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Title	Collective responsibility in the risk society: health as a catalyst for socio-technological innovation, ecological citizenship and sustainability
Authors	Mooney, Robert
Publication date	2015
Original Citation	Mooney, R. 2015. Collective responsibility in the risk society: health as a catalyst for socio-technological innovation, ecological citizenship and sustainability. PhD Thesis, University College Cork.
Type of publication	Doctoral thesis
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Download date	2026-11-01 03:49:36
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Collective Responsibility in the Risk Society

Health as a catalyst for socio-technological innovation, ecological citizenship and sustainability



University College Cork

Robert Mooney: PhD Thesis

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Thesis submitted in October **2015** to University College Cork in fulfilment of the requirements of the Doctoral Programme.

Acknowledgements

First and foremost, I would like to Gerard Mullally who took me in as a stray PhD student wandering through a quagmire of complex social theory, and with patience and guidance led me to completing a coherent piece of work which, I hope, adds to the field of the sociology of health and the environment.

I would also like to thank Piet Strydom for giving me the opportunity to start this work some years ago. I would also like to thank Henrike Rau and Myles Balfe for driving me to refine my ideas and turn this into a better piece of work.

On a personal note, I would like to thank my beautiful wife for her infinite patience, my parents for their endless support, and my son Reuben for making me realise that striving for excellence was not just a personal challenge but an opportunity for me to make him proud.

Thank you all.

Abstract

In 1987, in the context of the risks posed by climate change, the Brundtland Report defined sustainable development as meeting the needs of the present without compromising the ability of future generations to meet their needs. This widely employed definition has successfully promoted a sustainable approach to social and environmental policies and human rights across countries which have signed up to it. While climate change discourses have prompted discussions about of the future trajectory of human society, this thesis argues that the concept of sustainability has failed to be anchored conceptually to the everyday practices of global citizens.

These discourses have encouraged social and technological innovations which focus on meeting these risks. There remain, however, significant inequalities among the world's citizens in their capacity to access resources and their capacity mitigate climate risks. This thesis explores some of the risk factors which climate change poses, the sustainability discourses which have emerged from these debates, and their role in promoting an equitable, open, transparent and accessible form of cosmopolitan ecological citizenship.

I propose a model of ecological citizenship based on the premise that climate change poses risks to the physical, social and psychological health and wellbeing of the individual and communities, and that these risks are universal. I argue that these risks represent breaches of fundamental rights to health. Further, upholding the right to health is a collective responsibility for all human beings and these collective responses to these risks emerge in the form of social and technological innovations which address them. Finally, I argue that they are realisable through equal access to these fundamental rights.

Therefore, a holistic model of ecological citizenship can be developed by recognising the scientific evidence for the causal connections between risks to human health and wellbeing and environmental health, and arguing that these risks represent infringements upon individual's fundamental rights.

The sociological challenge is in the exploration and articulation of a generalizable means by which to frame a form of ecological citizenship that addresses this collective responsibility in the risk society. The model presented in this thesis supports the promotion of inclusive

discourses founded on public participation and the normalisation of responsibility for addressing environmental risks through collective action. It is entitled a Biopsychosocial Model of Ecological Citizenship (BiMEC). The connectivity between its four main themes is its foundation: human health, human rights, sustainability, and innovation.

I examine the validity of the approach by exploring the connections currently being made between these four themes across a series of case studies. Case studies include social innovators (social movements and drivers of sustainability projects) and technological innovations (involved in the advancement of information and communications technologies which support and promote sustainability discourses and the sharing and encouragement of new forms of collective responsibility- specifically Collective Awareness Platforms for Sustainability and Innovation). I examine the benefits of employing technological innovations in support of the promotion of social innovation. These case studies illustrate how health and wellbeing are viewed as a catalyst for encouraging socio-technological innovations which support sustainable practices based on the fundamental human rights to be free from environmental risks.

The purpose of this work is to establish a model, and supply empirical evidence, which supports the argument that the realisation of the Biopsychosocial Model of Ecological Citizenship is a series of incremental processes, and that adopting a socio-technological approach to innovation promotes attitudinal and behavioural change towards sustainability. Further, this model establishes health and wellbeing as a human right and the basis of a new cosmopolitan sustainability paradigm though which it is possible to build an open, equal, and accessible culture of cosmopolitan collective environmental responsibility.

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1. Chapter 1: Introduction

1.1. Health, citizenship and the environment

Human beings' mastery over nature emerged as far back as the agricultural revolution between 7000 to 5000BC[1]. This created access to plentiful food and fresh water supporting great population explosions prompting the spread of the human species to areas of previously wild natural habitats. This relationship remained largely unchanged for millennia. It was after the industrial and medical revolutions in the 1800's that the relationship between human beings and nature was dramatically altered from one of dominant symbiosis (where humans had power over nature) to one of dominant manipulation and destruction (where human beings' sheer numbers and their consumption of natural resources prompted divorced the human species from its ecosystem and cocooned it in a socially constructed reality)[2]. Changes in the relationship between human beings and nature have carried on into on to the present day through the scientific knowledge and technological revolutions.

Climate change now threatens the sustainability of finite resources such as air, land, and water. Anthropocentric activity leads directly to changes in the climate including rises in sea levels, extreme weather patterns, the spread of disease, the extinction of species, as a direct result of greenhouse gas emissions and the destruction habitats by human beings (IPCC, 2013a, 2013b). Human beings, therefore, generate risks to their health by means of environmental destruction (Environmental Protection Agency 2016, and the Intergovernmental Panel on Climate Change 2007, 2013 a/b, 2014 a/b).

These risks are risks to human and non-human life. Climate change, observable through radical changes in the global weather patterns, provides evidence of the beginning of the age of *The Anthropocene* (Crutzen, 2000). The *Anthropocene*, or the *Age of Man*, in which "human beings have become a force of nature reshaping the planet on a geological scale and a host of natural processes have been interrupted, refashioned and, most of all, accelerated" (Hernes, 2012:27). It is only now, in this context, that we are becoming aware of the effects human activities are having on the natural environment and the risks they pose to society.

[1] BBC: How many people can live on Earth? http://www.youtube.com/watch?v=dN06tLRE4WE
[2] Ibid.

These risks are universal as they effect, and are resonant with, all human beings, yet they are unequal in their consequences. This is due, in part, to their proximity to loci of climate events, and their access to economic, political, social, cultural, and technological resources.

The Universal Declaration of Human Rights (UDHR[3]) establishes the right to be free from risks to health as a right of all global citizens. Environmental risks are precipitated by the actions of the human species are likely to threaten the continuation of life, and the quality of life, of the human species itself (IPCC, 2007, 2013 a/b/c, 2014). An individual's ability to mitigate the effects of climate change is referred to as adaptive capacity. This prompts a sustainability discourse centred on what humans' relationship with nature should be, and what form citizenship, which now includes responsibility to the environment (ecological citizenship) should take[4].

This paradigmatic shift towards sustainability requires innovative ways of thinking, acting and living on a fundamental level. This represents an appreciation of the Earth as finite and fragile, recognition that local action and global processes are elements of the same system', and awareness of the impact of human actions on the natural environment. Further, we must recognise the ecosystem as being without boundaries and beyond political jurisdictions.

For example, the Environmental Protection Agency (EPA) *State of Environment Report Ireland's Environment - An Assessment 2016* state that the 'health and wellbeing of the people [and] individual communities' is based on the health and wellbeing of the environment in which they live. The International Panel on Climate Change (IPCC) highlight that as the rights to scarce resources (water, air, food, and energy) become increasingly contested, the possibilities of achieving environmental sustainability decrease and inequalities between humans become more pronounced (IPCC 2007, 2013a/b, 2014 a/b). This highlights that in the medium to long-term (from 50 to 100 years onwards) the repercussions of climate change on human health will become more profound (ibid). It will affect human beings most fundamental biological needs through a reduction to access to these resources. As the continuity of good health in human beings is linked to, and reliant upon, these resources, equitable access to them is a central issue for ecological citizenship. This argument implies

[3] Universal Declaration of Human Rights: http://www.un.org/en/documents/udhr
[4] See chapter 1 for details

that risks to human and environmental health are interdependent. This is a socio-legal approach which requires a holistic model of health and wellbeing as a basis upon which to build a rights-based argument. The challenge of translating environmental awareness into responsible action is to make the connection between our current behaviour and the repercussions of climate change for all human beings and the natural environment. This message is supported by growing scientific evidence and is now being reflected in national and international policies and legislation. The research (presented in this thesis) would suggest that this connection is not yet made among Irish citizens.

