a Leverage Point, as setting the design context to respond to the demands of sustainability, to propose and find new ways of value creating, and to push innovation to deliver opportunities to adopt more sustainable life-styles.

**Organisations as leverage point** the following quote is an example of the sustainability experts’ position in relation to organisations as a leverage point in the established system that can push sustainability forward, together with governments and legislation:

> Governments and businesses have a lack of vision: they do not think in the long term. They build visions like, for example, the 2020 sustainable vision, but they are always changing them as their budget is made for 3 to 5 years. And they still think the transportation problem is about roads! This shows lack of vision and understanding. It is important to integrate needs and the desires and not only focus on economics. Design should be socially useful: this is a key issue to change lifestyles. (Frank O’Connor, 2005 dialogues)

**Organisations set the context of design:** Organisations are key players in a system that dictates the market rules framing consumption and production, setting the scene for design. The current concept of growth frames organisations, as pointed out in the literature review. Sustainability operates with great levels of success in a different paradigm – one that challenges the concept of growth:

> To challenge the concept of growth it is necessary to focus on a sustainable economy by understanding that investments should be done inside the community in which one participates; in which one is part of that community. Nowadays we have a financial approach which only expects a return from an investment. The economy sees the community as a whole system. (Richard Douthwaite, 2005 dialogues)

**Organisations are responsible for value creation:** Another key finding from these dialogues is the importance of organisations challenging the type of value they can create or aspire to create, which is intrinsically related to how design is framed within organisations. If the way organisations see value creation beyond distribution to shareholders (and the traditional view of stakeholders which do not include nature as one), and embracing more than product and service sales, the level of sustainability will potentially raise, as the following example explains:
In a way, what I am talking about is the context within a stable business environment in which innovation will not happen. In fact, I was about to get launched into work: what I am writing has to do partly with launch discontinuities, about language, but as well, tools that just try and make people think. ... It is incredibly simple: basically using colours to generate different forms of value creation, etc. and I am basically being stupidly typically about that. If you look back to business, they only act in two colours, black or white (...). All of this big discussion is to try to say to companies that they need to be able to understand account management to create multiple forms of value. (John Elkington, 2005 dialogues)

Organisations have a responsibility to push innovation for sustainability: This responsibility expressed by sustainability experts is related to looking at value creation differently is connected with the capacity of an organisation to innovate in the way value is created across the business outputs, and the market opportunities that this brings. Organisations have the capacity to generate different outputs to society helping to embrace a sustainable life-style, as the following quote suggests:

When you are approaching someone and you want to let them know what sustainability is, it doesn’t matter what words you use: what matters is that they understand the possibilities that sustainability presents. Sustainability is an innovative form of thinking: it creates new markets. It is a differentiation key for competitiveness, but it depends on the type of society that you are in. (Ricardo Luz, 2005 dialogues)

These findings from the first set of dialogues indicated that the research should look at organisations that create sustainability as different organisations that follow different values, in order to understand how they do it, how they achieve this.
ANNEX 4.9. RESEARCH IMPLICATIONS SUPPORTED BY DATA

The dialogues with experts highlighted key points with strategic implications for the course of this research:

- The importance of the values, beliefs and motivations of individuals;
- The responsibility of the organisational ethos in creating paths towards sustainability;
- The role of design for F10 realities (i.e. the sustainability context).

The importance of individuals’ values, beliefs and motivations

These exploratory dialogues brought to the fore the importance of individuals and the connection between greater levels of intervention towards sustainability and the latter’s’ values, beliefs and motivations.

These dialogues showed the importance of:

- a feeling of inclusivity;
- sense of community (belonging);
- scope of vision (to create common goals);
- practicality;
- empowerment;
- creativity,
- a common framework;
- awareness.

Frank O’Connor (2005 dialogues) illustrate the importance of individuals and their values when he stated:

Thinking more responsibly requires a behavioural change to arrive at different action. Of course it is difficult to change a lifestyle, for example, but when you actually achieve making people understand and be more inclusive they automatically think more responsibly. (Frank O’Connor, 2005 dialogues)

This finding had an enormous impact on this research, as it drove an interest in understanding the importance of individuals in organisations in order to trigger/drive the sustainability.
The importance of the organisational ethos

Further, these dialogues brought recognition of organisations’ importance as the creators of the current systems to which design and, more importantly, individuals respond, John Elkington (2005 dialogues) expresses the importance of decision making to set different priorities, and, as seen in the literature, the set of priorities is related with the ethic (Sterling, 2003):

(...)the rest of the corrupt process is in decision making. People think about their own interests, they don’t think in the long term. They’re not really, really interested in the next 20 or 50 years. It is about a different priority approach. (John Elkington, 2005 dialogues)

The above uncover the second implication for this research involves looking for further understanding of how to intervene in the organisational ethos and what levels of importance individuals have to have in organisations in order to trigger/drive sustainability.

Design towards F10 reality

The sustainability experts’ dialogues also clarified the role of design towards F10 realities.

We need to design political systems that enable decisions to be made and thereby arrive at new forms of democracy ... A decision-making process needs to operate under a vision and a strength of design is to built and share visions. (Richard Douthwaite 2005, dialogues)

The above statement it is only an example of the strategic potential of design and allows identifying and exploring visions and opportunities anchored in innovation in order to engage in desirable futures for people and organisations, co-construct alternative paths of intervention and uncover new possibilities for growth and success:

We stop using our imagination and do not question how things are done. (Kate Fletcher 2005, dialogues)

This view of design has great implications for this research, as it shows design as a key enabler of innovation for sustainability. It illustrates design for sustainability from an innovation perspective in order to generate opportunities for creating sustainability, and was an important influence on this research output, and set the tone of this study’s view of sustainability through the lens of positive intervention-
ANNEX 4.10A EVIDENCE TO SUPPORT THE IMPORTANT OF VALUES TO PURSUE A SUSTAINABILITY AGENDA

Consultants view values as the forte of the outputs of an organisation. A company with strong sustainability values is not only creating sustainable products, but also transmitting these values in all they do. Consultants also underlined the importance of communicating internally and externally these values,

..and (this organisation) is seen as a leader organisation...and because gets down to (name) and (name) and their business vision, and because they started from scratch...they got top management support and they constructed their own brand value and the brand is too important...people that buy [their products] are a community, they buy their values which are expressed in the product itself ;but it is about individuals in the organisations being able to fulfil their values, their dreams, and grow as the organisation grows; and reaching their consumers and stakeholders; they are ethical fashion, they have organic materials and different processes, but more important is the message across the product: they are trying to change people's attitudes so the products they make are teaching and are fun...really interesting messages...fun messages with value. If people buy this [trade mark] they buy the message: they agree to what they carry in their bodies. (Dialogue with sustainability consultant, 2006)

ANNEX 4.10B EVIDENCE TO SUPPORT PEOPLE DRIVING CHANGE

These dialogues reveal the power of people to push sustainability further just by offering ways for people to participate in the creation of solutions. It was underlined the importance of involve all that are part of the business (end users too) in order to find solutions not only appropriate to the needs of those people, but also appropriate for the natural limits.

The charity for the homeless people in Australia – they come from different parts of Australia as the climate in Australia is really extreme, similar to some African countries – and more year by year, which is a disaster for many rural, agricultural families. Some end up in the cities as unemployed and homeless. The number of homeless people is increasing. It is a cycle which is happening where climate change affects directly people’s life. This charity works for these people. They are not building businesses, they are building properties. If you go to build properties without an environmental focus you're continuing the problem that created the homeless in the first place – there is a cycle there.
When we developed the stakeholder's dialogue, we included the major stakeholder which was the homeless people. The homeless people said to us: ‘Of course we care about the environment, we are in it most of the time, we are on the street, and we are on it. Climate change affects us more than many other people’. (Dialogue with sustainability consultant, 2006)

ANNEX 4.10C EVIDENCE TO SUPPORT TOP DOWN AND BOTTOM UP APPROACH

Consultants highlight the fact that creating change towards sustainability in an organisation does not depend strictly on the buy-in of the top management, it goes down to good ideas that underline the strength of the organisations and create value. All businesses want to prosper, and a good idea for value creation, add to the business prosperity.

This happened to a television company, not in England, which I work with, a media company: each of the state directors were very keen to implement sustainable processes, sustainability thinking, in each their regions, so we did some workshops. We look at the how to; we actually agree that we will have sustainability principles in their annual report; and it gets to the board, and one key board member says ‘no, we don’t want any of this rubbish! We’re a television company, a media company, we’re fulfilling social needs, and we don’t need to do it!’. What happened was that I went back to each individual state director and say to them: ‘Hey guys, you’re a state director, you have initiatives you can do locally, in your own domain; you may not apply it directly from your collective board, but why don’t you individually create change, and then come to the board and say “look at what we have done, look what has been the results”’, and that is what we did. Now the board knows exactly the opportunities and the benefits, and now it’s interlinking with other TV companies around the world to share best practice. Even if it was starting to be applied locally, they were working collectively because this was what the whole organisation wanted, this was what every single state wanted: they knew they had unhappy staff, they knew the waste was a problem, so they were working collectively so they could still bring back to the individual KPIs [key performance indicators] for their own business units, but they were still doing good for their company then collectively showing the results for the whole organisation. The structural implication was that some people in the higher structure moved: they realised the company wasn’t going really in
directions which fulfilled their values. Sometimes people leave because of their values not actually being in alignment with what is happening *en masse*. So *en masse* the company was moving in one direction, and its public was asking to do so as well, and the competitors were doing it. So in fact was not a risky move from the individual states because of the external mass factors. (Dialogue with sustainability consultant, 2006)

ANNEX 4.11A EVIDENCE TO SUPPORT ECO-INNOVATION CAPACITY

To illustrate with evidence the Eco-innovation capacity the example shared shows the human capital used to create new business opportunities, translating the vision of the organisation into a competitive output.

A photocopiers and cameras manufacturer – a Japanese company. The director from Japan set an objective: to achieve zero waste. That was their objective globally. How each individual country unit achieved that objective: that was up to them. [This organisation] and [their representation] here in (county] set up recycling facilities and in the first 18 months saved £80,000 or more, and this is 600 people working in the factory. Those people then went down to local schools to teach about recycling, and these are people whose daily work is to sit and make photocopies: these are not high-skilled profile managers, these are fundamental production workers. That is a good example. This is the story of [company] in England. [This company] in [country] which I also work with, they’re not manufacturers there, they’re just distributors, but they actually get all the ink toner back and they’ve developed a product out of the ink toner cartridges (...). They go to schools and teach students about that. That is an example of people in the warehouse, on the production floor creatively engaged. A global vision translated in a local innovation. And in a way they almost compete in how they, each unit, approach this mission – zero waste – which counts with a high personal engagement. (Dialogue with sustainability consultant, 2006)

ANNEX 4.11B EVIDENCE TO SUPPORT BRAND POWER REFLECTION OF HUMAN CAPITAL AND OUTPUT COHERENCE

The dialogues also underline the importance of consistence and coherence in all that is involved in, not only the product life-cycle, but also across the whole business-cycle. Stories illustrate that brand is the identity of a organisation, and such identity operates and is perceived in every output of any organisation.
They contacted us initially looking for a piece of packaging. The details were given to a colleague of mine. Like me, he is been interested in moving beyond what is required and asked: ‘Do you really want a piece of packaging?’ He actually found out that they wanted green packaging without understanding its potential: how it will affect the product. It’s not about a piece of cardboard or a piece of plastic; it is part of the brand, so it became a branding project: ‘What are you trying to sell? Organic flour that has been milled exactly as it has been milled for the last hundred years.’ If this is not communicated through the whole packaging, it will be packaging like all the other flours. But again, it is not the packaging itself, it is the packaging as a reflection of the whole organisation ... We start by understanding ‘What are your values? What is the message you’re trying to get across? Who are you and what you are trying to filter?’ etc. I mean, if you are trying to sell a product like organic flour, as this company is, it should guide your values: why is it organic? Why is it about local material? for example, etc, and so, by linking that with the product in the brand strategy people often reflect on the values, and the values become about sustainability, etc. It comes back to basics – bringing back the brand; trying to understand the brand; lifting out their personality – what is the personality? – and then walking forward to communicate that promise: ‘What are we promising to our stakeholders, to our consumers? Our promise is that everything we do is built around the idea of sustainability’. And come back then to reflect that in the packaging you choose, what promotion you do, etc. and in everything you do internally and externally, etc. is about the bigger picture of the message and what is behind the message. (Dialogue with sustainability consultant, 2006)

ANNEX 4.11C EVIDENCE TO SUPPORT EMBRACE PEOPLE’S CAPACITIES

The story below shows the importance of individual responsibility to add to the sustainability journey, because sustainability goes from big visions to small and discrete everyday decisions. To embrace people’s capacities is been shown as creating better results at the long-term, for everyday small decisions start to be framed differently.