Health and wellbeing are measurable on biological, psychological and social levels: this is referred to as the biopsychosocial approach to health and wellbeing (Engel, 1977). I argue that an awareness of the right to be free from risks to health imposed by climate change is a fundamental right, is a prominent issue in institutional sustainability discourses, and yet has failed to translate into actions which reduce the risks to human health and environmental wellbeing.

Further, for all human beings, technological advances and scientific breakthroughs have proven ineffective in keeping pace with the depletion of resources and the deterioration of the environment. I argue that we need to foster and support social and technological innovations by which we can enable these discourses to drive a governance based form of ecological citizenship which is participative, inclusive, and promotes new ways of living and being which are themselves co-designed by a range of citizens.

It is this model that this dissertation presents: A Biopsychosocial Model of Ecological Citizenship (BiMEC) based on health and sustainability as human rights and supported by social and technological innovations.

1.2. The sociological challenge

Climate change discourses have prompted discussions about of the future trajectory of human society. They have also encouraged innovations in the areas of technology and communications to meet these risks. This dissertation explores the role of these discourses in promoting an equitable, open, transparent and accessible form of cosmopolitan ecological citizenship (Dobson, 2007). This form of citizenship is based on an awareness of

environmental risks, founded on fundamental and universal rights, and collective responsibility (ibid). This suggests that universal human rights exist in international treaties yet the resources and the capacity to access human rights are not equally distributed among the worlds' population. These resources include access to other resources such as finance, political freedom, social justice, and a clean and healthy environment.

The IPCC (2007) report defines this as adaptive capacity:

> *"Adaptive capacity is the ability or potential of a system to respond successfully to climate variability and change and includes adjustments in both behaviour and in resources and technologies. The presence of adaptive capacity has been shown to be a necessary condition for the design and implementation of effective adaptation strategies so as to reduce the likelihood and the magnitude of harmful outcomes resulting from climate change."*

I argue that the concept of adaptive capacity can be applied to measure the ability of the individual to mitigate risks posed by climate change, and further that this can measure ones access to basic resources. The argument extends the concept of basic resources itself to include access to human rights, the capacity to be physically and psychologically healthy, and the capacity to participate actively in society. This argument defines the citizen's capacity to engage in innovative solutions to the challenges posed by climate change and promote sustainability.

From this position, I suggest that the connections made between environmental health and human health by the UDHR, the IPCC Reports (2007, 2013 a/b and 2014 a/b) and the EPA clearly establish a causal link between risks to human health as a violation of fundamental human rights (UDHR). To effectively articulate this argument requires an innovative approach to sustainability that considers: 1) environmental threats to the ecosystem and human beings as physical and biological risks; 2) the repercussions of the effects of these risks on the mental wellbeing of human beings as unequal; and 3) the influence these physical and psychological

risks pose to population health. I argue in this dissertation that sustainability is an issue of social justice on individual, local, national and cosmopolitan levels[5].

The BiMEC examines the lack of connection between made health as a human right and environmental sustainability among social innovators. The model suggests that health is situated at the centre of the global climate change debate. This approach promotes new and open governance processes. It represents ways of improving existing systems by opening them up to a larger number of people from different socio-economic and political backgrounds who have different levels of access to different resources. That is, through access to basic technologies both the resource rich and resource poor can become active and engaged in discourses, and hence become active ecological citizens.

With climate change disproportionately affecting the health and wellbeing of those with the fewest resources, this is important. The capacity to share existing ideas through communications technologies can promote new solutions to environmental risks which are applicable in multiple locations. The challenge for the model presented in this thesis is to articulate a clear argument where sustainability is founded on the right to health, and health is the basis of a biopsychosocial model of ecological citizenship.

1.3. Why a biopsychosocial approach to ecological citizenship?

The subtitle of this work, namely 'collective responsibility in the risk society' describes my approach to this challenge. The four main themes of the BiMEC model are health, human rights, sustainability and innovation which emerged from the examination of academic articles, scientific reports, and the other research materials gathered during the desk research. The themes were then examined as they contributed to the social construction of ecological citizenship at different societal levels. These societal levels (individual, micro, meso, exosystem, macro) were selected from an examination of these works, cognitive frame theory (Cicourel; 1973, Strydom; 2000, DiMaggio; 1983, Eder; 1991, Gamson; 1991, Goffman; 1986, Hárre; 2002, and Bronfenbrenner 1979). The model frames these themes as quadrants in one system constructed across the societal levels. It allows for a systematic examination of how

[5] The term 'cosmopolitan' used here includes the transnational and post-national (Habermas, 2001).

these themes are framed at each level and how the themes are connected at each level. In this way, it is possible to explore the validity of the model.

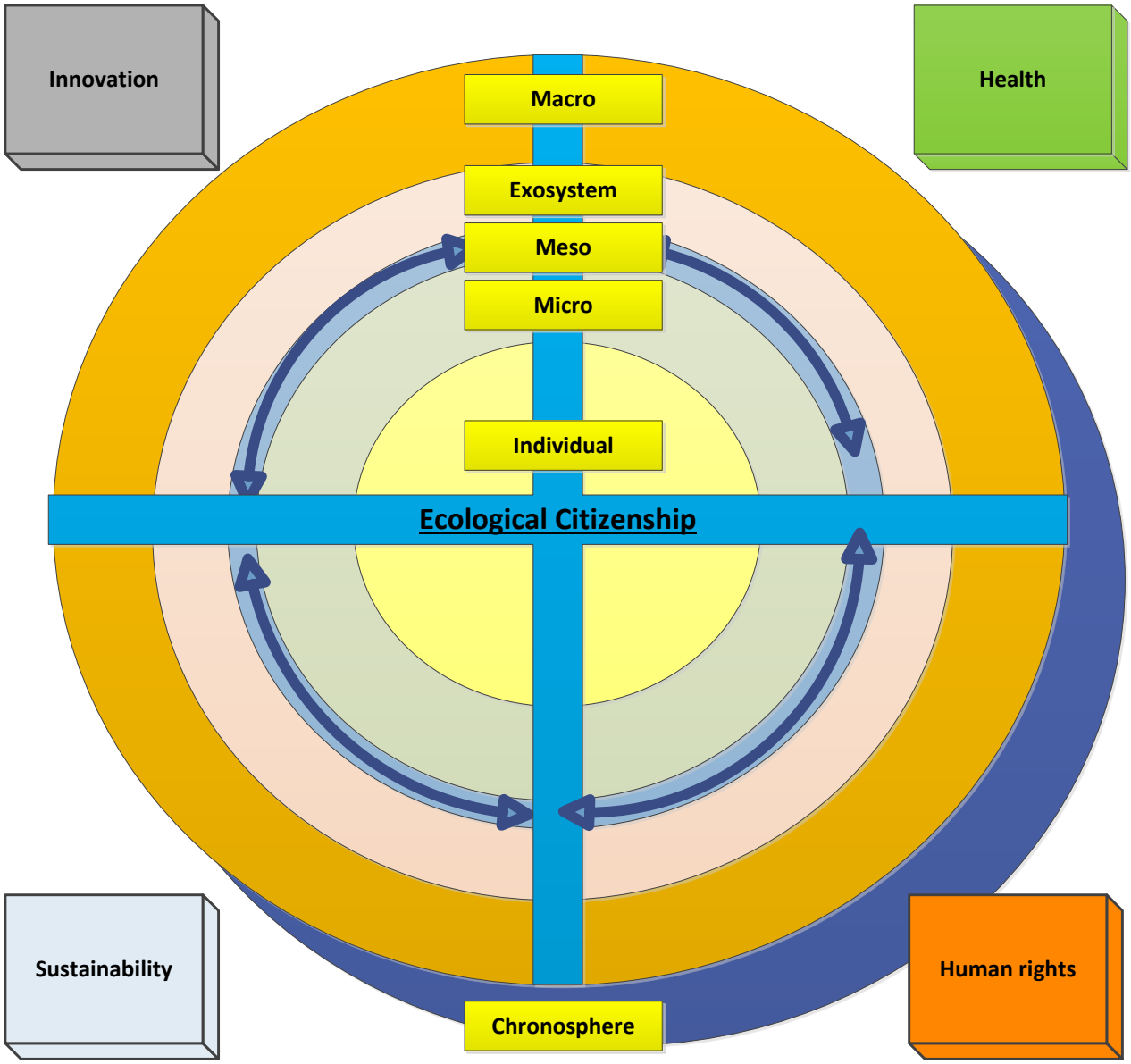


Figure 1: Sustainability, innovation and ecological citizenship

The four themes represent the key areas where I situate the indicators of contemporary ecological citizenship:

- Health: a biopsychosocial approach to health;
- Human rights: as rights to health, freedom from risk, and to a minimum standard quality of life through access to basic resources;
- Sustainability: as a meta-narrative and local and cosmopolitan discourse; and

- Innovation: as a driver of new responses in addressing these risks.

The yellow boxes represent the different societal levels including:

- Individual level made up of individual ecological citizens;
- Micro: one-to-one, collectives and small groups within the public sphere;
- Meso: communication mechanisms between the public and societal intuitions;
- Exosystem: or the institutional level;
- Macro: or level of the meta-narrative; and
- Chronosphere: the measurement of the effect of an event on the other levels over time.

While some themes are more dominant than others, all are fundamental to the functioning of the model. This next section explores how we frame our realities and why this concept is useful for the derivation of the model.

It is the variation between the contributions to the discourse and the examination of the emergence of collectives that is of interest and can be explored through qualitative analysis. Qualitative analysis allows for the exploration of the individual citizen's capacity to support their health and wellbeing by engaging in sustainability discourses. It also describes their capacity to influence an innovative discourse promoting responses to risk events in the formation of collective responsibility at all levels. Collective responsibility is, in this context, the social scientific measures of adaptive capacity: it extends responsibility for biopsychosocial health from the individual to include the health of other citizens available through proximal (micro level) and distal (through meso level communications) networks. It involves a broadening of the capacity for communication with others who are engaged in the distal relationships which open individuals to a cosmopolitan community of ecological citizens. New opportunities for communication allow for the inclusion of environmental risks to health in social and environmental responsibility discourses. Responsibility discourses now require that citizens recognise that there is a connection between the health of every human being and the environment in which we live. If we can accept this premise, then we become ecological citizens by default through conscious recognition, or the normative framing, of citizenship as including environmental stewardship.

1.4. Framing and the BiMEC model

The concept of the frame emerged from a cognitive turn in scientific investigation in the 20thCentury. Cognitive sociology involved a major epistemic shift "towards knowledge in the discourses of the human and social sciences… in a continuous but interrupted historical development of cognitive forms [frames]… [which are] less about knowing reality than about emergent forms of the real and a reflexive relation to the world in which reality is shaped by cognitive practices, structures and processes" (Delanty and Strydom, 2003: 10).

Cognitive sociology has its roots in micro-sociology and cognitive science (Delanty and Strydom, 2003; Harré, 2002). It focuses on the individual agency and individual action, face-to-face interaction, intersubjectivity, and the processes of communication in the social construction of society and the individual. The most prominent of these approaches are symbolic interactionism, phenomenology, ethnomethodology, and linguistic sociology. It identifies humans as social actors who act in relation to their worlds and can interpret the world and give meaning to it. Social events are objects of enquiry and present opportunities for dynamic discourse. It is the social world that is the starting point for sociological enquiry. It is not the social act that is the base unit of analysis but the process of the formation of knowledge structures (Strydom, 2000a, 2002, 2007). If we accept this premise, a powerful methodological tool for analysing social phenomena can be derived from this approach.

The challenge lies in exploring and articulating how ecological citizenship is framed on different societal levels. It is met by examining how these framings are relevant to sustainability and resonant to participants in existing discourses. This is illustrated through an analysis of the cumulative effect of the construction of the framing of the four main themes of the model across the different societal levels, the interrelationships between these themes, and by examining how these themes collectively describe ecological citizenship. This is illustrated by responses to climate risks as represented by the case studies.

These discourses are examined at the level of social innovation and through new forms of Information and Communications Technologies (ICT's) including face-to-face and virtual discourses. They are used to examine how individuals respond to and articulate their version of events in the context of media representations. They are mechanisms which facilitate

communal discourse and promote consensus and trigger conflict. The communications technologies examined here are Collective Awareness Platforms for Sustainability and Innovation (CAPS).

1.5. Collective Awareness Platforms for Sustainability and Innovation (CAPS)

CAPS are "ICT systems leveraging the emerging 'network effect' by combining open online social media, distributed knowledge creation and data from real environments in order to create awareness of problems and possible solutions requesting collective efforts, enabling new forms of social innovation"[6]. CAPS represent tools which support "grassroots processes and practices to share knowledge, to achieve changes in lifestyle, production and consumption patterns, and to set up more participatory democratic processes"[7]. Their purpose is to "enable dialogues and discussions in civil society to collectively orchestrate the most appropriate actions in a truly democratic, informed and non-mediated manner"[8].

> *"Although there is consensus about the global span of the sustainability problems that are affecting our current society, including the economic models and the environment, there is little awareness of the role that each and every one of us can play to ease such problems, in a grassroots manner."* [9]

CAPS represent means of communicating which promote sustainability while supporting social and technological innovations[10]. This form of communications innovation allows for the creation of cosmopolitan discourses in which environmental risks are discussed, and resolutions to these risks addressed, by sharing individual examples of innovations. They are also always embedded in other contexts and discourses at the national and international levels. They reflect political and legal policies, the current state of the national and global economy, resource availability, population increase, food production, human rights, population health and other issues. The challenge is to understand how these ideologies are symbolically constructed and framed, how these framings are articulated and through which

[6] Collective Awareness Platforms for Sustainability and Social Innovation: http://ec.europa.eu/digital-agenda/en/collective-awareness-platforms-sustainability-and-social-innovation

[7] Ibid

[8] Ibid

[9] Ibid.

[10] These refer to hardware and software innovations including digital and physical innovations.

media and what differences exist on which societal level. This would define which risks have the most profound impacts on collective responsibility and the framing of sustainability as a contemporary societal paradigm.

Apel (1993) defines collective responsibility as societal responsibility for the problems that human beings have caused (Apel; 1993, 1996; Strydom, 2002)[11]. It is my view that environmental responsibility can be defined as the capacity *and* the willingness to adapt to environmental risk. I propose that ecological citizenship is built upon the acceptance of environmental risks as universal to all human beings, that rights are fundamental, and that responsibility is a collective initiative. It is the establishment of collective responsibility on the basis of universal rights that represents a significant societal challenge.

1.6. Empirical Material

To examine collective responsibility, I chose a series of case studies including grassroots/niche initiatives, societal institutions, and organisations which are involved in promoting collective responsibility. The case studies include social and technological innovations and innovators. Local activists drive social innovations through cultural and experiential knowledge. They provide insight and input into the motives of grassroots initiatives. These inputs are critical to establishing the issues which technological innovations should try to address. Social innovations, in turn, may benefit from the opportunities new communications technologies offer.

Examples include encouraging citizens from ones' own country and different jurisdictions to engage in sustainability discourses, increasing the reach of the core message of sustainability, incorporating new sustainability issues within the group's remit, and creating awareness of sustainability on a societal level. The case studies presented are analysed across the four themes, and connections between the themes examined. Finally, I examine the potential for the employment of information and communications technological innovations by social innovations: this is socio-technological innovation.

[11]Climate Change 2007: Impacts, Adaptation and Vulnerability: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg2_report_impacts_adaptation_and_vulnerability.htm

Finally, I evaluate the potential of situating health as a quality of life issue based on fundamental human rights as the central catalyst for driving innovation and promoting sustainability as a paradigm of the 21st century.

1.7. Summary

This thesis proposes the Biopsychosocial Model of Ecological Citizenship (BiMEC) based on the argument that human rights to health and wellbeing are fundamental and are founded on the quality of the environment. The model is supported by scientific evidence, the legislation and policy, and is built on a vision where all social actors across all societal levels are active environmental stewards. The availability of resources as a measure of adaptive capacity define their capacity to act as stewards. These resources include the ability to encourage social innovators to use ICT's to co-design socio-technological innovations to environmental problems, achieve their goals, and establish an international mechanism for governance which promotes collective responsibility. Finally, I ask can new ICT's act as a catalyst for local, national, and the cosmopolitan public spheres and encourage open, transparent, and inclusive governance based sustainability in the form of ecological citizenship.

2. Chapter 2: Theory I: Ecological Citizenship: A Health-Based Approach

2.1. Introduction to ecological citizenship

> "*As the risk of global ecological disaster intensifies, citizenship must be sensitive to the needs of the environment ... indivisible from the needs of citizens*" (Faulks, 2000: 12).