Strong leadership obviously comes from the top, but also comes from the environment champions: people who are passionate about achieving environmental goals, and you should not underestimate that task and that leadership. Obviously it needs the support of the top, leadership from the top.
But leadership is not restricted to the top; leadership, to me, is about understanding that everyone is a leader, a potential leader in respect to sustainability, etc. It’s about leading people and leading a vision, having and sharing a common concept and common vision, etc. For me it’s as much up-leadership as down-leadership; in other words it’s about teamwork where everyone in that team is a leader; we want to lead the way in terms of sustainability, environmental and social performance responsibility. If an organisation thinks that individual leadership is undesirable; that is where I think it’s difficult to meet sustainability premises because there is not a direct sense of individual responsibility. (Dialogue with sustainability consultant, 2006)

ANNEX 4.11D EVIDENCE TO SUPPORT THE ABILITY TO ASK DIFFERENT QUESTIONS

Consultants underlined that asking questions differently is the starting point to re-evaluate and re-think the strategy

If you ask different questions then you go to the organisation strategy, because if you start asking ‘do we need cups?’ and the company sees making cups as its business, they start thinking: ‘If we do not make cups we do not have a mode of existence’. (Dialogue with sustainability consultant, 2006)

ANNEX 4.11E EVIDENCE TO SUPPORT THE CAPACITY TO INTERVENE AT VARIOUS LEVELS

Consultants agree that opportunities to create sustainability is not reserved to products; the difficulty is on transmitting to organisations that people are becoming more aware of their individual responsibility as consumers, and what their purchase, and everything that is associated with (e.g. responsible value-chain), needs to reflect their worries. The story bellow illustrate the difficulties that is to approach sustainability beyond the need for a solution, to instead focus on re-formulate the need (and not the solution)

But people and organisations are so keen to get the WHAT; so keen to get the WHAT from you; so no one asks questions; even the briefing disappears, as the focus is on the WHAT. So when you start asking: ‘Look, what about environmental issues?’ ‘No one said anything about environmental issues.’ ‘It is in the recycle briefing.’ ‘What?’ And this actually happened. The main worry is about pleasing the client so the client chooses them, but to such an extent that you stop being rigid with the specifications and briefs. And this is a
responsibility. That is why responsibility is such a huge issue. (Dialogue with sustainability consultant, 2006)
ANNEX: CHAPTER 5
## Annex 5.1 Organisations Communicating Values of Sustainability

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<th>Representation of:</th>
<th>Organisation</th>
<th>Illustrative example</th>
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<td><strong>Products</strong></td>
<td><strong>Services</strong></td>
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<tr>
<td>Rachel’s Organics: Dairy products from organic farming</td>
<td>‘I hope my grandmother would approve. She instilled in us all a fundamental belief in the miracle of nature and the importance of good husbandry to produce wholesome, nutritious food. She never wavered from her beliefs and neither have I.’ (<a href="http://www.rachelsonorganic.co.uk">http://www.rachelsonorganic.co.uk</a>)</td>
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<tr>
<td>Eglu: 21st-century plastic henhouse for urban gardens</td>
<td>‘It does feel like a bit of a revolution. We even had a chicken drought a few months ago because so many people wanted us to supply them, but with 20 million gardens in the UK there are plenty more families who can keep their own chickens. Ninety per cent of our customers have never kept livestock before but they find it easy, and love the eggs.’ (<a href="http://www.omlet.co.uk">www.omlet.co.uk</a>)</td>
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<tr>
<td><strong>Organisation configuration</strong></td>
<td>Waitrose: Supermarket from John Lewis Partnership</td>
<td>The partnership recognises the needs of individuals, both locally and globally, and that it is important to get involved at a local level. It encourages close links between partners, schools, institutions, charities and local authorities. Work with the community includes charitable giving, partner volunteer work, customer panels and much more. (<a href="http://www.waitrose.com/ourcompany/index.aspx">http://www.waitrose.com/ourcompany/index.aspx</a>)</td>
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<tr>
<td><strong>Organisational strategy</strong></td>
<td>Green &amp; Blacks: Chocolate products organic and fairtrade</td>
<td>‘Being a small company means that every person is as vital as the next, whether it is making sure the orders are dealt with promptly or getting the chocolate from A to B. Our office is based in south London near Waterloo, but we rely on a far larger group of people to make sure our chocolate gets to you. Without the hundreds of farmers in Belize, Dominican Republic and Madagascar who grow our organic cocoa we would not be able to make our delicious chocolate.’ (<a href="http://www.greenandblacks.com/">http://www.greenandblacks.com/</a>) - Winner of the Readers’ Ethical Consumer awards 2003</td>
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<td>River Nene: Organic vegetables box scheme that delivers to homes</td>
<td>‘River Nene organic farm is situated along the River Nene in Yaxley, near Peterborough. We grow and deliver fresh organic vegetable boxes direct from the farm to homes across the Midlands and Eastern Counties.’ (<a href="http://www.rivernene.co.uk">www.rivernene.co.uk</a>)</td>
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<tr>
<td><strong>Organisation ideals and beliefs</strong></td>
<td>Open University Higher education for all</td>
<td>The Open University is open to people, places, methods and ideas. The teaching style is called ‘supported open learning’ for ‘distance learning’. Open learning: learning in your own time by reading course material, working on course activities, writing assignments and perhaps working with other students. Supported: support from a tutor and the student services staff, as well as from centralised areas. ‘If you find the thought of an examination a bit daunting, then please don’t let it put you off.’ (<a href="http://www8.open.ac.uk/about/main/the-ou-explained">http://www8.open.ac.uk/about/main/the-ou-explained</a>)</td>
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<tr>
<td>Fairtrade NGO</td>
<td>Protect millions of small-scale producers</td>
<td>“Trade is a powerful engine of economic growth; however, it can also fuel massive inequalities. Trade ‘liberalisation’, enforced by the World Trade Organisation makes it increasingly difficult for small traders to compete. Through trading, campaigning and working with producers, Oxfam aims to enable poor producers to take part in trade and overcome the significant hurdles they face.” (<a href="http://www.oxfam.org">www.oxfam.org</a>)</td>
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### ANNEX 5.2 RELATING FINDINGS FROM PRIMARY, SECONDARY SOURCES AND THE ANALYSIS OF THE ORGANISATIONS COMMUNICATING SUSTAINABILITY VALUES.

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<th>Literature – secondary sources (not exhaustive)</th>
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<td>Efficiency (Dewberry, E. and Fletcher, K., 2001)</td>
<td>Accessibility</td>
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<td>Balance</td>
<td>Equality</td>
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<td></td>
<td>Equity (Dewberry, E. and Fletcher, K., 2001)</td>
<td>Persistence and constant: traditional values</td>
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<td>Responsibility</td>
<td>Co-evolution</td>
<td>Accountability</td>
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<td></td>
<td>Equity (Dewberry, E. and Fletcher, K., 2001)</td>
<td>Ethical</td>
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<tr>
<td>Fairness</td>
<td>Lightness</td>
<td>Respect for the planet</td>
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<td>Scale (Dewberry, E. and Fletcher, K., 2001)</td>
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<tr>
<td>Wellbeing – social, environmental economic</td>
<td>Simplicity</td>
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<td>Sufficiency (Dewberry, E. and Fletcher, K., 2001)</td>
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<tr>
<td>Creativity</td>
<td>Awareness</td>
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<td></td>
<td>Systems (Dewberry, E. and Fletcher, K., 2001)</td>
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<tr>
<td>Innovation</td>
<td>Complexity</td>
<td>Bio-diversity</td>
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<td>Appropriate-ness (Dewberry, E. and Fletcher, K., 2001)</td>
<td>Fair</td>
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<tr>
<td>Individuals</td>
<td>Creating values</td>
<td>Building sense of community</td>
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<td>Diversity (Dewberry, E. and Fletcher, K., 2001)</td>
<td>Fulfilment</td>
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<td>Discontinuity (Manzini 1992, 1994, 2005; Dewberry, Lewis and Gestaky, 2001) also</td>
<td>Quality v. quantity</td>
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<td>Certification</td>
<td>Fun</td>
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<td>Fun</td>
<td>Recognition</td>
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<tr>
<td>Future</td>
<td>Positive output → giving something positive</td>
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<td>Long term</td>
<td>Dialogues</td>
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<td>Participation</td>
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<td>Lifestyle</td>
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<td>Economics</td>
<td>Slowness (Alistair Fuad-luke, 2002)</td>
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<tr>
<td>Inclusivity</td>
<td>Resource usage (Schmidt-Bleek, 2000)</td>
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<tr>
<td>Social</td>
<td>Slowness (Alistair Fuad-luke, 2002)</td>
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### Limits to growth (Dewberry, E. and Fletcher, K., 2001)
- Collaboration
- Global and local
- Relationships

### Efficiency (Dewberry, E. and Fletcher, K., 2001)
- Incremental (Lewis and Gestaky, 2001)
- Comfort
- Good lifestyle
- Resources respect

### Resources usage (Schmidt-Bleek, 2000)
- Commitment (strong; high)
- Healthy (nature and people)
- Respect for nature

### Close circles (Ehrenfeld, 2004)
- Communication
- Human driven
- Responsibility

### Conserve resources
- Connection between human and nature
- Inclusion
- Rhythm

### Effectiveness (William McDonough & Michael Braungart, 2001)
- Flow (Schmidt-Bleek, 2000)
- Connection between human and nature
- Inclusion
- Rhythm

### Sustainable Economy (Schmidt-Bleek, 2000)
- Communication
- Human driven
- Responsibility

- Communities
- Identification
- Rethink traditional relationship

### Flow (Schmidt-Bleek, 2000)
- Connection between human and nature
- Inclusion
- Rhythm

### Intelligent resource use (Schmidt-Bleek, 2000)
- Connectivity
- Individuality
- Scale

### Diminution in use – dematerialisation (Schmidt-Bleek, 2000)
- Context base/dependency
- Innovation
- Seasonability

### Resource productivity (Schmidt-Bleek, 2000)
- Contribution
- Integration
- Sharing

### Slowness (Alistair Fuad-luke, 2002)
- Convenient
- Local & global
- Slow
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<tr>
<td>Fuad-luke, 2002</td>
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<tr>
<td><strong>Cooperation</strong></td>
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<td><strong>Balance</strong></td>
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Local v. global: Small and large scale
Social justice: Technology
Metabolism: Open system
Trust: People above systems
ANNEX 5.3 MAPPING FIRST FINDINGS FROM VALUES OF PRIMARY AND SECONDARY SOURCES, AND ORGANISATIONS’ ANALYSIS
ANNEX 5.4a CLUSTER OF FINDINGS FROM VALUES OF PRIMARY AND SECONDARY SOURCES, AND ORGANISATIONS’ ANALYSIS AT EACH LEVEL (BELOW CONDUCT OF ACTION LEVEL)

**Conduct – action**
- Individual beliefs & motivation
- Peoples beliefs & motivation
- Social beliefs & motivation
- Ecological limits

**Scale**
- Planet Scale
- Geographic Scale
- Timescale
- Contextualise Scale (moment)

**Equity**
- Natural Capital: Integration; Participation
- Human Capital: Participation; Appropriateness
- Social Justice: Inclusive; fair

**Limits**
- Nature: Rhythm-cyclical & Usage-sufficiency
- Systems/interaction: Rhythm-cyclical
- Social: Ethical – justice
- Economic: Trade offs
ANNEX 5.4b CLUSTER OF FINDINGS FROM VALUES OF PRIMARY AND SECONDARY SOURCES, AND ORGANISATIONS’ ANALYSIS AT EACH LEVEL (BELOW STRATEGY LEVELS)

**Strategy**
Course of action, Drivers (human, economic, natural); Long/Short term; Incremental/Radical
Goal & Objectives: Local & Global; Internal & External
Resource allocation: Process, Structures, Relations

**Priorities**
Processes
Structures
Relations
Impacts
Inputs ↔ outputs

**Impacts**
Individuals
Communities
Society
Ecosystem

**Opportunities**
Future; rethink interrelations: human, natural, technology
Common vision; limits to growth
Context base: Local vs Global

**Innovation**
Balance: human ingenuity; technology possibilities; natural limits
Cooperation: human; technology; natural resources
Participation/collaboration: human, technology, nature
ANNEX 5.4c CLUSTER OF FINDINGS FROM VALUES OF PRIMARY AND SECONDARY SOURCES, AND ORGANISATIONS’ ANALYSIS AT EACH LEVEL (BELOW STRUCTURES LEVEL)

**Structures**
- People ecosystem
- Stakeholders ecosystem
- Communities ecosystem
- System(s) ecology
- Nature ecology

**Human Interaction**
- People & people
- People & Products
- People & Services
- People & Systems
- People & Nature
- Nature & Systems
- Nature & products
- Nature & Services

**Relationships**
- Between people
- People & Systems
- Nature & Systems
- Nature & People
Annex 5.4d CLUSTER OF FINDINGS FROM VALUES OF PRIMARY AND SECONDARY SOURCES, AND ORGANISATIONS’ ANALYSIS AT EACH LEVEL (BELOW PROCESSES LEVEL)

Processes
Product & services
Organisational
Systems (social, economical, technological & ecological)

System Thinking
Acknowledge Diversity of elements, metabolisms involved
Mindset complexity - interrelation, interconnection; interaction
Action: Simplicity-flow; co-evolution; togetherness

Wellbeing
Internal (individual wellbeing during the process)

Resources
Mindframe: Natural Capital – Conserve; Restore; Respect support nature and natural processes
Usage: Intelligent; independent (non fossil); efficient & effectiveness

Production
Mindframe: awareness of limits (nature); metabolism/cyclicity
Awareness: Technology as interaction between human & nature; resources limits
Action: efficiency and effectiveness use
ANNEX 5.4e CLUSTER OF FINDINGS FROM VALUES OF PRIMARY AND SECONDARY SOURCES, AND ORGANISATIONS’ ANALYSIS AT EACH LEVEL (BELOW PRODUCT LEVEL)