2.1.1. Citizenship and the environment

In an increasingly globalised society citizenship now extends beyond the nation state to include global environmental, cultural, political, technological, legal, and economic life: Malesevic (2013), Heater (2000); Eder and Giesen (2003); Held (1998); Linklater (1998a, 1998b, 1999); Preuβ (1998); Archibugi (1998); and Habermas 2001)[12]. Contemporary concepts of citizenship include a conflation of state based/sovereign and cosmopolitan perspectives. I argue that new concepts of citizenship extend beyond these social constructs and that citizenship necessarily includes the stewardship of the natural environment.

Cosmopolitan citizenship is imbued with fundamental human rights which involve conventions and policies are embedded in and transgress European and national legislation (Archibugi; 2008, Heater; 2002, Beck; 2000, 2012, Christoff; 1996, 2016, Faulks; 2000). This argument proposes that the individual is a member of an international community and bears the rights and responsibilities incumbent on the cosmopolitan citizen (Beck, 1996). Further, it moves discourses about citizenship beyond individual human rights to include the collective responsibilities each citizen has toward each other as a member of a cosmopolitan collective. Heater (2002) suggests that this represents a form of citizenship that is 'multiple' and complex in nature.

This ecological form of citizenship and has been addressed by many authors (Archibugi; 1998, 2008, Beck; 1992, 2012, Eder; 2003, Faulks; 2000, Linklater; 1999, 2007, Strydom; 2002, 2011, vanSteenbergen; 1996). At its core, this form of citizenship includes the capacity for public participation by all individuals in the democratic processes of political decision-making and civic engagement. The capacity for public participation is described by Faulks (2000) as the

[12] It should be noted that some authors (e.g. Turner, 2007) propose a counter argument, stressing the prevalence of the increasing securitization creating immobility which is supported by technological advancements that are now being used to assert political control and spatial regulation.

'ethics of participation' and is based on an individual's capacity to be a member of a community differentiating citizenship from subjecthood. It is the "ability to make judgements about their lives, which is not predetermined by their race, religion, class, gender or any other single part of their identity" (Faulks, 2000: 4) which establishes a form of citizenship not only based on human rights but also the responsibilities related to them.

2.1.2. Cosmopolitan democracy and ecological citizenship

In this context citizenship is a concept to be expanded beyond the nation state and open to local communities as holders of fundamental rights which are based on the realisation that the natural environment is unbounded by political boundaries and that a holistic form of citizenship must overcome power imbalances in all spheres of life. For example, in contemporary western societies the experience of citizenship remains based on a growing cosmopolitan world while there are also signs of retrenchment into nationalism: 'Brexit', and the nationalist resurgence resulting in the election of the alt-right Donald Trump into the White House in the USA exemplify this. In this context, the experience of citizenship differs for individuals depending on their nationality, age, gender, race, and their legal status (e.g. nationals, refugees, asylum seekers, resident workers, etc.).

Hobbes (2000) argues that, along with nationalism, citizenship includes the concept of fundamental rights which play an important role in shaping the nature of cosmopolitanism. New modes of governance, public participation and civic engagement, and the rights to protest against political and economic hegemony, manifest as social movements and have had a significant impact on the status and meaning of citizenship. They also promote the extension of fundamental rights to individuals and groups.

I argue that the advancement of fundamental human rights is crucial to the capacity of ecological citizens to access their rights, and that the successful implementation of an inclusive model of cosmopolitan ecological governance. To legitimise rights social responsibilities must be linked to a participatory ethics: "the ethics of participation is the key to uniting rights and responsibilities" (Hobbes, 2000: 106). Critical to the goal of ecological citizenship is removing the barriers to the fulfilment of responsibilities. In this way, rights and responsibilities can be increasingly interlinked.

Beck (1996, 2012) argues that globalisation and cosmopolitanism blur old, and erect new, boundaries to collective responsibility in the areas of religion, economics, the retention of nationalism, and the struggle over scarce environmental resources. Global communication networks and technologies open up new spaces where global culture and the nature of citizenship can be debated. In this space, global culture is not characterised by homogeneity but is in a state of negotiation (Hobbes, 2000). The resonance of the framing of ideas, beliefs, and new ways of living as cosmopolitan citizens is based upon communities of interest as well as traditional concepts of national identity (ibid).

For example, the increasing frequency and severity of extreme weather patterns act as catalysts which propel sustainability into the centre of human rights discourses. As these events are global, this forms the basis of an emergent form of cosmopolitan ecological citizenship and cosmopolitan democracy. Cosmopolitan democracy implies that rights and responsibilities emerge to deal with this new arrangement beyond the state in a move toward global governance "concerned with the problem of order and the distribution of … resources" (Hobbes, 2000: 149).

I argue that cosmopolitan democracy underpins ecological citizenship. The four main themes of the BiMEC model enable an analysis of ecological citizenship. First, environmental risks have a direct impact on the biological, psychological and social (biopsychosocial) *health and wellbeing* of individual citizens and communities across the world. Second, the right to health is a universal and fundamental *human right* and enshrined in international conventions and treaties, and available to all human beings. Third, *social and technological innovators and innovations* drive new responses to environmental risks. Fourth, these themes converge through discourses around sustainability.

2.2. Health and ecological citizenship

The IPCC (2013a: 4) defines climate change as:

> "*A change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes*

or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use".

IPCC (2013a: 4)

The UDHR comprisesss a suite of rights that include the right to life, human health, and a healthy environment as universal to all people. It also stresses that with these rights come responsibilities which each individual owes to their community. By extension, these responsibilities include upholding the rights of current and future generations to a clean environment (WCED, 1987) and freedom from risks posed by climate change.

The IPCC (2013 a/b) reports identify the risks to human health of global warming as including a depletion of basic resources, an increase in infectious disease and heat-related issues, and an increase in severe and extreme weather patterns. Examples include higher global average temperatures, droughts and floods which affect farming, deterioration in water quality, deterioration in air quality due to pollution, increased bacterial growth, damage to local property and infrastructure, the and the rendering of some areas as uninhabitable (ibid). In the long term, population growth will pose risks to human beings' capacity to meet our basic resource needs.

The risks represented by unsustainable practices and overpopulation require that human beings transform their way of living by the reduction, transfer and sharing of these risks; e.g. by collectively recognising the threats posed by changing weather patterns and become equally more resilient to them (ibid). The social factors that define an individual's vulnerability to risks are dependent on economic, social, geographic, demographic, cultural, institutional, governance, and environmental factors including levels of financial wealth and education, and health, gender, age, and other demographics (ibid).

Khoo (2015) argues that we require a renewed concept of solidarity to human rights and health to counteract the 'individualisation of responsibilities' and 'deficits of care and collective responsibility' (Khoo, 2015: 272). She proposes that solidarity, a founding principle of human rights, involves "belonging, bonding, and inclusion by focusing our attention on the practical responsibilities of belonging in a social-moral community" (ibid: 273). She argues, further, that the 'statist' approach taken by Stjernø defines solidarity as a redistributive ethic

based on the sharing of resources. The challenges to solidarity lie in the capacity for contemporary citizens to frame a form of 'contract', or collective frame, that enables individuals to move beyond their personal needs, and the tensions inherent in collective discourses, and to engage in the form of an action orientated collective framing of environmental responsibility. I argue that this allows the individual to retain their rights while sharing in communitarian values. Universal norms such as health and the environment are constructed from these rights. Universal human rights reduce the need for hard community boundaries and promote a permeable form of a collective frame to form which may coexist with individual and communitarian framings of human rights, environmental risk and universal responsibility. Adaptive capacity, I argue, allows us to frame the human right to health as universal to all the worlds' citizens, the capacity to access this right as an issue of justice, and "the way in which health rights are claimed must be truly egalitarian" (ibid: 290).

Local and global environmental events, which promote discourses and awareness, are the basis for the construction of ecological citizenship. These discourses constitute a paradigmatic shift in the importance we place on sustainability.

2.2.1. Human rights to health as a part of the sustainability debate

Article 25.1 of the Universal Declaration Human Rights (1948) states that everyone has the right to a standard of living adequate for the health of him/herself and one's family[13]. Article 12.1 of the International Covenant on Economic, Social and Cultural Rights (ICESCR, 1966)[14] states that "the State Parties recognise the right of everyone to the enjoyment of the highest attainable standard of physical and mental health". General Comments 14 to the ICESCR The Right to the Highest Attainable Standard of Health[15], clarifies many important characteristics of the Right to Health and recognises the underlying determinants of health. Examples cited include water/sanitation, food, housing, work, education, gender equity, freedoms for the individual, and entitlements e.g. access to essential medicines. Further, they include access to basic health services and participation in health-related decisions. In addition, it states that

[13] Universal Declaration of Human Rights: http://www.un.org/en/universal-declaration-human-rights/

[14] A multilateral treaty adopted by the United Nations General Assembly on 16 December 1966 which commits its parties to work toward the granting of economic, social, and cultural rights.

[15] CESCR General Comment No. 14: The Right to the Highest Attainable Standard of Health (Art. 12) http://www.refworld.org/pdfid/4538838d0.pdf

the individual countries: a) are obliged to provide public health programs, facilities and services; b) must refrain from interfering with citizens enjoying these rights; c) must prevent others interfering with the enjoyment of their rights; and d) must adopt appropriate measures towards the full realisation of these rights. Finally, the United National Sustainable Development Goals (SDG)[16] include 17 goals and 169 targets to improve sustainability towards 2030). 'Health in the SDG Era' clearly situated health and wellbeing at the centre of protection of health from climate risks and promoting health through low carbon development[17].

Lawrence's (2001) argues that changes to ecosystems reflect and lead to changes in human behaviour. Linking human rights and responsibility to the environment is most poignant in the context of these international treaties and covenants goals. He suggests: a) that there is a reciprocity in the human being - environment relationship; b) that human ecosystems are open to external factors; c) that there are influences emanating from human regulatory mechanisms including from human adaptation and resilience for sustenance; and d) that the eco and social systems co-evolve over time. In this way, defining health as a quality of life issue supports universal rights for all human beings as ecological citizens. The following represent three short examples where environmental risks can affect access to basic resources and pose risks to human health: water, food and energy.

Water

Water is essential for life and represents a basic resource to which every human being must have access. According to the World Health Organisation- WHO- (2015)[18], each human being requires roughly 100 litres of water a day. Human beings currently appropriate over half of the available global water supply to serve our needs such as drinking, bathing, energy, farming, irrigation, etc. Water can be, and is, recycled, but not to the extent that we can keep pace with population growth and sanitation needs: there is no more water on the planet than there was when life first emerged. For example, as of 2015, more than 1.1 billion people on

[16] United Nations Sustainable Development Goals: http://www.un.org/sustainabledevelopment/sustainable-development-goals/

[17] World Health Organisation: Health in the Sustainable Development Goals Era: http://www.who.int/topics/sustainable-development-goals/sdg-banner.jpg?ua=1

[18] World Health Organisations Fact Sheet: Water: http://www.who.int/entity/mediacentre/factsheets/fs391/en/index.html

earth already lack access to clean, safe drinking water. Yet, roughly 2.6 billion people lack a simple latrine and 1.6 million people die every year from diarrhoeal diseases[19].

If human beings do not develop the capacity to colonise new planets shortly, at the present rate of population increase, we will be forced to live on less and less clean fresh water per person in the future. Accessing clean, fresh water will only become more challenging as the population continues to grow. Like all finite resources, this will mean the least well-off will have less access to this basic resource which in turn will increase inequalities between global citizens. For example, by 2050 more than 3 billion people may suffer similar water shortages at least one month of every year[20]. The shortages are projected to hit megacities on every continent, from Manila to Johannesburg to Mumbai. Water is fundamental to the continuity of human life: responsibility for its preservation is an intra- and inter-generational issue.

Food

The United Nations Committee on Economic, Social and Cultural Rights (CESCR) states in its General Comment 12 that the *"right to adequate food is realized when every man, woman and child, alone or in community with others, has physical and economic access at all times to adequate food or means for its procurement"* [21]. According to Olivier DeSchutter (United Nations Special Rapporteur on the Right to Food Food), food production cannot increase as rapidly as human reproduction. There is now little more arable land that can be used for agriculture. Consequently, technological innovation must raise the productivity of land by a factor of 2. At present, China, Saudi Arabia, and the UK use lands in sub-Saharan Africa to produce food for export in areas where the land cannot support the production of food to feed the indigenous populations (Ibid). Also, the populations of these countries are increasing at the most rapid pace among all the worlds' populations. This system of renting land not only

[19] World Health Organisations Fact Sheet: Water Sanitation: http://www.who.int/water_sanitation_health/mdg1/en/index.html

[20] Proceedings of the National Academy of Sciences of the United States of America: Urban growth, climate change, and freshwater availability http://www.pnas.org/content/early/2011/03/21/1011615108.full.pdf for more details

[21] United Nations Human Rights: Special Rapporteur on the right to food: http://www.ohchr.org/EN/Issues/Food/Pages/FoodIndex.aspx

heightens inequalities in accessing basic resources, but it also encourages socio-political destabilisation.

Challenges to the future of food production exemplify the challenges climate change and population increase present to resource management and equity among individual citizen in that those who make the decisions to rent the land to these developed countries are those who benefit and not those who suffer. The latter have no access to public participation or decision-making mechanisms highlighting a democratic deficit and a lack of governance in these countries/areas and governance systems. This implies that the most resource-rich countries in the world are now using the most fertile land in some of the poorest countries in the world on which to produce their food: this has become known as '*the race for food security' (ibid)*.

Energy

One of the resources that has most profoundly transformed industrial and post-industrial societies is energy (IPCC 2014 a/b). In the 19th and 20th centuries, energy was produced mostly by the burning of fossil fuels. These production methods resulted in carcinogens being introduced into the atmosphere damaging the air quality (ibid). The risks these pollutants pose are to the quality of the air, the damage inflicted on the land during the abstraction of these materials, and the wars that have been fought over their control (ibid).

Examples in context

Human beings' capacity to identify risks to life, and to place values on them, highlight the primacy of economic concerns over and above fundamental human resource needs for fresh and clean water, nutritious and high-quality food, and access to affordable and reliable energy sources. It places economic progress above the protection of the environment and fails to recognise that human rights and environmental health are interrelated systems and reliant on the continuity of the quality of basic resources. It is, I argue, a fallacy to believe that continuous progress which places economic gain above environmental sustainability can ultimately be profitable. Sustainability needs to be defined by access to resources if it is to address deficits in knowledge, or the lack of the acknowledgement of the long-term

environmental repercussions of short-term economic actions. Fundamental rights, public participation, and models of governance are the foundations of this argument.

2.2.2. Participation, adaptive capacity and reframing institutions

Public participation is a core component of any model of governance. Participatory mechanisms allow citizens to voice their opinions in a discourse based on scientific/accredited and lay/experiential knowledge's and contribute to innovations in the management of approaches to sustainability. There are a variety of possibilities for implementing models of participation.

Mullally (2011) asks: "what role do ideational factors play? can societies learn to respond strategically (mitigate or adapt) to climate change? and what role can citizen participation play in developing the social capacity or resilience to deal with climate change?" (ibid). He identifies three types of participation: citizen, community or organisation. The various means of public participation are through political parties, social movements, public consultation and public enquiries, and referenda. In this way, discourses become more resonant supporting the reinterpretation of institutionalised practices and regimes (Mullally, 2011). For this model to function effectively, it is important to provide equal opportunities for all citizens to participate in decision-making. New ICT's have opened sustainability discourses to new actors and the possibility for them to participate in decision-making in new ways. These discourses are founded on universal human rights. I ask: 'how should this be framed' and 'what procedures encourage and support innovation'?

2.3. Human rights

2.3.1. Human rights: early to contemporary cosmopolitanism

The UDHR, formally adopted by the UN General Assembly on 10 December 1948, emerged in response to the unprecedented atrocities that occurred during World War II carried out by the Nazi regime. These attrocities inspired the establishment of fundamental human rights which were to be available to all human beings regardless of nationality, age, gender, ethnicity or religion. The 48 members of the UN General Assembly passed the original treaty in 1948

establishing the first set of fundamental, universal and natural human rights. Since then it has been the basis for a variety of international treaties[22].

The International Covenant on Civil and Political Rights- ICCPR- (1966), and the International Covenant on Economic, Social and Cultural Right- ICESRC- (1966), entered into force in 1976. Coupled with the UDHR (1948) they constitute the International Bill of Human Rights. The UN human rights system was eventually set up establishing a set of fundamental rights and institutions that could be accepted by the signatory states as binding. Three-quarters, or 140, of the 190 UN states have ratified this bill to date[23]. However, as *fundamental* rights they are not legally binding in national legislation and ratification of these laws beyond the non-binding declarations remains a significant challenge. A lack of ratification results in rights not being applied in the same way in different jurisdictions. Therefore, their *compossibility*[24] (Freeman; 2002) remains a challenge, as does access to equality within different nation states and jurisdictions. The challenge of implementing fundamental human rights is one of equity and universality and emerges when attempting to uphold one person's human rights while not violating another's. Simultaneously addressing equity and universality is the foundation of disagreements about a basis for 'natural' human rights. Ultimately, in the context of these democratic deficits, the role of the implementation of fundamental human rights laws was taken up, at least partially, by non-governmental originations (NGO's).