**Results**
- Human creativity
- Technology potential
- Individual & Society Needs
- Nature capabilities & rhythm
- Ecological capabilities & rhythm

**Wellbeing**
- External (provided by organisational outputs)

**Outputs**
- Lifestyle: healthy, quality, values – people & nature
- Fulfillment: Individual, societal
- Education: Consumption vs Production
- Ecosystems: balance & support natural systems
### ANNEX 5.5a CONDUCT OF ACTION CHARACTERISATION – FINDINGS CONCLUSIONS

<table>
<thead>
<tr>
<th>Organisations’ element</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conduct of action:</strong></td>
<td><strong>Scale</strong></td>
</tr>
<tr>
<td>- Individual beliefs &amp; motivation</td>
<td>- Planet Scale</td>
</tr>
<tr>
<td>- Peoples beliefs &amp; motivation</td>
<td>- Geographic Scale</td>
</tr>
<tr>
<td>- Social beliefs &amp; motivation</td>
<td>- Timescale</td>
</tr>
<tr>
<td>- Ecological limits</td>
<td>- Contextualise Scale (moment)</td>
</tr>
</tbody>
</table>

| | **Equity** |
| | - Natural Capital: Integration; Participation |
| | - Human Capital: Participation; |
| | - Appropriateness |
| | - Social Justice: Inclusive; fair |

| | **Limits** |
| | - Nature: Rhythm-cyclical & Usage-sufficiency |
| | - Systems/interaction: Rhythm-cyclical |
| | - Social: Ethical – justice |
| | - Economic: Trade offs |

### ANNEX 5.5b STRATEGY CHARACTERISATION – FINDINGS CONCLUSIONS

<table>
<thead>
<tr>
<th>Organisations’ element</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy:</strong></td>
<td><strong>Priorities</strong></td>
</tr>
<tr>
<td>- Course of action: Drivers (human, economic, nature); Long/Short term; Incremental/Radical</td>
<td>- Processes</td>
</tr>
<tr>
<td>- Goal &amp; Objectives: Local &amp; Global; Internal &amp; External</td>
<td>- Structures</td>
</tr>
<tr>
<td>- Resource allocation: Process, Structures, relations</td>
<td>- Relations</td>
</tr>
<tr>
<td></td>
<td>- Impacts</td>
</tr>
<tr>
<td></td>
<td>- Inputs &lt;-&gt; outputs</td>
</tr>
</tbody>
</table>

| | **Impacts** |
| | - Individuals |
| | - Communities |
| | - Society |
| | - Ecosystem |

| | **Opportunities** |
| | - Future: rethink interrelations: human, natural, technology |
| | - Common vision: limits to growth |
| | - Context base: Local v Global |

| | **Innovation** |
| | - Balance: human ingenuity; technology possibilities; natural limits |
| | - Cooperation: human; technology; natural resources |
| | - Participation/collaboration: human, technology, nature |
### ANNEX 5.5c STRUCTURES CHARACTERISATION – FINDINGS CONCLUSIONS

<table>
<thead>
<tr>
<th>Organisations’ element</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structures:</strong></td>
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</tr>
<tr>
<td>- People ecosystem</td>
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<tr>
<td>- Stakeholders ecosystem</td>
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<tr>
<td>- Communities’ ecosystem</td>
<td></td>
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<tr>
<td>- System(s)’ ecology</td>
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<tr>
<td>- Nature’s ecology</td>
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<tr>
<td><strong>Human Interaction</strong></td>
<td></td>
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<tr>
<td>- People and people</td>
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<td>- People and products</td>
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<td>- People and services</td>
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<td>- People and systems</td>
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<td>- People and nature</td>
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<td>- Nature and systems</td>
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<td>- Nature and products</td>
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<td>- Nature and services</td>
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<tr>
<td><strong>Relationships</strong></td>
<td></td>
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<tr>
<td>- Between people</td>
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<tr>
<td>- People and systems</td>
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<tr>
<td>- Nature and systems</td>
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<tr>
<td>- Nature and people</td>
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</table>

### ANNEX 5.5d PROCESSES CHARACTERISATION – FINDINGS CONCLUSIONS

<table>
<thead>
<tr>
<th>Organisations’ element</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processes:</strong></td>
<td></td>
</tr>
<tr>
<td>- Product &amp; services</td>
<td></td>
</tr>
<tr>
<td>- Organisational</td>
<td></td>
</tr>
<tr>
<td>- Systems (social, economical, technological &amp; ecological)</td>
<td></td>
</tr>
<tr>
<td><strong>System Thinking</strong></td>
<td></td>
</tr>
<tr>
<td>- Acknowledge: diversity of elements; metabolisms involved</td>
<td></td>
</tr>
<tr>
<td>- Mindset: complexity- interrelation; interconnection; interaction</td>
<td></td>
</tr>
<tr>
<td>- Action: simplicity- flow; co-evolution; togetherness</td>
<td></td>
</tr>
<tr>
<td><strong>Wellbeing</strong></td>
<td></td>
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<tr>
<td>- Internal (individual wellbeing during the process)</td>
<td></td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td></td>
</tr>
<tr>
<td>- Mind frame: natural Capital – Conserve; Restore; Respect; support nature and natural processes</td>
<td></td>
</tr>
<tr>
<td>- Usage: intelligent; Independent (non fossil); efficient &amp; effectiveness</td>
<td></td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td></td>
</tr>
<tr>
<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td></td>
</tr>
<tr>
<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td></td>
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<tr>
<td>- Action: efficiency and effectiveness use</td>
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</tbody>
</table>
### ANNEX 5.5e PRODUCTS CHARACTERISATION – FINDINGS CONCLUSIONS

<table>
<thead>
<tr>
<th>Organisations’ element</th>
<th>Characterisation</th>
</tr>
</thead>
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<tr>
<td><strong>Results:</strong></td>
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<td>- Human creativity</td>
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<tr>
<td>- Technology potential</td>
<td></td>
</tr>
<tr>
<td>- Individual &amp; Society Needs</td>
<td></td>
</tr>
<tr>
<td>- Nature capabilities &amp; rhythm</td>
<td></td>
</tr>
<tr>
<td>- Ecological capabilities &amp; rhythm</td>
<td></td>
</tr>
<tr>
<td><strong>Wellbeing</strong></td>
<td></td>
</tr>
<tr>
<td>- External (provide by organisational outputs)</td>
<td></td>
</tr>
<tr>
<td><strong>Outputs</strong></td>
<td></td>
</tr>
<tr>
<td>- Lifestyle: healthy, quality, values – people &amp; nature</td>
<td></td>
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<tr>
<td>- Fulfilment: individual, societal</td>
<td></td>
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<tr>
<td>- Education: consumption vs production</td>
<td></td>
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<tr>
<td>- Ecosystems: balance &amp; support natural systems</td>
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</tbody>
</table>
### ANNEX 5.6a KEY FINDINGS - CONDUCT OF ACTION

<table>
<thead>
<tr>
<th>Organisational elements</th>
<th>Meta-values concept</th>
<th>Values</th>
<th>Organisations’ example stories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conduct of action</strong></td>
<td></td>
<td></td>
<td>'The sensitivity on environment was something inevitable growing up down here in St Davids. It has become part of me - from growing up here, in this very special part of the world, in a national park; living on a coast and playing every day on the cliffs, rocks and ocean; it is in my blood…and it is a fairly big point about values.' (TYF – CEO and founder; 2006)</td>
</tr>
<tr>
<td>- Individual beliefs &amp; motivation</td>
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<td></td>
<td>'We believe in the organic production of food, we believe that organic foods are nutritionally better … anything you put on your skin. Up to 60% of it can be absorbed through the skin into the bloodstream… we are passionate about avoiding chemicals in products, not just the chemicals we add which are the preservative agents and so on…but also the hidden ingredients which are part of plant materials derived from conventional agriculture. It’s just something that is central philosophy to what we do. We don’t question it because it’s just one of the core values.' (Green People – R&amp;D director; 2006)</td>
</tr>
<tr>
<td>- People’s beliefs &amp; motivation</td>
<td></td>
<td></td>
<td>'Whilst we’re seeking to satisfy the stakeholders, we are also seeking to operate in a socially responsible manner; we’re also seeking to operate in an ecologically sustainable manner. Ethics should not be seen as something that you kind of “have to”: it inherently means a kind of reduction of sort of service or value…There is a strong relation between growth and ethics in the Co-operative, and this can be expressed for example in the bank business: what attracts customers to the bank is our ethics, therefore is very easy to translate the benefit of ethics in to numbers that are related to the business growth, which is done through customer feedback. ‘Reason to join the bank? Attracted to ethics!’ (Co-Op; Senior manager; 2007)</td>
</tr>
<tr>
<td>- Social beliefs &amp; motivation</td>
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<td></td>
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<tr>
<td>- Ecological limits</td>
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<table>
<thead>
<tr>
<th><strong>Scale</strong></th>
<th>- Planet scale</th>
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<tbody>
<tr>
<td>- Geographic scale</td>
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<tr>
<td>- Timescale</td>
<td></td>
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<tr>
<td>- Contextualise scale (moment)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Equity</strong></th>
<th>- Natural capital: integration, participation</th>
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</thead>
<tbody>
<tr>
<td>- Human capital: participation</td>
<td></td>
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<tr>
<td>- Appropriateness</td>
<td></td>
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<tr>
<td>- Social justice: inclusive, fair</td>
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<table>
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<tbody>
<tr>
<td>- Systems/interaction: Rhythm –cyclical</td>
<td></td>
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<tr>
<td>- Social: ethical – justice</td>
<td></td>
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<tr>
<td>- Economic: trade offs</td>
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</tbody>
</table>
### ANNEX 5.6b KEY FINDINGS - STRATEGY

<table>
<thead>
<tr>
<th>Organisational elements</th>
<th>Meta-value concepts</th>
<th>Values</th>
<th>Organisations’ stories and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Course of action: Drivers (human, economic, natural); Long/short term; Incremental radical</td>
<td></td>
<td></td>
<td>‘The business had always a collaborative approach, that is why I use “we”: even if it was always my business; we wanted to do business because not only was it commercially worthwhile, but also in recognition that there were not lot of things similar to what we were doing: teaching people how to play again’ (TYF – CEO and founder; 2006)</td>
</tr>
<tr>
<td>- Goal &amp; objectives: Local &amp; global; - Internal &amp; external - Resource allocation: Process, structures</td>
<td></td>
<td></td>
<td>‘The LOVE part is: we give them chocolate, they taste chocolate, because people that grow cacao, they never ever.... with something like cacao, if you taste the chocolate, and specially dark chocolate, you can hold it up and say: ‘I grow the beans in this, and it is good’ and that is the positive side. The FEAR part, the negative side, is a tight controlling system … But it’s their own cooperative that is doing the testing, because if they don’t test it properly, and it comes to us and we test it again, which we do, and we reject it, then it has larger implications. That’s never happened.’ (Green &amp; Blacks – CEO and founder; 2006)</td>
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<td>‘When we designed the primary school, Meadlands, the teachers were quite concerned (and this is young children aged 6 to 11), that they would be taken out of the kind of safety of the classroom that they knew and put into this weird-shaped base and that they would feel uncomfortable, and it would affect their behaviour. In fact the opposite happened: they go into the space far from the conventional classroom. What the teachers have observed is that the children focus a lot better in the space that we’ve designed – they feel incredibly comfortable – it’s sort of womb like, enveloping, and they feel very comfortable, very safe. So they work harder.’ (Organisation Z – partner; 2006)</td>
</tr>
</tbody>
</table>
### ANNEX 5.6c KEY FINDINGS - STRUCTURE

<table>
<thead>
<tr>
<th>Organisational elements</th>
<th>Meta-value concepts</th>
<th>Values</th>
<th>Organisations’ stories and examples</th>
</tr>
</thead>
</table>
| **Structure**           | **Human Interaction** | - Trust  
- Durability  
- Creativity(ingenuity)  
- Participation  
- Diversity  
- Humanity  
- Cooperation  
- Balance  
- Compassion  
- Eco-intensity  
- Accountability  
- Appropriateness  
- Inclusivity  
- (In)dependence  
- Collaboration  
- Accessibility  
- Transparency  
- Connectivity  
- Protection  
- Togetherness  
- Commitment  
- Helpfulness  
- Educational  
- Identification | ‘They said they wanted to move the operation, as they are based in Devon and they didn’t want to be supplying this far; it was against what they believe, as for example, delivering so far was just increasing food miles…the food miles is a bit of a funny one, people are obsessed by that, but it’s not as simple as saying: “driving a lorry from A to B is not ecologically sound”. ..You have all these factors to deal with, for example: what is better, to grow tomatoes under hot houses in the winter with paraffin heaters in Devon or to fly them in from Spain? Which is actually better for the environment?’ (River Nene – Bedford Franchise; 2005) |
|                        | **Relationships**    | - Trust  
- Durability  
- Creativity(ingenuity)  
- Participation  
- Diversity  
- Humanity  
- Cooperation  
- Balance  
- Compassion  
- Eco-intensity  
- Accountability  
- Appropriateness  
- Inclusivity  
- (In)dependence  
- Collaboration  
- Accessibility  
- Transparency  
- Connectivity  
- Protection  
- Togetherness  
- Commitment  
- Helpfulness  
- Educational  
- Identification | ‘Just creating a good place to work!!!! …we have a flexible approach to work: up to 5% of the working time we spend on community projects…We also have a ‘surf time’: not in front of the computer. If it is a lovely day, if there are good waves or people have got things they want to do, we can do that and work when it’s more convenient. It is about the objective, not about time... the understanding is “providing the customer doesn’t suffer”; and this seems to work very well.’ (TYF – CEO and founder; 2006) |
|                        | **Production**       | - Trust  
- Durability  
- Creativity(ingenuity)  
- Participation  
- Diversity  
- Humanity  
- Cooperation  
- Balance  
- Compassion  
- Eco-intensity  
- Accountability  
- Appropriateness  
- Inclusivity  
- (In)dependence  
- Collaboration  
- Accessibility  
- Transparency  
- Connectivity  
- Protection  
- Togetherness  
- Commitment  
- Helpfulness  
- Educational  
- Identification | ‘Just creating a good place to work!!!! …we have a flexible approach to work: up to 5% of the working time we spend on community projects…We also have a ‘surf time’: not in front of the computer. If it is a lovely day, if there are good waves or people have got things they want to do, we can do that and work when it’s more convenient. It is about the objective, not about time... the understanding is “providing the customer doesn’t suffer”; and this seems to work very well.’ (TYF – CEO and founder; 2006) |

**Notes:**
- People’s ecosystem  
- Stakeholders’ ecosystem  
- Communities’ ecosystem  
- System(s) ecology  
- Nature ecology
### ANNEX 5.6d KEY FINDINGS - PROCESSES

<table>
<thead>
<tr>
<th>Organisational elements</th>
<th>Meta-value concepts</th>
<th>Values</th>
<th>Organisations’ stories and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Products &amp; services</td>
<td></td>
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<tr>
<td>- Organisational</td>
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<td></td>
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<tr>
<td>- Systems</td>
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<td></td>
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<tr>
<td>(social, economical,</td>
<td>System thinking</td>
<td>- Protection</td>
<td>“…and this is the way we run the retail shop, as well. Currently we are in the process of trying to make it ecological responsible, it is quite hard to find products at the moment. We try to run our business like this which implies the involvement of our suppliers; one of them is Patagonia they are not perfect but they try harder to do good. We choose our suppliers according to our own values; we do an ethical order to the hotel: everything to buy in the hotel, not just buying but checking how good people actually are, so we know how the process is…” (TYF – CEO and founder; 2006)</td>
</tr>
<tr>
<td></td>
<td>- Acknowledge diversity of elements; metabolisms involved</td>
<td>- Eco-intensity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Mind Set: complexity – interrelation; interconnection; interaction</td>
<td>- Wellbeing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Action: simplicity – flow; co-evolution; togetherness</td>
<td>- Responsibility</td>
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<tr>
<td></td>
<td>Wellbeing</td>
<td>- Effectiveness</td>
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<tr>
<td></td>
<td>- Internal (individual wellbeing in organisations)</td>
<td>- Efficiency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resources</td>
<td>- Simplicity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Midframe: natural capital – conserve; restore; respect; support nature and natural processes</td>
<td>- Limits to growth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Usage: intelligent; independent (non-fossil); efficient &amp; effectiveness</td>
<td>- Sufficiency</td>
<td></td>
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<tr>
<td></td>
<td>Production</td>
<td>- Participation</td>
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<tr>
<td></td>
<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Respect</td>
<td></td>
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<tr>
<td></td>
<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Productivity</td>
<td></td>
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<tr>
<td></td>
<td>- Action: efficiency and effectiveness use</td>
<td>- Co-ownership</td>
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</tr>
<tr>
<td></td>
<td>Production</td>
<td>- Appropriateness</td>
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<tr>
<td></td>
<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Commitment</td>
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<td></td>
<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Cooperation</td>
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<tr>
<td></td>
<td>- Action: efficiency and effectiveness use</td>
<td>- Helpfulness</td>
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<tr>
<td></td>
<td>Production</td>
<td>- Creativity(inenuity)</td>
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</tr>
<tr>
<td></td>
<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Futurity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Locality &amp; globality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Action: efficiency and effectiveness use</td>
<td>- (In)dependence</td>
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<tr>
<td></td>
<td>Production</td>
<td>- Humanity</td>
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<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
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<tr>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Accessibility</td>
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<td></td>
<td>- Action: efficiency and effectiveness use</td>
<td>- Durability</td>
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<td>Production</td>
<td>- Humanity</td>
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<tr>
<td></td>
<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Transparency</td>
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<tr>
<td></td>
<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Limits to growth</td>
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<tr>
<td></td>
<td>- Action: efficiency and effectiveness use</td>
<td>- Sufficiency</td>
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<tr>
<td></td>
<td>Production</td>
<td>- Participation</td>
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<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Respect</td>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
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<tr>
<td></td>
<td>Production</td>
<td>- Creativity(inenuity)</td>
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<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Futurity</td>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Locality &amp; globality</td>
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<td>- Action: efficiency and effectiveness use</td>
<td>- (In)dependence</td>
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<td>Production</td>
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<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Transparency</td>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Limits to growth</td>
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<td>- Action: efficiency and effectiveness use</td>
<td>- Sufficiency</td>
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<td>Production</td>
<td>- Participation</td>
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<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Respect</td>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Productivity</td>
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<td>- Action: efficiency and effectiveness use</td>
<td>- Co-ownership</td>
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<td>Production</td>
<td>- Appropriateness</td>
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<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
<td>- Commitment</td>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Cooperation</td>
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<td>- Action: efficiency and effectiveness use</td>
<td>- Helpfulness</td>
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<td>Production</td>
<td>- Creativity(inenuity)</td>
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<td>- Mind frame: awareness of limits (nature); metabolism/cyclicity</td>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
<td>- Locality &amp; globality</td>
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<td>- Action: efficiency and effectiveness use</td>
<td>- (In)dependence</td>
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<td>- Awareness: technology as interaction between human &amp; nature; resources limits</td>
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<td>- Action: efficiency and effectiveness use</td>
<td>- Durability</td>
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</table>
| - Constancy       | unnecessary preservatives added, which aren’t treated in particular ways that destroy the goodness of the plant material they’re starting with. And if you were to produce this, we would buy it from you. But as it is at the moment, what you’re offering is no good”.
| - Justice        | And on a couple of occasions they’ve come back to us a year later and said: “Yes, actually we’ve had a couple of other people have mentioned this same problem so we are going to go ahead with production of a preservative-free version” or whatever’ (Green People – R&D director; 2006)
| - Respect        | 
| - Persistence    | 
| - Slowness       | 
| - Responsibility | 
| - Participation  | 
| - Diversity      | 
| - Identification | 
| - Connectivity   | 
| - Co-evolution   | |
### ANNEX 5.1e KEY FINDINGS - RESULTS

<table>
<thead>
<tr>
<th>Organisational elements</th>
<th>Meta-value concepts</th>
<th>Values</th>
<th>Organisations’ stories and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Results</strong></td>
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<td></td>
<td></td>
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<tr>
<td>- Human creativity</td>
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<td></td>
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<tr>
<td>- Technology potential</td>
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<td></td>
<td></td>
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<tr>
<td>- Individual &amp; societal needs</td>
<td></td>
<td></td>
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<tr>
<td>- Nature’s capabilities &amp; rhythm</td>
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<tr>
<td>- Ecological capabilities &amp; rhythm</td>
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<tr>
<td><strong>Outputs</strong></td>
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<tr>
<td>- Lifestyle: healthy, quality, values – people &amp; nature</td>
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<tr>
<td>- Fulfilment: Individual, societal</td>
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<tr>
<td>- Education: Consumption v. production</td>
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<tr>
<td>- Ecosystems: balance &amp; support natural systems</td>
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</table>

**Wellbeing**
- External (provided by organisational outputs)
- Responsibility
- Protection
- Dematerialisation
- Productivity
- Appropriateness
- Slowness
- Connectivity
- Co-evolution
- Lightness
- Accessibility
- Trust
- Collaboration
- Educational
- Limits to growth
- Simplicity
- Identification
- Participation

-We look at things like biodiesel and stuff like that: we had a big discussion about that at the weekend. From my personal view biodiesel is a great idea, but as soon as quite a few people start doing it it won’t be sustainable, so it’s a waste of time. Because you can’t grow enough rapeseed oil for the masses to get biodiesel.” (River Nene – Bedford Franchise; 2005)

-There are reports of more environmentally-friendly packaging materials becoming available based on potato starch and various other things. They’re not stable enough for cosmetics yet. They’re okay for short-term products; food packaging, and I think there’s a milk package which has been made out of some kind of starch and chalk, for example. But milk packaging only has to remain stable for a week or so, whereas our products have a shelf life of anything up to three years, and there is no natural plastic or natural packaging material which will last that long – yet. They’re working on it and one day they’ll crack it, and when they do we’ll change over to it. ‘ (Green People – R&D director; 2007)

-I’ve done a couple of projects in the past which sadly haven’t been realised, which were in response to some social condition or a natural disaster, and we proposed an architectural solution. We did a tent for the disaster area in Africa and that was around the time of Live Aid ...., we proposed this collapsible tent-like structure with a very sophisticated fabric that would deal with the heat and the conditions.’ (Organisation Z – partner; 2006)
ANNEX: CHAPTER 6
ANNEX 6.1 DIFFERENT VIEWS ABOUT ECO AND SUSTAINABLE INNOVATION

Policies view:

“Eco-innovation is the response from industry and the academic community to the challenge of sustainable product development” (Nuij, 2001:49). In this perspective it is argue that eco-innovation is not about incremental change, i.e. redesigning what already exists, but rather it is about fulfilling consumers’ requirements with a radical change approach in order to create eco-efficient products and services. This view is still very much attached to exploring people’s needs and market share as an important strategy for the future of the firm, but treats the environment as an add-on or a new element to be included in this process. Therefore the idea of a “radical change” approach from this perspective is not compatible with the view of this investigation about radicalness: pursuing different thinking about sustainability and ecological limits, which greatly challenges the current business paradigm (see Chapter 2).

Market competitiveness view:

In here it is defend innovation as a variation between the following components: 1) market orientation (which depends on technological turbulence and market turbulence – e.g. demand uncertainty); 2) competitor orientation; 3) customer orientation; 4) inter-functional coordination; and finally 5) the environment (Ferrell, et al, 2000: 244). This view underlines innovation as a process to deal with and respond to externalities (e.g. competitors) which can affect the organisation, requiring an internal change to adapt to external demands – for example: established norms and routines, rapid need for leaning, or even production line investment (Fosfuri & Rønde, 2007). This view illustrates the correlation between the act of innovating and the system within which innovation is originated.

Risk assessment view:

Eco-innovation is seen as key to achieving competitiveness to meet environmental legislation (Lisbon Strategy for Growth and Jobs 2007 strategic report). This view highlights the importance of nourishing an emerging ‘green market’ for economic gain. Such a perspective leads to an understanding of eco-innovation at the level of the European Union as an opportunity to put different skills in action and exploit the market with products and services.
Technological improvements view:

This perspective defend that the next technological revolution will be led by eco-innovation (Makela, T., 2007). This view defines eco-innovation as:

“...a term used to describe products and processes that contribute to sustainable development, add market value and produce environmental and social benefits. The term is often used to describe a range of related ideas, from environmentally friendly technological advances to socially acceptable innovative paths towards sustainability.” (ibid: 1). This view position eco-innovation as a step towards achieving sustainable development, close to traditional innovation objectives but supported by the application of environmentally-friendly materials, energy, processes and technologies and aligned with consumer needs. Here eco-innovation is seen as dependent on technological improvement and implementation.

Strategic positioning view:

A more systemic view of innovation is defined as: “an adaptation to the externalities, reinforced by feedback loops analysis of marketing strategy in order to be ‘on the train or on the track’, interpreting complex systems to foster opportunities” (Dickson, et al, 2001: 234). Therefore innovation is related here to the capacity of the individual or team to think systemically and the organisation to seeing it as part of a system.

Enviropreneurial marketing view:

Relates innovation to environmental strategies which guide to unique capabilities contributing “new product success” (Baler & Sinkula, 2005: 471 citing Hart, 1995). Innovation is also seen as connected with a value-led environmental strategy with behavioural dependency (ibid: 466). Innovation encapsulates: a) the physical environment; b) the creation of economical value; and c) organisational values related to brand identity (ibid: 472).