For example, in 1993, the Vienna Declaration stated that all human rights were universal, indivisible, and interdependent. Universalism could recognise diversity in two ways: 1) certain moral rules apply in all cultures, in spite of their diversity, and 2) universal principles may require unique interpretations and applications when applied to different social contexts. This made it difficult to determine human rights in a culturally specific way without undermining their universal applicability. Despite this, human rights were still egalitarian; meaning that all humans have equal rights despite their cultural differences. In 1993, there were 2,970 NGO's

[22] These include the Geneva Convention (1949), European Convention on Human Rights (1952), Convention Relating to the Status of Refugees (1954), Convention on the Elimination of All Forms of Racial Discrimination (1969), International Covenant on Civil and Political Rights (1976), International Covenant on Economic, Social and Cultural Rights (1976), Convention on the Elimination of All Forms of Discrimination Against Women (1981), Convention on the Rights of the Child (1990), Charter of Fundamental Rights of the European Union (2000), and the Convention on the Rights of Persons with Disabilities (2007).

[23] As of June 2015.

[24] This refers to the application of human rights in full into national legislation.

and 28,900 INGO's in existence. This marked the 'associational revolution' (Freeman, 2002). A significant number of these were established to address the ongoing challenges of upholding universal human rights (e.g. Amnesty International). A remaining democratic deficit lies in the fact that these groups still, largely, operate in specific areas and jurisdictions.

2.3.2. Conventions, rights and public participation

In 1972, in Stockholm, the international community met for the first time to consider global environmental and development needs at the UN Conference on Human Environment. The Brundtland Report (1987) framed much of what would become the 40 chapters of Agenda 21[25] and the 27 principles of the Rio Declaration on Environment and Development. In fact, its first principal states that "human beings are at the centre of concerns for sustainable development [and] are entitled to a healthy and productive life in harmony with nature."[26] It outlined key policies for achieving sustainable development that meet the requirements of those with fewest resources by recognising the limits of economic development to meet global needs. In this context, I interpret need as referring to economic interests, and to a holistic model of global sustainability incorporating risks to social and environmental systems.

The real political dawn, or hardening, of environmental legislation of the European Union, originates from this meeting and was founded in the United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, Brazil in June 1992; otherwise known as the Rio Summit. It was at this meeting that an emphasis was placed on environmental risks as current issues; no longer possible future. The evidence of environmental risk was now apparent, and changing weather patterns and rising temperatures measurable with scientific instruments. This provided real evidence of the fact that we were now living in the age of the *Anthropocene*.

In *A Sustainable Europe for A Better World: A European Union Strategy for Sustainable Development* (2001)[27] the EU adopted the definition for sustainable development from the

[25] United Nations Conference on Environment & Development
Rio de Janerio, Brazil, 3 to 14 June 1992:
https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

[26] Ibid

[27] EUGRIS: portal for soil and water management in Europe:
http://www.eugris.info/displayresource.aspx?r=5614

Brundtland Report. This proposes that these risks present real threats to human health, that the solution to economic, social and environmental sustainability are interlinked, and solutions are necessarily only possible by addressing all three simultaneously.

The Brundtland Report, further, puts forward the argument that a fundamental change in attitude and behaviour is necessary to achieve equity in the ability to react to environmental risks. This was the catalyst for a global impetus to encourage the development of political solutions to these escalating crises. This marked the beginning of the recognition by national governments of the need to redirect international and national plans and policies to ensure that all economic decisions fully consider environmental risks. It was at this point that the political establishment became engaged in meaningful discussions focused on addressing climate change at an international level. The recognition of the seriousness of the threat was evidenced by the attendance of 172 countries, with 108 heads of State or Government. Also some 2,400 representatives of non-governmental organisations (NGOs) and a total of 17,000 people attending the parallel NGO Forum. It was one of the first major milestones in the emergence of ecological citizenship.

Changing plans into action, or awareness behaviour, remains the main challenge for ecological citizenship even today, nearly a quarter of a century after the Rio Summit.

2.3.3. Europe and ecological citizenship: treaties, conventions and challenges to their implementation

International treaties and conventions have gone some way to address the deficits in public participation and the implementation of risk mitigation strategies. The *Treaty of Maastricht*[28] defined the parameters of European citizenship of the European Community. The Treaty, signed in 1992, aimed at strengthening the protection of the rights and interests of the citizens of its Member States through the introduction of a citizenship of the Union. In addition to the rights attached to citizenship of the EU explicitly mentioned in the Treaty, there are a series of fundamental rights and obligations which stem from the case-law of the Court of Justice of the European Communities, the Council of Europe's *Convention on Human*

[28] Treaty of Maastricht on European Union: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:xy0026&qid=1428941970473&from=EN

Rights and the constitutional traditions of the Member States. The *Charter of Fundamental Rights*[29] is consolidated at EU level expanding human rights legislation to include the protection of dignity, bio-ethics, freedoms, equality, solidarity, citizens' rights and access to justice. It connects health, defined as physical and mental integrity (Article 3), with the right to life (Article 2); it identifies freedom of thought and expression (Article 10) and the freedom of assembly (Article 12). It recognises intergenerational rights (Article 24: rights of the child), the right of collective bargaining (Article 28), and a high level of human protection as a right to health care (Article 36). It connects these with environmental protection and quality of the environment (Article 37) and a right to access to fair justice system (Articles 39 through 41, 43 and 45 through to 50). It also supports access to information (Article 42), and the right to petition and protest (Article 44). Collectively these rights constitute the political institutionalisation of ecological citizenship. Again, the effectiveness of the implementation of this charter varies according to national and local social, economic and political circumstances.

The *Åarhus Convention* (1998)[30] provides guidelines for the development and application of public participation models and access to the decision-making process for all citizens of those member states who sign up to the agreement.

> *"The objectives of the Åarhus Convention is the desire to guarantee rights of public participation in decision-making in environmental matters in order to contribute to the protection of the right to live in an environment which is adequate for personal health and wellbeing."*[31]

It also details the right to participate in decision-making around the management of environmental risks. It provides for citizens to have the right to challenge perceived risks to breaches in environmental law as issues relating to social justice. This treaty represents a global and EU directive clearly establishing the rights of the citizen to an environment of sufficient quality which can support a specific quality of life.

[29] Charter of Fundamental Rights of the European Union: http://www.europarl.europa.eu/charter/pdf/text_en.pdf

[30] Convention on Access To Information, Public Participation in Decision-Making and Access To Justice in Environmental Matters : http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf

[31] Aarhus Convention: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003L0035

In the EU Directive 2003/35/EC on Public Participation states that:

> *"Effective public participation in the taking of decisions enables the public to express, and the decision-maker to take account of, opinions and concerns which may be relevant to those decisions, thereby increasing the accountability and transparency of the decision-making process and contributing to public awareness of environmental issues and support for the decisions taken."*[32]

This directive is among many policies and legislative documents whose contents assure rights to public participation but fail to address the practicalities of its implementation. Policy makers are now required to hold public hearings where they take account of the opinions of interested stakeholders while retaining the possibility of taking no heed of opinions raised.

A Sustainable Europe for a Better World (Brussels, 15/5/2001) identifies the EU member states, national, regional and local governments as *most* responsible for implementing environmental policies. It suggests that the public has a central role in policy making through widespread public participation, and are ultimately those who will build sustainability into our daily lives. Ideally, this will improve inclusion of cosmopolitan ecological responsibility at all societal levels.

> *"Action must be taken by all and at all levels: many of the changes needed to secure sustainable development can only successfully be undertaken at EU level. Clear examples arise in policy areas where the Community has exclusive legal competence, or where integrated European economies mean that uncoordinated action by Member States is likely to be ineffective. In other cases, action by national, regional or local governments will be more appropriate. However, while public authorities have a key role in providing a clear long-term framework, it is ultimately individual citizens and businesses who will deliver the changes in consumption and investment patterns needed to achieve sustainable development".*[33]

[32] Ibid.

[33] EU Strategy for Sustainable Development: http://europa.eu/legislation_summaries/environment/sustainable_development/l28117_en.htm

The *Environment Directorate General of the European Commission* argue that sustainable development now means "a better quality of life for everyone, now and for generations to come [that] will not be brought about by policies only [but] ... be taken up by society at large as a principle guiding the many choices each citizen makes every day, as well as the big political and economic decisions that have to be taken"[34]. Again, the principals of this strategy fall short of providing detailed means of its practical implementation.