Knowledge management view:

Sustainable innovation is about: “creating greater synergies between environmental and innovation policies, and that is no easy endeavour” (Andersen, 2004:3). In this perspective sustainable innovation is related to an innovation system by of elements and relations which interact in the production, diffusion and use of new and economic useful knowledge which leads to market add-value (Anderson, 2004:3, citing Lundvall, 1992). This
view presents a clear association between innovation and the essential elements from which the creation of value depends (e.g. currently, the economy of knowledge), and defends innovation as strongly aligned with technology, the organisational business model and design and marketing (ibid: 9).
### ANNEX 6.2 ANALYSE PROCESS - COGNITIVE MAP OF SUSTAINABILITY’S DIMENSIONS AND ECO AND SUSTAINABLE INNOVATION ELEMENTS

<table>
<thead>
<tr>
<th>Dialogues data to understand dimensions of sustainability (concepts captured during the dialogues) Note: quotes which are self-explanatory were chosen – for further information about the organisations (see Chapter 5)</th>
<th>Key components (considering the following dimensions to create sustainability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the <strong>societal perspective</strong> – <em>...the LOVE part: we give chocolate to the growers and they taste it, because people that grow cacao never tasted something like chocolate. If they taste chocolate (and especially dark chocolate), they can hold it up and say: ‘I grow beans which are in this chocolate and it is good’ …and this is the positive side. The FEAR part (the negative side): is a tight controlling system, but it is their own cooperative that is doing the testing, because if they don’t test it properly and it comes to us [and we test it again] and we reject it, then it has larger implications...</em>(Green &amp; Black – 2006)</td>
<td><strong>People:</strong> The dialogues reveal that the key is not to see society as external to the individual, or to the cultural context in which individuals operate, but understand the individuals universe (direct implication with individuals’ empowerment, responsibility and awareness). The key factor when approaching sustainability is focus on <strong>people</strong> - not only underpinning the different levels of society (individual, communities, populations, etc) but also:</td>
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<tr>
<td><strong>−</strong> infrastructure (e.g. education, communications, employment);</td>
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<td><strong>−</strong> culture (e.g. moral system, symbols and symbolism, behaviour, and level (individual, family, community)</td>
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<tr>
<td><strong>−</strong> government (e.g. administration, policies, legislation, rules, rights).</td>
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<tr>
<td>Dialogues data to understand dimensions of sustainability (concepts captured during the dialogues)</td>
<td>Key components (considering the following dimensions to create sustainability)</td>
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</table>
| From the **economic perspective** – …and this is the way we run the retail shop, as well. Currently we are in the process of trying to make it ecologically responsible; it is quite hard to find products at the moment. We try to run our business in a way which implies the involvement of our suppliers; one of them is Patagonia; they are not perfect but they try harder to do well. We choose our suppliers according to our own values… (TYF – 2006) | **Trades**: The sample of this research shows, from a sustainability perspective, economics goes beyond financial achievement to looking at the trading-system in place, from an ethical and ecological perspective. This is another key component to bear in mind when approaching sustainability: **trades** are a symbiotic relationship between natural, human and economic capital, beyond finance. It is important to bear in mind the following at any level:  
- metabolisms (e.g. ecosystem, regeneration capacity);  
- source (e.g. geographic location of providers, resources or material);  
- procedures (e.g. cultivation, process, extract, usage). |
| From the **environmental perspective** – They wanted to create another operational centre as they are based in Devon and they didn’t want to be supplying this far; it was against what they believe, as delivering so far was just increasing food miles…but food miles is a controversial subject – people are obsessed by that, but it’s not as simple as it seems, there are different factors to deal with, for example: what is better, to grow tomatoes under hot houses during winter with paraffin heaters in Devon, or to fly them in from Spain? Which is actually better for the environment? (River Nene – 2005) | **Nature**: The different dialogues revealed a way of seeing the environment holistically rather than treating it as external to the system. Organisations and people that have values, beliefs and motivation related to sustainability at their core look at the environment beyond materials, energy and impacts; they see it as part of a system of interactions. The key component is **nature** – seen not as an externality, but as framing relationships between different levels of the ecosystem, of which people are also a part, with a systemic perspective of the dynamics of:  
- cyclicity;  
- seasonality;  
- rhythms. |
### Dialogues data to understand dimensions of sustainability (concepts captured during the dialogues)

Note: quotes which are self-explanatory were chosen – for further information about the organisations (see Chapter 5)

| From the **technological perspective** – If we ask our growers to grow something, we buy it off them no matter what and it’s our problem if it’s not good enough. If we reject it, it’s a self-prophesying failure. We take a different approach: we’ve bought into them as growers so we want them to perform well. In fact we need to understand what each grower is good at and encourage that talent. We are all interdependent. (River Nene – 2005) |

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### Key components (considering the following dimensions to create sustainability)

**Operations:** The majority of approaches to sustainability are made via an evaluation of industrial processes and their efficiency focusing, for example, on products and materials, as well as on the energy efficiency of the product and its disposability. Conversations with the organisations explored the technological dimension beyond machines and industrial processes, they see it as encompassing the arena of all actions. **Operations** involves understanding how we (the business, the team, the manufacturing...) relate to people, nature and trades in order to create, produce and use any outcome/output, involving the systems, structures and processes in place in any level and intervention:

- inputs: natural (energy & resources); human (knowledge & labour); financial (investment & return)
- transformation: systems, structures, process, tools
- outputs: initial phase, transformation phase, distribution & storing phase, commercialisation, end of life.
### ANNEX 6.3 ANALYSE PROCESS - COGNITIVE MAP OF THE EIGHT SUB-SYSTEMS

<table>
<thead>
<tr>
<th>Conversation data (concepts captured during the dialogues)</th>
<th>Key components (Considering the following sub-systems to approach sustainability from a holistic and systemic perspective)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>to understand the eight sub-systems as part of a practical approach</strong> Note: the quotes presented here were scrutinised for those that were self-explanatory and are verbatim</td>
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</table>
| ...
| **...we want to encourage more people to use natural and organic cosmetics. We want everybody to be able to afford these products, at least the vast majority (...) enabling people to live a healthier lifestyle (Green People – 2007)** |

| ...we helped the growers’ cooperative with an application to the British Foreign Aid body for international development; (...) they’ve planted more than a million new trees with that. They are now training people outside their area and help them not just to grow cocoa, but when to harvest; how to ferment, how to dry it... (Green & Blacks - 2006) |
| **Cells** - refers to the features and relationships within this level (materials, energy, aesthetics, software, meetings, business cards, words, attributes...) |

| **What we really try to pass to our clients during the time they pass between us is: if they eat good food and exercise, they live longer. We have to put things at an individual level, so it’s not about teaching people but about giving the example. The more we can live what we teach; the more we demonstrate that it’s not about talking but about doing it: if we don’t do it, no one believes; and I think the interesting thing is the more we do that as a business, the better results we have. Yesterday I had a meeting where we cycled and talked at the same time; and the better we are, the fitter we feel, the better we do business, because people can see that we walk and we talk...walking and talking creates non-doing gaps, because people believe you when you say it and do it too.... It’s about trust. Walk the talk. (TYF - 2006)** |
| **Organ** – the result of several inter- and extra-relationships of the group of components or features from the level of cells which are products – includes abstract products (e.g. insurance) or concrete products (e.g. chair) |

| **Organism** – refers to relationships within the organisation (internal relationships) and the outcomes offered. It is the result of combining concrete and abstract products (such as in a product and services outcome) and offering sustainable live style choices |
**Conversation data** (concepts captured during the dialogues) to understand the eight sub-systems as part of a practical approach Note: the quotes presented here were scrutinised for those that were self-explanatory and are verbatim

<table>
<thead>
<tr>
<th>Key components</th>
<th>Group – refers to an assemblage of related organisms which allows the generation of product services systems (PSS) - e.g. architecture and a laundry delivery service</th>
</tr>
</thead>
</table>

When we did the Green Building it was a highly engineered and researched project and we had many engineers from different disciplines: structural; electrical; mechanical; sunlight and wind engineers: and all of them we asked how the building would look if it was entirely designed according to their disciplines. It was very much a kind of understanding the mechanical constraints and elements that needed to be there in order to create such a building. (Organisation Z - 2006)

…we were working with the national park locally, to set up a code of practice for everyone working with the national park to instigate good environmental practices. The main idea was to base the creation of the code in a collaborative approach. We presented this concept to the national park and let them develop it. It was really successful; it impacted on the way that five or six other national parks in the UK are run. Since it started we haven’t had any conflict with the national park (TYF – 2006)

Organisation – refers to the whole system supporting the outputs: the actors of a business model in enterprises and companies (e.g. providers), but also the actors not taken into account (the indirect actors) such as: the urban and/or rural surroundings and landscape, and the existing ecological systems...
### Conversation data (concepts captured during the dialogues) to understand the eight sub-systems as part of a practical approach

Note: the quotes presented here were scrutinised for those that were self-explanatory and are verbatim

We’ve got a co-operative of growers round from Cambridgeshire, Norfolk and Bedfordshire and so on. He got those growers on board because most growers are good at growing certain things. No one is really good at growing a whole range of products: each grower is very good at growing certain things. That’s why a lot of box schemes fail, because they’ll either be one farm or they’ll be buying it in and they can’t get to the right growers; the growers will always give them all the rubbish that they can’t sell to the supermarkets, which makes it a very difficult operation. But because we could sustain the offer with the example of Devon farms and how it’s worked down there, the growers are a lot keener to get on board. Now that they’ve been doing it for 18 months they absolutely love it because they’re getting more money for their products; they can grow more of what they like to grow rather than what they’re told to grow and they just love it. *(River Nene - 2005)*

… I don’t want my money invested in any business that extracts fossil fuels because I’ve got big concerns about climate change’… That is reflected in a policy which governs how the bank will or won’t invest its money. We’ve been able to do that successfully by asking customers about the issues that are important to them and ensuring that our most significant impact as a banking business, which is a financial position, reflects their concerns. *(Co-Op - 2007)*

### Key components (Considering the following sub-systems to approach sustainability from a holistic and systemic perspective)

**Community** – refers to the external (e.g. multinationals and businesses associations) and internal partnerships (e.g. cooperatives and unions) as well as the internal and external infrastructures.

**Society** – refers to the externalities that contribute to the dynamics of the system as external influences (e.g. regions and states as well as countries and cities) and internal influences (e.g. business culture, rules of compensations etc.)
**Conversation data** (concepts captured during the dialogues) to understand the eight sub-systems as part of a practical approach

Note: the quotes presented here were scrutinised for those that were self-explanatory and are verbatim

**Key components** (Considering the following sub-systems to approach sustainability from a holistic and systemic perspective)

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The Co-Op’s foundation principles: …a defining Co-operative principle is that of openness and honesty; and it’s absolutely imperative in a business like the Co-op, and that does rely quite heavily on trust in order to bring customers through the door...There is a strong relation between growth and ethics in the Co-operative and this can be expressed for example in the bank business: what attract consumers to the bank is our ethics, therefore is very easy to translate the benefit of ethics into numbers that are related to the business growth, which is done through consumer feedback. "Reason to join the bank" “Attracted to its ethics!” (Co-Op - 2007)

**Supranational** – the organisation of societies: governments, policies and legislation, but also the value system implied (internal and external)
ANNEX 6.3 ANALYSE PROCESS - COGNITIVE MAP OF THE TWELVE LEVERAGE POINTS

The next table presents the cognitive map of the twelve leverage points to intervene in a system as they are capable of delivering a different paradigm (Meadows, D 1997/99:7).

<table>
<thead>
<tr>
<th>Cognitive Map</th>
<th>Dialogues data to understand the behaviour paradigm</th>
<th>Key components</th>
</tr>
</thead>
<tbody>
<tr>
<td>The <strong>leverage points of a systems</strong> are points of power to intervene in a system (Meadows, D 1997/99:1)</td>
<td>The thing about the food industry in general is when a company gets big, some smart accountant tries to figure out how you can save, and each time you save a little bit, making a little tiny sacrifice, you put in danger the integrity of the product (Green &amp; Blacks - 2006)</td>
<td>12. Constants, parameters, numbers (such as subsides, taxes, standards)</td>
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<td>Guy is very pragmatic about the way the box scheme works. He obviously responds to ecological issues and it is a very green company and a very ethical company. On the other hand they're not afraid to, for example, import goods at certain times of the year when we need to because there's hungry gaps and there's times when there isn't any British crops around (River Nene - 2005)</td>
<td>11. The size of buffers and other stabilising stocks, relative to flows</td>
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<td>A co-operative down there of growers were built around the farm. They're all 100% supplying the box scheme; none of them supply the supermarkets or anything, now they just go through the box scheme. But he realised that the operation was getting too big in Devon, so he wanted to move it up. This was like the pilot to see if it would work, if you like cloned the operation to another part of the country. So he has done exactly the same thing here. Rob came along, he set the farm up in Yaxley. He went around to all the local organic growers, talked them into supplying the box scheme and another co-operative of organic farmers were born. (River Nene - 2005)</td>
<td>10. The structure of materials, stocks and flows (such as transports networks, population, age structure)</td>
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<td>You get preservatives which are permitted in organic products, but they themselves are not certified, they don't have a stamp of organic origin. The emulsifiers, in theory, could be made from organic breed, organic raw materials, but in practice they're not, they're made from non-organic. And it comes back to scale and volume again. If they’re making ISO emulsifiers, they will produce 6 to 8 tons in one hit, in one go. Now that amount of conventional product, conventional emulsifier is going to last, in a company like ours, from two to three years. And we need it fresh. We will use fresh ingredient, buy it in fresh, with the maximum of shelf life, use it immediately, put the product out as soon as possible because we cannot be sitting on hundreds of kilos of raw ingredients. We can buy conventional surfactants in the sort of quantities that we need, the quality is fine, there are no nasty processes involved, it's just that they're not, unfortunately at the moment, using an organic breed…maybe in the future… (Green People – 2007)</td>
<td>9. The lengths of delays relative to the rate of system change</td>
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<tr>
<td></td>
<td>If you make a mistake like that (decrease the product quality by any means) with loyal customers, that's the moment when they try if your competitor’s product is better or just as good as yours; you’ve lost them. And people don’t get back once you’ve lost them. And the thing with</td>
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</table>
Green and Black’s is we never, never sent out bad chocolate. We’ve never failed to have chocolate for our consumers…the other thing is to find it when they go into the shop. Those are the sort of key important bases. (Green & Blacks - 2006)

Most of the farmers round here have been on their own land for generations, people don’t really generally buy a farm and set up a farm these days, they’ve grown into it, they’ve developed into organic farming. It takes us three years to convert a farm into organic now, so we’ve got a long term plan for that, we’ve got a 25 year lease on it. We have a program for detoxing… there’s quite a lot of grants and things available for doing that. There’s a lot of money available to manage farms in an organic manner. (River Nene - 2005)

We have a very tight controlling system for everyone who brings cocoa to the co-operative: 20 beans are taken out of the bag, sliced in half, looked at. If three or more are purple then they take another 20 and if more than three are purple in the second lot, it’s rejected. That’s a negative incentive…but it’s their own co-operative that is doing the testing because if they don’t test it properly and it comes to us and we test it again, which we do and we reject it, then the matter becomes serious. It never happened… even when the person testing it is from close family… in one case it was the brother of the person bringing it in and the beans belong to their mother and he rejected them. (Green & Blacks - 2006)

For instance if we get an oil company coming in and saying “we need X million pounds to finance some new exploration in Y”; our ethical policy will kick in and say “No! We cannot do that because our customers have told us that they have concerns about climate change and our ethical policy have a clear position with regard to fossil fuel extraction. (Co-Op - 2007)

The green building was a research project mainly about how a building will look like - what form a building will take - if it was designed entirely according to the way the building would exploit the ability to use environment o its favour and create a zero waste energy building. We wanted the air to work for us, the air will naturally move, creating and exaggerating the effect of cross ventilation and the stack effect of hot air rising, to create movement into the building so that there wouldn’t be a need to air condition and it would feel comfortable. There was the possibility also to modulate the air coming through and all the stale hot air would go up the sides which weren’t inhabited and then to the top. It was elevated above the ground which enabled taking the air from above the main pollution levels so the air would be relatively more pure with the park underneath and it was, shaped - the form of the building - was shaped in an aerodynamic way because that is what encourages…as the air doesn’t move in straight lines. (Organisation Z - 2006)

We have to put things at an individual level, so it’s not about teaching people, but about giving the example. The more we can live what we teach; the more we demonstrate that is not about talking but about doing it. If we don’t do it, 7. The gain around driving positive feedback loops

8. The strength of negative feedback loops, relative to the impacts they are trying to correct
no one believes us; and I think the interesting thing is, the more we do that as a business, the better results we have. Yesterday I had a meeting: I was running a workshop where we spend half the day walking rather than working in an office with no windows. (TYF - 2006)

When we designed the world classroom, the teachers were quite concerned (and this is young children aged 6 to 11), particularly with the children that had behavioural difficulties. The concern was that they would be taken out of the kind of safety of a classroom that they knew and identify as classroom, to be put into this weird-shaped base building, feeling uncomfortable, potentially affecting their behaviour. In fact the opposite happened; they go into the space far from the conventional classroom (and we made an issue that everybody that goes into the space takes their shoes off immediately), and what the teachers have observed is that the children focus a lot and they feel incredibly comfortable. The shape of the building is womblike, enveloping, and the children feel very, very comfortable and very safe. Apparently they work harder. They use the space in a different way: they’ll lay on the floor for example and work; whereas in their day-to-day classroom they would normally just sit at the table and work … They enjoy it, and I think the teachers enjoy teaching there too. The idea of this project was to challenge the way in which children learn and teachers teach. (Organisation Z - 2006)

Another important factor is through our work to try and have a distinct form of reconnecting people and help people to realise when they exercise, when they spend time outdoors they feel better towards life, but in a gentle way. It is not imposing but informing people so they make better choices. (TYF - 2006)

Ethics is something which changes according to the changes of customers’ priorities which determines how the policies are going to reflect them; currently there are positions which may change over time (Co-Op - 2007)

And this is the way we run the shop, the retail shop, as well. Currently we are in the process of trying to make it ecologically responsible; it is quite hard to find products at the moment. We try to run our business like this which implies the involvement of our suppliers. One of them is Patagonia – they aren’t perfect but they try harder to do good. We choose our suppliers according to our own values; we do an ethical order to the hotel: everything to buy in the hotel, so not just buying but checking how good people actually are, so we know how the process is, because again, once we’ve been through the process we learn how we can inform other people; and that’s the idea. (TYF - 2006)

When we found our chocolate partner factory in Italy it was a family business: there was Mama who was in her eighties signing the cheques; Angelo, her oldest son was in his fifties and the other sons and daughters; Daddy had died. It was a typical Italian family business, all the family worked in it and each one had a skill that was useful to the business and to us. For example Angelo: his two great strengths were 1) he could just take cocoa beans raw
before they’d been roasted, hold them to his nose, crack them open, take another batch and then say “Ok, roast these for 25 minutes at this temperature, roast these for 20 minutes at a lower temperature and then blend 40% of these with 60% of that”. So all the time, year after year, we had the same taste in our finished chocolate. (Green & Blacks - 2006)

We are trying to move to a space where all the full time staff of the business will decide how much they want to earn based on understanding how that part of the business works. So it is about understanding the spreadsheet and where the money comes out and getting to a level at which there is an understanding about the relation between individual effort/responsibility and the business profitability. Let’s say we need to get 10% clear out of the business unit to invest and to pay the capital to do whatever is need to maintain and improve business, rather than that, if you want to get more out of it I can’t do that for you. If you want to do it I can help you and give you some ideas, but I can’t make you do it and that way, I think, creates a good level of understanding and a good sense of how much people want to earn; again to work and create a fertile structure and to engage. (TYF - 2006)

It’s very difficult to be able to re-educate people. We can’t do it single-handed. We can’t re-educate people about eating in season. I mean, your classic comment about not eating tomatoes in winter but, can you imagine people in the UK without tomatoes? And I think the UK is probably, I don’t have that much travelling experience but, I believe that the consumers in the UK are probably the worst for this eating out of season thing. In the end the product is a problem and it’s not, even when we could put a really good product on someone’s doorstep, then you’ve got the problem which is people: the earth on the vegetables or because we’ll leave the outer leaves on it, the outer leaves are all ropey on it. We leave them on to protect the heart of the product so that it doesn’t get bashed about and things like that. It’s like cauliflowers, people are so used to seeing cauliflowers as a white head aren’t they?…and we leave all the outer on it and people don’t understand…they don’t get it and then they ring up. (River Nene - 2005)

Enabling people to live a healthier lifestyle. Um in global terms I suppose we’re highlighting the issue of natural and organic cosmetics and it’s very interesting: over the last couple of years and in particular in fact over the last six months, there has been a tremendous increase in interest in our area of business by the big manufacturers. L’Oreal, the biggest of the cosmetic companies worldwide, bought the Body Shop earlier this year. (Green People – 2007)

The aim of the business is to teach people to play and think differently. (TYF - 2006)

In the beginning I think we were waiting for the bubble to burst and…it has just continued….It’s been a fantastic lifestyle change for us; from a parental point of view we’re around for the children: we can go off and do the school run morning and afternoon and although we might be in the office the children are out here playing or they’re around or you can run them around to their friends or whatever… and

4. The power to add, change, evolve, or self-organise system structure

3. The goals of the system

2. The mindset or paradigm out of which the system arises
you’re just so much more flexible. (River Nene - 2005)

At the very start point, 20 years ago, there was a need, people asking for this kind of approach and it didn’t take long to realise that, as soon as we started to understand organisations more, to realise how sick most of them are in term of the way they engage people; how little people engage at work; there is really a need, a social need. Between then and now, we have many stories of people telling us that coming down spending two to three days with us in a program in St Davids changed their lives; and this is what makes it worth it! (TYF - 2006)

The ethical policy has existed since ‘92 and that covers all the kind of assets and liabilities. I think more recently, because that’s in place and working well there’s been more of an attention focussed, from our team and others, to the nature of the products themselves. Whilst the money is invested ethically and of no concern there, it’s like whether there can be a more ethical proposition for a particular product. The first thing, I suppose, to go down that way was the bank’s mortgages, which essentially have a variety of features making them green. (Co-Op - 2007)

I don’t know if you’ve seen our latest Green & Black’s advertisement. We have a picture of a cocoa tree with pods, a beautiful picture and it just has a little ribbon hanging from it. Then we describe how the growers, when a tree is doing really well, how they put a ribbon around that tree because they got cheated by Hershey’s many years ago. They planted terrible trees, very vigorous, but very prone to disease. They have these and they could cut them down and plant a new tree, but what they do is to understand if the tree is established now, if so, they put on, graft on branches from the older more disease-resistant trees. That way they don’t have to wait five or six years for a tree to grow; they have a productive tree within two or three years. Now, that’s a very technical and detailed thing for a customer to get their head round, but, in fact, it’s not! There is an awful lot of stuff that farmers do that is very clever. This is one of them…people see that advertisement in the Sunday Times, or the Observer, or whatever, permanent. They stop and think, and they think it’s really nice and it’s really good they’re doing this in order to farm more organically. And, it helps to create a positive world view and it’s Green & Blacks. (Green & Blacks - 2006)

In the early days of a business it is very common, I think, that everyone is busy working in the business not on it. It took me a few years to get a position of not earning but working on the business…and now it is clear that the more I do that the more successful the business is. (TYF - 2006)
## ANNEX 6.5 NINE PRINCIPLES TO ILLUSTRATE A SUSTAINABILITY PARADIGM

Nine tables show examples taken from the dialogues, each one illustrating one principle.

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<thead>
<tr>
<th>First Principle (related to matter)</th>
<th>Key characteristics</th>
<th>Illustration of the principle in action: dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
</tr>
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</table>
| Time as an inherent quality | Understanding time as a quality requirement rather than a cost element | **Long-term changes (behavioural)** – Another important factor is through our work to try and have a distinct form of reconnecting people and help people to realise when they exercise, when they spend time outdoors they feel better towards life, but in a gentle way; it is not imposing but informing people so they make better choices. (TYF - 2006)

**Strategic thinking** – In the early days of a business it is very common, I think, that everyone is busy working in the business not on it. It took me a few years to get a position of not earning but working on the business… and now it is clear that the more I do the more successful the business is. (TYF - 2006)

**Long term planning** – We have a program for ‘detoxing’: It takes us three years to convert a farm to organic now, so we’ve got a long-term plan for that, we’ve got a 25 year lease on it. (River Nene - 2005)

**Framework** – The co-operative is a seasonal box scheme which is very important. We do try to keep to the seasons. We generally won’t put stuff in the boxes… if we can source it from the UK and from our farms, that’s what we put in the boxes, so you are unlikely to get exotic products in the box when they’re not in season in this country. (River Nene – 2005)

**Priorities** – Ethics are something which change according to the changes of customers priorities, which determines how the policies are going to reflect them; currently there are positions which may change over time. (Co-Op – 2007)

**Knowledge** – … in making cocoa beans there are ways you can save time: 1) it causes a little damage to the flavour, so when someone is working in really hot tropical conditions and they look at a pod and they think: “No, I’ll leave it for a couple of days more and then I’ll come back and harvest it” or 2) when they are fermenting the beans and they put their hand in and it is warm but it could be a little bit warmer, or is cooling off and they think: “Well, I could let it up to dry now, but I will leave it for another day” – it’s those kinds of decisions; we don’t make them ourselves, but we have to be sure people will do it for us.(Green & Blacks – 2006)

**Process integrity** – The thing about the food industry in general is, when a company gets big, some smart accountant tries to figure out how you can save, and each time you save a little bit, making a little tiny sacrifice, you put in danger the integrity of the product. How did we get the cocoa growers to be so loyal to us? …we know every single one of their names; they know me; they know other people from the company because they’ve seen us (Green & Blacks - 2006)
Annex: Chapter 6

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<th>Second Principle (related to relationships with matter)</th>
<th>Key characteristics</th>
<th>Illustration of the principle in action: Dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
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<tr>
<td>Accountability of resource use</td>
<td>Establishing a respectful relationship with place, material and energy and Participatory relationship with people throughout the life-cycle (growers, providers, technicians, etc.)</td>
<td><strong>Business life cycle</strong> – If we ask them to grow something we buy it off them, no matter what. And it's our problem if it's not good enough. Whereas the supermarkets just reject it and won't pay for it. If you reject it, it's sort of a self-prophesying failure if you do that. Because if you ask them to grow something and they grow it and you don’t like it because it’s got too much aphid on it and you reject it, then they may not be there next year because you might have wiped the business out by doing that. Whereas we take a different approach, that we’ve bought into them as growers, so we want them to perform well, we want them to grow their business as well as possible. There’s no point in us destroying their business in the first two years of trading with them just because we don’t like their crop, or because we don’t think we can make a profit out of it. (River Nene – 2005) <strong>Cause and effect</strong> – How did we get the cocoa growers to be so loyal to us, you know? And we’re still dealing with the same cocoa growers. I know every single one of their names; they know me; they know other people from the company because they’ve seen them. Those cocoa growers never see the final product, all they see is some agent for some trading company that sells to Cadbury's or Nestlé or something, you know. They actually see us and have a relationship; that makes a difference to the finished product. (Green &amp; Blacks – 2006) <strong>Appropriate</strong> – No! No! No! Because we don’t fly it, everything goes by ship. You can’t grow cocoa in Britain. You shouldn’t really grow sugar in Europe, it’s just crazy, because of the indirect costs… There are all kinds of energy that go into stuff and the biggest source of all is the sun; so if you’re growing sugar cane (which is growing 4 metres high with tropical sunshine), why grow beets in Europe that produce little round beets and don’t produce very much sugar for Europe? And the impacts are soil erosion from the beets produced in Europe; environmentally it’s one of the worst crops to grow. It only grows…we only grow it in Europe because the French sugar industry developed when the British blockaded Haiti and Louisiana in 1812. (Green &amp; Blacks – 2006) <strong>People</strong> – We always had a relatively macro approach to environmental education, in the awareness that people’s wellbeing is related with the wellbeing of the planet and with the wellbeing of the land. It is about connecting; we always had a systems-based approach to the way we work because it’s, in fact, the way I see the world. My</td>
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background in geography though my systems thinking, and I apply it in everyday business. It is known in business thinking that the most productive places are where people are happy, so it was a short extension of what we’ve been doing. (TYF – 2006)