For example, the Irish National Economic and Social Council (NESC)[35] suggest that public confidence has been damaged by human and animal health scares (BSE, swine flu, etc.). They voice concerns that the policy responses have been driven more by narrow sectional interests than the wider interests of society. Further, they suggest that perception is part of a wider malaise of the observing public, that policy has become too technocratic and remote, and is too much under the influence of vested interests. To tackle this rising disaffection with the political process, they suggest that policymaking must become more open. Widespread popular 'ownership' of the goal of sustainability depends not only on more openness in policymaking but also on the perception that individuals can, through their actions, make a real difference. Access to decision-making can be tested through measures of the effectiveness of the implementation of these policies[36]. This suggests that sufficient scientific evidence, and legislation, which guide sustainability exist and public participation of citizens in the decision-making processes also exist. These treaties and conventions establish rights in law, yet we have failed to develop effective means for their implementation. The public has no real power outside submitting appeals to the courts and judiciary which is complicated, time-consuming, and beyond the capacity of many individuals. This makes the ecological citizen an active participant with limited recourse to action in the decision-making process.

For example, the *Special Eurobarometer 416*[37] conducted a survey of 27,998 European Citizens on environmental consciousness and opinions across all 27 EU in 2014. 76% believe that environmental problems have a direct impact on their everyday lives, illustrating a high level of risk awareness. 85% believe they can participate in protecting the environment, yet

[34] Sustainable Development: http://ec.europa.eu/environment/sustainable-development/index_en.htm

[35] National Economic and Social Council: http://files.nesc.ie/nesc_background_papers/NESC_122g__bg_paper_5.pdf

[36] Ibid

[37] Special Eurobarometer 416: http://ec.europa.eu/public_opinion/archives/ebs/ebs_416_en.pdf

the proportion of people who separate waste for recycling varies considerably from country to country; from 92% in Luxembourg and Slovenia, to 23% in Bulgaria (6). 77% feel that big companies are not doing enough to protect the environment. 75% state that they are willing to pay more for environmentally friendly products. Concern over natural resources is growing with 75% believing that the state of the environment has an impact on their quality of life. 79% believe using environmental resources more efficiently can lead to economic growth. 65% reported television as their primary source of information (down from 72% in 2011), with those reporting that they obtain information about the environment through the internet and social media rising from 31% in 2011 to 41% in 2014. Scientists (40%), environmental protection agencies (37%), television (34%), newspapers (19%), consumer associations (18%) and the Internet (18%), all rank higher than the European Union (7%) and the national government (6%) as trusted sources of information about the environment. While many EU citizens felt well informed about environmental matters, most felt that they did not know enough about the impact of pollutants on human health and that they were not empowered to affect change and mitigate these risks. This illustrates risk awareness, rights consciousness and yet a lack of capacity to engage in the political process. I suggest that this reflects a growing engagement with environmental discourses in the European public sphere, supported by a belief that joint decision making between national and EU organisations should include scientists and NGO's as trusted sources of accurate environmental information. I ask can interactive ICT systems help to addresses this democratic deficit by institutionalising a form of citizenship based on universal rights which are available to all.

2.3.4. International treaties and universal rights for ecological citizenship

The IPCC (2007, 2014a) argues that the first of these rights is demonstrable through the measure of the direct impact on human health by the deterioration of the environment.

> *"The health of human populations is sensitive to shifts in weather patterns and other aspects of climate change. These effects occur directly, due to changes in temperature and precipitation and occurrence of heat waves, floods, droughts, and fires. Indirectly, health may be damaged by ecological disruptions brought on by climate change (crop failures, shifting patterns of disease vectors), or social responses to climate change (such as displacement of populations following prolonged drought) ... Biological and*

social adaptation is more difficult in a highly variable climate than one that is more stable."

(IPCC, 2007: Chapter 14: 3)

The joint Office of the High Commissioner for Human Rights (OHCHR) and United Nations Environment Programme (UNEP) report *Human Rights and the Environment*[38] states that there are three essential components to good environmental decision-making: the right to a safe, healthy and balanced environment as a human right; the right to access to information, participation in decision-making; and, access to justice in environmental matters. Firstly, these rights represent an aspirational collective moral and ethical responsibility (Apel, 1996) codified in the interpenetration of national and international policies and laws (Christoff, 1996; Habermas, 2001). Secondly, they frame global discourses on human rights and constitute a global normative order (Apel, 1996; Habermas, 2001) encouraging national governments to ratify international treaties (Beetham, 1998; Archibugi 1998). The first of these rights establishes a connection between the condition of the environment and human health, based on human rights. The second of these rights represents the main democratic deficit highlighted by the BiMEC model: the awareness of ecological citizens of their rights and their capacity access their rights to expression and to be free from environmental risks.

2.3.5. Thin cosmopolitan rights and thick local responsibilities

The cosmopolitan concept of citizenship represents the globalisation of culture associated with the growing interconnectedness of the world economy, global polity, technologies and new media which open up new discursive spaces. These encourage individuals and societies to conceive of themselves as part of a world system.

Thick and thin moralities are central to understanding the emergence of cosmopolitanism (Delanty and Strydom, 2003a). Thin moralities are represented by universal and moral human rights and exist on fundamental levels applicable to all. They are not culturally, socially, economically or politically specific. The UDHR represents a thin film of universal rights underlain by a thick web of local and national responsibilities. These represent specific issues

[38] Human Rights and the Environment: http://srenvironment.org/wp-content/uploads/2013/05/JointReportOHCHRandUNEPonHumanRightsandtheEnvironment.pdf

that arise in the process of upholding universal rights in local settings: a thin (universal) moralities upheld in thick (local) ways (Delanty and Strydom, 2003a).

For example, in a knowledge society - based on the premise that sharing knowledge has the power to transform lives and societies - perceptions of risk are shared via information and communications technologies on a cosmopolitan scale: while action may be local, discourses can be geographically dispersed. Knowledge sharing empowers communities and opens local issues up to cosmopolitan socio-political discourses. It situates the collective dimension of citizenship, as well as an individual sense of identity, within the cosmopolitan public sphere. Further, this collective application of thin moralities does not negate the sense of responsibility to the abstract other. Abstract others, in this instance, are cosmopolitan citizens with whom one has no prior connection yet one has a relationship with through shared collective responsibility for the environment. In fact, it inculcates a global sense of risk through a collective responsibility at the cosmopolitan level (local and global). Therefore, it is risks and rights awareness at the thin cosmopolitan level that promotes a global culture of responsibility which is universally relevant and yet locally specific. Environmental actions are implemented by social innovators supported by a thick culture of local responsibility. Cumulatively these actions frame collective global environmental innovations and actions, and are evident in the actions of the global environmental movement.

Strydom (2004c) argues that the environmental movement began in the 1960's with normative innovation based upon a concern with global environmental risk signposted by the appearance in scientific, and soon popular, media of articles detailing the risks posed by climate change promoting a high level of awareness and resonance of global environmental risk issues. Eder (1996) argues that the environmental movement broadened its membership and its knowledge base significantly through the second transformation of the public sphere (ibid):

> "*Ecological discourse shapes the public space of modern societies through restructuring the ideological cleavages which mobilise social groups and actors. This change is theorised as the second structural transformation of the public sphere.*"
>
> (Eder, 1996b: 205)

Delanty (2000) contends that classical theories of citizenship fail to grasp the significance of the public sphere as a location of citizenship. This approach emphasises the role of collective citizenship based upon participation and identity, rather than rights and duties. The expansion of global multiculturalism and local particularism in political discourses, alongside a growing EU and world civil society, infuses individual citizens with a sense of collective responsibility which cannot reasonably be ignored. The cosmopolitan discourses of risk, rights and responsibility allow for the expansion of national concepts of citizenship and collective interests without succumbing to the symbolic disassociation of generalised meaning (ibid) required to abstract these concepts to the cosmopolitan. Consequently, universal and moral requirements cannot claim authority over political and social relations and each citizen is, to different degrees, simultaneously a member of many collectives through different discourses at different times.

Extending this argument further, Bellamy and Castiglione (1998) maintain that human rights are cosmopolitan, self-standing, and justified without referring to a specific sovereign state. They argue that their scope is uniform and universal. Here, citizenship is attributable to human beings and not specific to states. Active discourses promote a shared sense of fate around the resonance of an event encouraging collective responsibility through universal rights (Apel, 2000). From this perspective, individual citizens can negotiate rights in culturally specific ways yet from a cosmopolitan perspective.