**Responsibility** – I suppose our work with these suppliers goes a long way. We try and influence them by saying: “We want products which are free of solvents; which are GMO free; which don’t have unnecessary preservatives added; which aren’t treated in particular ways that destroy the goodness of the plant material they’re starting with”. And if you, they were to produce this, we would buy it from them. But as it is at the moment, what they have to offer is no good. And on a couple of occasions they’ve come back to us a year later and said: “Actually we’ve had a couple of other people have mentioned this same problem so we are going to go ahead with production of a preservative-free version”, or whatever. This gives us a nice feeling because you think: “Well ok! I’ve influenced them to do something”. A company of our sort of size doesn’t have a lot of pressure, but in some cases it is enough... (Green People – 2007)

**Survival** – ... proposing activities in relation to that is also a reflection of our fundamental need to be forward thinking. We are looking at renewable energy with a company that offered us an eight-year deal, where green energy will be provided to the bank, and we got that at a very competitive price which is going to generate a number of wind farms...we sort of collaborate with them. After two years, what’s happening now is that the strategy is not delivering the resources that we need to support our longevity, and we want to continue to be a business. (Co–Op – 2007)
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<tr>
<th>Third Principle (related to matter and peoples’ relation to it)</th>
<th>Key characteristics</th>
<th>Illustration of the principle in action: dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
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<tr>
<td>Legacy: giving something back</td>
<td>Acting to revitalise nature, society and individuals</td>
<td><strong>Constructing individuals</strong> – A sense of belonging is very important, particularly when you are dealing with children: the school building that we’re doing at the moment, it’s a huge school – 1600 kids from age 3 through to 18 – and it’s very important to break it up into pieces so that you don’t feel that you’re in a huge campus, but that you actually feel there are these rites of passage as you pass through the space…you feel that you are kind of passing and going up to the next….Also because buildings are large-scale and this is a large project, it can be quite intimidating. You want to make people feel that when they get to school they are embraced and safe. But at the same time you also want them to feel excited and interested and stimulated – it’s a balance. (Organisation Z – 2006)</td>
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<td>Beyond zero impact: creating a positive impact</td>
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<td><strong>Positive impacts</strong> – We have a broad principle, which is trying to minimize our own impact on the local environment, full stop. Everything we do is trying to minimize. One of the actions is: we’ve been a carbon neutral business for 5 or 4 years and that is fine, but we might be moving towards being carbon positive; this is one of the principles we’re doing. Another principle is through our work to try and have a distinct form of reconnecting people, but in a gentle way, and helping people to realise that when they exercise and when they spend time outdoors they feel better towards life. It is not imposing but informing people, in order for them to make better choices. Our sorts of business proposition are about helping people to have different ideas. We don’t teach anything; I suppose what we do, for a smaller business, is to try and involve people. (TYF – 2006)</td>
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<td><strong>Community responsibility</strong> – We can certainly point to the fact that the Co-operative has a unique position as a member-led organisation and its history has been as a socially responsible community orientated business that really takes its responsibilities seriously. That has without doubt attracted many, many staff to come and work here. (CoOp – 2007)</td>
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<td></td>
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<td><strong>Contribution</strong> – Yes, we set our own agenda: we set our agenda for growth, we set our agenda for profits, we set our agenda for donations to charity, which again is a very important part of what we do. And there’s nobody that can tell us otherwise. No bank manager sitting there saying: “Well you can’t give this charity £5000 because you owe me some interest on this loan. Got to pay that first before you do this.” That doesn’t happen. (Green People – 2007)</td>
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<tr>
<td>Fourth Principle</td>
<td>Key characteristics</td>
<td>Illustration of the principle in action: Dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</td>
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| Reframing Growth | Growth is seen as beyond financial achievement  
Consequence of a 'values and ethics' led business | Consumers’ reflections – One of the ways that we’ve been able to do that quite successfully is by asking customers about the issues that are important to them and ensuring that our most significant impact as a banking business, which is the provision of finance, reflects their concerns. I think in many ways it’s exemplary; it’s not a case of us sort of saying: “Well, we think that’s wrong so we won’t do that”. Which, to be honest, some of the other banks have got sort of ethical policy-style statements now on a couple of issues but there’s no mandate from their customers. It is something like: “We will not invest in the arms trade” – a very categorical statement, but it’s not supported by any sort of consultation as far as I’m aware. That’s really what sort of makes our ethical policies stand out. It is genuinely a customer-led exercise. (CoOp – 2007)  
Massification – We want to encourage more people to use natural and organic cosmetics. It’s not a case of pricing it so high that you’re putting people off or making it exclusive: we want everybody to be able to afford these products, at least the vast majority. And again, that is important to us. We make sufficient from the manufacture and sale of the products to be able to do what we do. We don’t need to do more than we already do. (Green People – 2007)  
Conduct of action – We’ll have a rep from a company coming in and they’ll say: “Got a wonderful new range of products, here we are”, all the details, and you look at them and on the face of it they’re fine, they would be suitable for us. They say: “Ok, they’re extracts”. “How are they actually extracted? What process do they go through?”, “Oh we use hexane”, or some other solvent... “Well, we’re not interested”. “Why not?” “Well we don’t use hexane, hexane destroys the ozone layer in the atmosphere. It’s a highly toxic chemical, hugely volatile, causes lung cancer if you breathe it in and all this sort of stuff.” “But everybody uses it!” “We don’t. We have a standard which we will not change.” Until these people from the manufacturers begin to understand what we’re about, they honestly think they can talk us round and get us to accept ingredients that to them are perfectly normal, but which to us is a step too far. (Green People – 2007)  
Currently Guy doesn’t like it at the farm in Devon because he doesn’t know everyone, for they’re
buying some more farms now Guy doesn’t recognise everyone anymore because there are too many people working down there. So he’s setting up a strategy and buying different farms so that they can localise production – do the same thing again: A central farm; get a cooperative of local growers and supply the local area. So the idea is to cut the food miles drastically (River Nene – 2005)

We have business meetings, we have work meetings were we cycle and talk at the same time and the better we are, the fitter we feel, the better we do business, because people can see that we walk and we talk….walking and talking creates non-doing gaps, because people believe you when you say it as you do it too…. It is about trust. Walk the talk. So, creating pressure to do good things is really good for us, the more we talk about things the more it makes us want to do them, which is great. (TYF – 2006)

People scale – It’s about, not just letting a business grow. Some businesses (I’m trying to think of a financial company…) every year they fire 20 per cent of the staff. Every year 20 per cent of the company goes and they’re brilliant, some of them, really capable, qualified people who immediately get a job somewhere else. (Green & Black – 2006)
<table>
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<tr>
<th>Fifth Principle (related to people and the system)</th>
<th>Key characteristics</th>
<th>Illustration of the principle in action: dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
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</table>
| Collaborative Cultures                           | Encouragement a participatory social fabric | **Influence** – We don’t really get a say in the strategic decisions. But they will ask us what we think before they do it. The reason the company works for us is because Guy’s got a fantastic vision and he’s recruited people that are along the same lines as him. But they’ll not necessarily agree on everything, but the actual goal of the company is to provide ethical, organic produce, vegetables and fruits, to people at a reasonable cost that keeps farmers in a living; keeps the consumers happy and keeps us in a living. That’s their goal. Guy has got a vision that people work around. But saying that, the people he’s got working around him are very strong people, and if they think something’s wrong they’ll tell him and they will lobby until they get their own way really and he will change his mind. He’s not afraid to change his mind, but he’ll only change his mind when someone can convince him that it’s the right thing to do. And it’s very much about doing the right thing, isn’t it – not necessarily the thing to make the most money. (River Nene – 2005)  

The members of the Co-operative have the very big say in what goes on in this business. I think you’ll have seen the democratic structure whereby you basically can pay a pound, you can then seek election to an a Committee I think of which there are about 45 off the top of my head, in the country. And that gives you a say in how the Co-operative group of businesses is operating. (Co– Op – 2007)  

**Relating** – The cocoa growers never see who they dealing with, who their cacao is bought by; all they see is some agent for some trading company that sells to Cadbury’s or Nestlé’s or something. They actually see us and have a relationship that makes a difference to the finished product. (Green & Black – 2006)  

**Involvement** – We get their views on it, yes. And very often the people that are doing the job, that are involved in the process, have the solution in their minds already…but you need to tap into that and give them the chance to contribute. Once that feedback is altogether, that’s written up, comes back to the management meeting and we say: “What a great idea, why didn’t we think of it before: put it into action! (Green People – 2007)  

“We” mean the office. We are 28 people and there are some very talented architects and designers here. While Jan and I will head our different projects, the other people, senior people on the team, make a very real contribution and help to push us in directions that perhaps we wouldn’t go in by ourselves. So it’s a much more open situation. And perhaps that comes back to your first question about the name Future
Systems: it is not only about the work that we do here, but as well about how we work here. (Organisation Z – 2006)

Sharing – ...ecological metaphor might be: if we are in a very stable environment there is a very little pressure to evolve; I suppose we tend to do the opposite on purpose, which is to surround ourselves with people that challenge us; in the retail business it's to spend time with the people of Howies, and they inform us as much as we inform them; or working at places like Schumacher, connecting with others. Being involved in different fields is really good and very valuable, quite often during holidays; summer holidays, or during weekends, people from our business come down to stay to have dinner conversations with us. (TYF – 2006)
### Sixth Principle
(related to people relating to people)

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<tr>
<th><strong>Key characteristics</strong></th>
<th><strong>Illustration of the principle in action:</strong> dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
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</table>
| **Leader as facilitator** | Generating opportunities for individuals to express their interests  
Flexible structures  
Allowing the exercise of accountability |
| **Facilitator** | The challenge (around that) is for me to work and run the business to make sure I give people as much space as I can, to be able to interfere as little as possible and not get too involved. I aspire to facilitate rather than it being my decision, but sometimes when the business is under pressure I have to get more involved, but my aspiration will be to help and work together to develop guidelines about good ways to run a business and then to facilitate the business, to be more like a social entrepreneur who supports businesses (in this case each unit). Each unit is independent in this way. (TYF – 2006)  
People perceive us as a big company. Some people perceive it like this; particularly the press and the national media perceive us as a big company, but we’re not really: we’re just a collection of little companies… And everyone’s got a sort of power; everyone can go and say what they think to the board. There are always different people; different people have got different views. And the way it works is absolutely fantastic. (River Nene – 2005)  
**Organics** – There are people who are responsible. I like... you know, the best form of management is to go to somebody and say, you know: “Now it’s 8 o’clock” – like that, but… If people understand what they’re supposed to be doing and they understand what the goals of the business are, then you don’t need to manage them that hard. And if they’re highly motivated, if they like the business and what they’re doing, they put pressure on other people in the business who aren’t working. So you... I think you just get a good team. (Green & Black – 2006)  
**Human** – I set myself very strict standards over how I should behave in business, how I should treat my employees, and when I met Charlotte and talked to Charlotte I realised that she had got very similar views that I was very comfortable with. She looked after the staff here, treated everyone that she ever comes into contact with very well, with compassion, with friendship, with warmth. That to me is important, that humility and humanity are very important. (Green People – 2007) |
<table>
<thead>
<tr>
<th>Seventh Principle (related to relationships)</th>
<th>Key characteristics</th>
<th>Illustration of the principle in action: dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
</tr>
</thead>
</table>
| Co-dependence and Self-Sufficiency        | Generating structures that integrate diversity, self-organisation and independence, at the same time functioning as interdependent and interconnected organisms | **Togetherness** — At a traditional level it will be very easy to sell a unit of the business… but each unit support each other, which is much, much harder to make those decisions due to the intangible benefit of all units working together; and what we are working right now is to really increase the activities between the different parts of the business (TYF – 2006)  
**Collaboration** — At Devon, they can’t grow onions to save their lives down there because the soil is just rubbish for onions. What they’ll be doing is using some of our onions and vice versa, there are some things that they can grow better down there; they can grow artichokes down there better. (River Nene – 2005)  
There are certainly examples where we’ve worked with our suppliers to provoke a change. For instance, we want our staff canteen to supply fair trade chocolate coffee biscuits etc – that would be a conversation we would have to have with a certain supplier and they would have to provide us with such products… that is a real example, actually, where we worked with the supplier to try and get that offer. It wasn’t a product that they had as a regular thing on their books. By doing so, we helped equip the supplier to potentially provide this kind of product to other businesses as well. There are a few instances where things happen like that. (CoOp – 2007)  
**Reliance** — I used to make a peanut butter and jelly… but to build a brand, the important thing is to get the recipe right and to make sure that the people who are growing the cocoa are giving you the best possible cocoa beans. In making cocoa beans for example there are a lot of ways that you can save time. (Green & Black – 2006) |
### Eighth Principle (related to systems’ approach to its outputs)

<table>
<thead>
<tr>
<th>Key characteristics</th>
<th>Illustration of the principle in action: dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
</tr>
</thead>
</table>
| **Creating healthy metabolisms** | **Healthy systems generate healthy outcomes:**  
- Natural wellbeing  
- Social wellbeing  
- Economic wellbeing  

**Business** - It is different franchising, because it's about a lifestyle, it's a lifestyle change and about the products and about organic farming, organic growing and making sure that everybody is happy all the way along the line, right from the grower right through to the customer and everybody in between. And we did like that ethos and it was just lucky that we could actually join by buying a franchise. (River Nene – 2005)

**Outputs** – Outside the business, we've started a project about five years ago called St Davids Eco-City Project – the World's First Zero Carbon City; that's moving forward with a number of different projects from solar powered school to solar heating on the toilet in St Davids and that's the kind of thing that we're working on. (TYF – 2006)

**Commitment** – I've done a couple of projects in the past which sadly haven’t been realised, where in response to some social condition or a natural disaster, we proposed an architectural solution. And so we did a tent for the disaster areas in Africa and that was around the time of Live Aid, that’s Live Aid and we felt we had other disillusion too, so we proposed this collapsible tent-like structure with a very sophisticated fabric that would deal with the heat and the conditions. Then we had another proposal which was a boat for homeless people, where we took an old barge and then built a series of cabins on the barge around a common area. But again these were proposals and ideas that were not taken up. But it’s about wanting to, in a very small modest way, make a contribution. (Organisation Z– 2006)
<table>
<thead>
<tr>
<th>Ninth Principle (related to the foundations of the systems aim)</th>
<th>Illustration of the principle in action: dialogues with organisations illustrating the different scales at which the principle is applied (not exhaustive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature as a partner (key stakeholder)</td>
<td><strong>Matter</strong> — We wanted the air to work for us; the air will naturally move, creating and exaggerating the effect of cross ventilation and the stack effect of hot air rising, to create movement into the building… there wouldn’t be a need to air-condition and it would feel comfortable. … You could moderate the air coming through and all the stale hot air would go up the sides which weren’t inhabited and then to the top. The building was elevated above the ground, which enables taking the air from above the main pollution levels so the air would be relatively more pure with the park underneath. The form of the building was shaped in an aerodynamic way in order to allow the air to move. (Organisation Z – 2006)</td>
</tr>
<tr>
<td></td>
<td><strong>Ecosystem Model</strong> — The cooperative is a seasonal box scheme. We do try to keep to the seasons, which is very important. We generally won’t put stuff in the boxes… if we can source it from the UK and from our farms, that’s what we put in the boxes, so you are unlikely to get exotic products in the box when they’re not in season in this country. (River Nene – 2005)</td>
</tr>
<tr>
<td></td>
<td><strong>Mentor</strong> — Because the ethical policy has existed since ’92, and that covers all the kind of assets and liabilities. I think more recently, because that’s in place and working well etc, there’s been more attention focussed, from our team and others, on the nature of the products themselves… whilst the money is invested ethically and of no concern there, it’s like whether there can be a more ethical proposition for a particular product. The first thing, I suppose, to go down that way was the bank’s mortgages, which are essentially having a variety of features which make them green (CoOp – 2007)</td>
</tr>
</tbody>
</table>
ANNEX: CHAPTER 7
## ANNEX 7.1- SUMMARY OF FINDINGS REPORTED IN CHAPTER 6

<table>
<thead>
<tr>
<th>SuCo’s ground base element</th>
<th>Theoretical Background: Cognitive maps</th>
<th>Illustrative examples from dialogues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seeds of Change</strong> show a mindset of a cultural perception of ecological businesses</td>
<td>Abstract side of complex systems to apprehend the system behaviour: the twelve leverage points (Meadows, D. H., 1997) serve as cognitive map to look at data, to illustrate a pattern of “being”. Nine principles emerged with different scales of perception: these were the distinctive ways in which the organisations of this research were characterising</td>
<td><strong>Time as a framework</strong>: The co-operative is a seasonal box scheme which is very important; we do try to keep to the seasons. … if we can source it from the UK and from our farms, that’s what we put in the boxes, so you are unlikely to get exotic products in the box when they’re not in season in this country. (River Nene; 2005) <strong>Time as knowledge</strong>: … in making cocoa beans … there are ways you can save time: one, it causes a little damage to the flavour, so when someone is working in really hot tropical conditions and they look at a pod and they think ‘No, I’ll leave it for a couple of days more and then I come back and harvest it’ or second, when they are fermenting the beans and they put their hand in and it is warm but it could be a little bit warmer, or it’s cooling off and they think, ‘well, I could let it up to dry now, but I will leave it for another day’: it’s those kind of decisions. We don’t make them ourselves, but we have to be sure people will do it for us. (Green &amp; Blacks; 2006) <strong>Time - process integrity</strong>: The thing about the food industry in general is when a company gets big, some smart accountant tries to figure out how you can save, and each time you save a little bit, making a little tiny sacrifice, you endanger the integrity of the product. How did we get the cocoa growers to be so loyal to us? We’re still dealing with the same cocoa growers – in fact we know every single one of their names, they know me, they know other people from the company because they’ve seen us’ (Green &amp; Blacks; 2006)</td>
</tr>
</tbody>
</table>

Table 2 - Annex 7.1: Summary of Seeds of Change element
**Table 3: Annex 7.2 - Summary of OvOlution element**

<table>
<thead>
<tr>
<th>SuCo’s ground base element</th>
<th>Theoretical Background: Cognitive maps</th>
<th>Illustrative examples</th>
</tr>
</thead>
</table>
| **OvOlution** offers a mindset to understand the system and system interdependency & scale of relationships | Eight levels that expose the organisation and complexity of the system structure serve as cognitive map to understand the different relationships around the subject of study (or intervention): the cell; organ; organism; group, organisation; community; society; supranational (Miller et al, 1995:12-15). Exposes the physical element of living systems by embracing the notion of organizations as social organism of communities of practices (Wenger E; Snyder, WM., 2000:2).The important relationships between inputs and outputs across the system and the elements of its structure (Miller et al; 1995:25) | **Relationships with the communities around value-chain** Beyond ethics and fairtrade: *Four years ago we helped [the cacao cooperative] with an application to the British foreign aid body, the Department for International Development …they’ve planted more than a million new trees. And they are now training people outside their area, and help them not just to grow cocoa, but to ferment it; when to harvest; how to ferment; how to dry it…. (Green & Blacks, 2006).*

**Collaboration as a basis to create different relationships** Beyond outdoors; Beyond sports: *We were working with the national park locally, to set up a code of practice for everyone working with the national park around good environment practice. The main idea … was through a collaborative approach: we gave the idea to the national park and let them develop it. It was really successful, has impacted on the way that five or six other national parks in the UK run. Since it started we haven’t had any conflict with the national parks (TYF; 2006).*
SuCo’s ground base element | Theoretical Background: Cognitive maps | Illustrative examples
--- | --- | ---
**AgreeCulture** provides a framework - sustainability lenses | The dimensions of sustainability that served as lenses. The result is four interconnected and interdependent dimensions – people; nature; trades; operations – and a set of parameters that characterise each one. | **Nature: About metabolisms**: You shouldn’t really grow sugar in Europe, it’s just crazy … There are all kinds of energy that goes into stuff and the biggest source of all is the sun. If you’re growing sugar cane that’s growing four meters high in tropical sunshine, why grow beets that don’t produce very much sugar in Europe? And you will have soil erosion from beets in Europe, environmentally it’s one of the worst crops to grow. (Green & Blacks; 2006)  
**Operations: About transformation**: The love part is, we give them chocolate, they taste chocolate, because people that grow cacao, they never ever tasted something like chocolate, if you taste the chocolate, and specially dark chocolate, you can hold it up and say: ‘I grow the beans in this and it’s good’, and that is the positive side. The fear part, the negative side, is a tight controlling system … But it’s their own cooperative that’s doing the testing, because if they don’t test it properly and it comes to us and we test it again, which we do, and we reject it, then it has larger implications. (Green & Blacks; 2006)  
**People: About infrastructures and culture**: When we designed the primary school, Meadlands, the teachers were quite concerned (and this is for young children aged 6 to 11), that they would be taken out of the kind of safety of the classroom that they knew and put into this weird-shaped building and feel uncomfortable, affecting their behaviour. In fact the opposite happened; they go into the space far from the conventional classroom. What the teachers have observed is that the children focus a lot better in the space that we’ve designed – they feel incredibly comfortable – it’s sort of womblike (Organisation Z, 2006)  
**Trades: About natural & human capital**: …and the growers that we deal with in Europe, we generally have got quite good relationships with them, we’re not just buying it in from them, we’ll work closely with them and share techniques and farming methods and things like that. It is very important to do that with organic farming: to share the different methods and stuff, as well as to be able to go where people grow their vegetables and fruits, where people are good organic growers. (River Nene, 2005)

Table 4: Annex 7.1 - Summary of the AgreeCulture element
## Annex 7.2 - Frameworks for DFS Innovation Strategies

<table>
<thead>
<tr>
<th>Framework</th>
<th>What it involves</th>
<th>Key feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable development management system - Rocha et al. (2007)</td>
<td>Integrates seven key elements – stakeholders, resources, leadership, processes, values, objectives and results – and enables: the introduction of sustainable development principles into each of the seven micro-level key elements; macro-level understanding of the interrelationships and trade-offs between the elements.</td>
<td>Allows managing the overall strategy according to a whole system perspective, which considers short- and long-term impacts</td>
</tr>
<tr>
<td>Development and integration of product innovation model towards the design of eco-efficient services - Hallenga-Brick and Brezet (2005)</td>
<td>Easy-to-use approach with quick results: <em>Sustainable Innovation Design Diamond Model</em> – a creative process of ideas/concept generation which supports the design of sustainable innovation strategies</td>
<td>A brainstorming tool that facilitates value chain members’ collaborative generation of new ideas.</td>
</tr>
<tr>
<td>Defining and implementing social performance indicators - Brent and Labuschagne (2007)</td>
<td>Introduces methods and indicators to follow up the impact of social sustainability throughout projects and technology life cycles</td>
<td>Focus on aspects of social sustainability</td>
</tr>
<tr>
<td>Environmental performance indicators for assessing sustainability - Fadeeva (2004)</td>
<td>Takes into account: types of innovation (new ways of thinking or acting); the scope of the impact (economic, societal, environmental); the level of the generated value-added (personal, organisational, regional, society); the degree of achievement of the network’s own goals.</td>
<td>The importance of: collaborative practices among all within a heterogeneous value network (VN); and of a multi-faceted approach</td>
</tr>
<tr>
<td>Product-service systems: innovation strategy definition in which the objective is not selling a product but selling satisfaction - Manzini and Vezzoli 2003</td>
<td>Customer satisfaction is achieved through the design of a bundle of products and services; which consists of adding value to the product life cycle</td>
<td>The importance of product and service life cycle (PSLC) thinking</td>
</tr>
<tr>
<td>Business strategies involving lifecycle thinking - Mont and Bleischwitz (2007)</td>
<td>Relates method design for the environment, eco-labelling, environmental product declarations and environmental management systems to strategic lifecycle thinking, including life cycle assessment (LCA).</td>
<td>Focus on sustainable consumption and resource management</td>
</tr>
</tbody>
</table>

Table 4: Annex 7.2 – Summary of frameworks for DFS innovation (Flores et al., 2008)
ANNEX 8.1
Table: Steering Group work session details

<table>
<thead>
<tr>
<th>Material presented</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• An identical PowerPoint presentation with the four levels of information described above was presented (see SDN work session details in 8.3.1)</td>
<td></td>
</tr>
<tr>
<td>• Each part of SuCo was presented via PowerPoint</td>
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</tr>
<tr>
<td>• The session was recorded, allowing a dynamic and fluid meeting based on conversation to capture key improvements</td>
<td></td>
</tr>
<tr>
<td>• Notes were taken during the meeting.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Process</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• The agenda was sent to participants in advance</td>
<td></td>
</tr>
<tr>
<td>• The key foundations of the investigation (see Table 8.1) were presented by the research. The meeting was held in a common office rather than a meeting room, due to the close relationships that already existed among the invitees and because it allowed a more comfortable and friendly atmosphere.</td>
<td></td>
</tr>
<tr>
<td>• Presentation of SuCo as a methodology followed, focusing on its two parts: Cultural – <em>Seeds of Change</em> (composed of a mindset, a framework and a process presented and illustrated with stories) – and Operational – <em>Agreeculture</em> (also presenting a mindset, a framework, and a process)</td>
<td></td>
</tr>
<tr>
<td>• Relaxed and friendly conversations were held and invitees expressed their opinions while handwritten notes were taken. Questions were asked and explanations given. Market-oriented conversation seemed to be the driver of the discussion</td>
<td></td>
</tr>
<tr>
<td>• Coffee and tea were served during the conversations.</td>
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</table>