Cosmopolitanism necessarily involves a complex model of citizenship enabling individuals to become simultaneously engaged with discourses around single issues (e.g. risks to health, water quality, food scarcity, and access to clean and affordable energy) and with the global economic, political, and cultural risk issues that are not always consistent with sustainability. Cosmopolitan rights and responsibilities only make sense embedded in local settings (Bellamy and Castiglione, 1998; 162) which support local action.

For example, non-face-to-face mediums dominate modern communication (Bellamy and Castiglione, 1998). Eder (Eder, 1996b) argued that global media have become the prime intermediaries of discourses in contemporary society. It is through ICT communications tools that discourses, including the practices of justice and rights in which they are jointly responsible, can emerge across the globe. What is emerging through new global interactive

communications mechanisms is the capacity to implement thin and thick moralities on cosmopolitan levels while encouraging local action simultaneously across multiple sites. This, in turn, can promote collective action in the form of empowering global political movements. These global political movements constitute overlapping networks of communicators who impart experiential knowledge in the promotion of innovation at the cosmopolitan level. To be effective they must be able to move beyond socio-political and cultural boundaries.

2.3.6. The cosmopolitan public sphere: public participation, governance and ecological citizenship

Human beings have constructed artificial boundaries in the form of political borders. Ecological boundaries do not recognise these anthropogenic constructs. ICT's open up the possibility of unbounded discourses which goes some way towards counterbalancing these political constructs. It is in this context that the cosmopolitan ecological citizen can evolve. The ecological citizen is, therefore, local and global and hence cosmopolitan. By logical extension, as every human being lives on the same planet and is affected by their environment and environmental systems are necessarily global, every human being is an ecological citizen. Not all, however, are affected by risks equally and not all have access to the same suite of rights.

An extreme example of an ecological citizen is the environmental refugee defined by the National Geographic as *people who must leave their homes and communities because of the effects of climate change and global warming*[39].

To summarise, a significant risk to human health and wellbeing lies in the destruction of human habitats and environments. If climate change is not addressed, the failure to put in place remedial actions to prevent risks to human and environmental health will be in violation of human rights to health. I argue that addressing these democratic deficits, and supporting the development of a model of ecological citizenship, forms the basis of a cosmopolitan democracy. This form of democracy needs to be supported by individuals and institutions who are advocates of an egalitarian form of ecological citizenship. It is by improving equality in the

[39] National Geographic: http://education.nationalgeographic.com/education/encyclopedia/climate-refugee/?ar_a=1

access to resources and rights that we can address imbalances among citizen's adaptive capacities through the formation of collective responsibilities.

2.4. Sustainability and human rights

2.4.1. Cosmopolitan democracy and global communications networks

Held (1998) identifies the need for new international democratic institutions in which all citizens of the world participate. He proposes a movement towards cosmopolitan governance which includes national and international governments and civil societies. He views power as "the capacity to transform material circumstance – whether social, political or economic – and to achieve goals based on the mobilisation of resources, the creation of rule systems, and the control of infrastructures and institutions" (Held, 1998: 14). New institutions and mechanisms of accountability are required in a cosmopolitan democracy. In the exploration of the forms these institutions might take new types of governance systems emerge which include overlapping spheres of influence. Cosmopolitan democracy, then, can be understood as "the development of an administrative capacity and independent political resources at regional and global levels as a necessary complement to these in local and national polities" (Held, 1998: 24). This approach includes broad access to civic participation on national and regional levels and is underpinned by transparency, accountability, legitimacy, and access to the decision-making process at all levels for all citizens.

Christoff (1996) suggests that 'ecological democracy' supports this vision. Ecologically guided democracy includes a hierarchy of values where universal ecological values (such as the conservation of biodiversity, the basic needs of future generations) are given priority over particularistic ones (such as the survival of a specific species) and narrow anthropocentric values (such as the right of an individual human, classes, or nations to subdue the Earth). It supports the argument that validity claims by cosmopolitan citizens, articulated through global communications networks, can challenge the (re)production of these power relations in the institutionalisation and constitutionalisation of the (new) allocation and distribution of resources. These networks have uneven power relations and affect the life chances and wellbeing of cosmopolitan citizens based on the individual's access to resources. I argue that these networks and validity claims improve access to resources and that it is by making

communication resources available to all global citizens that equity in accessing these resources can be improved.

2.4.2. Europe, cosmopolitanism and the ecological citizen

The EU has made some progress towards the establishment of cosmopolitan and ecologically guided democracy. Cosmopolitan citizenship in Europe fulfils the conditions of the European Union Treaty[40] specifying that every person holding a nationality of a Member State shall be a citizen of the Union, enjoy the rights conferred by this Treaty, and shall have the right to travel, vote, representation, and the right to petition. A thick concept of citizenship, in this European context, includes the right to legislative appeal beyond the state to EU courts of law in defence of the rights and identity of the citizen. The European Union has the opportunity to support its citizens in becoming cosmopolitan ecological citizens by simultaneously upholding their sovereign rights, European rights, and fundamental rights and responsibilities. It is in this context that European (cosmopolitan) civil society has emerged from discourses around specific risks, supported by rights of EU citizens, and from the national and cosmopolitan public spheres.

Linklater (1998) suggests that the state is only a temporary socio-political organisation which displaced previous and alternative sites of subnational and transnational power. He suggests that in the future the state may adopt a different role in a social, political, legal and cultural network of interconnected global networks:

> "*The recent impact of globalisation and fragmentation on the constitutionally stable societies in Europe suggests that the era of consolidated states is drawing to an end. The erosion of state monopoly powers has increased the possibility that alternative sites of power and competitors for human loyalty will emerge. This is the context in which the moral resources which were accumulated in the course of extending and deepening the meaning of citizenship can be harnesses to create a multi-ethnic,*

[40] European Union Treaty: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12012M/TXT&from=EN

transnational social democracy which protects the legal, political, social and cultural rights of all members."

(Linklater, 1998: 118)

Therefore, if sovereign political boundaries are being opened to cosmopolitan public spheres, global issues are being discussed on this level. Proposing a form of cosmopolitan citizenship that asks, 'what am I a citizen of?', 'what does cosmopolitan mean?' is the current challenge (Linklater, 1998). I describe the concept, and practice, of cosmopolitan ecological citizenship in this diverse and inclusive way, and argue that this is achievable by inclusive and participative co-design of innovative solutions to environmental risks.

2.5. Innovation and ecological citizenship

2.5.1. Innovation and ecological citizenship

Beck defines risk as the probability of physical harm (Beck, 1992: 4). The challenges of climate change require innovative solutions (innovations). I suggest that these innovations should be inclusively co-designed to ensure that they are technologically fit for purpose and meet needs of the social actors who may adopt them. This participative co-design approach supports knowledge sharing, creativity and learning.

Social innovations are defined as "the new ideas (products, services and models) that simultaneously meet societal requirements (more effectively than alternatives) and create new social relationships or collaborations" (Vega; 2013). The Bureau of European Policy Advisers (BEPA) identifies three categories of social innovation: niche or grassroots; local/national addressing a societal wide need (e.g. NGO's); and a system or institution which "relates to fundamental changes in attitudes and values, strategies and policies, organisational structures and processes, delivery systems and services" (BEPA, 2010: 12).

In response to risks posed by climate change new social, scientific and technological innovations, and new economic and political models are required which focus on reducing the effects of climate change on all the worlds' citizens, while also addressing the cause of climate change itself. To effectively articulate sustainability discourses it is necessary to identify a central issue that has a meaning for all human beings: in this case health. From this

standpoint, innovations should address risks universally (through the thin concept of responsibility) and be flexible enough to account for diversity in local vulnerabilities and differences in access to resources (through the thick application of innovations). Innovations should also offer immediate/short term benefits based on underlying longer term goals to reduce vulnerability and reflect individuals and collectives access to resources.

As new communications technologies enable interactive discourse across the world they broaden the boundaries of discourse through the involvement of social actors on a global scale, have the capacity to open individuals up to new ideas and perspectives and challenge their pre-existing boundaries of their perception of environmental risk. Through these new mediums of communication boundaries between different types of knowledge (scientific/accredited, tacit/experiential) are reduced inviting input from a variety of actors who bring various forms of knowledge into sustainability discourses. ICT's have a significant role in facilitating these discourses.

2.5.2. Communication technologies and public participation in a cosmopolitan public sphere

According to the Global Internet Report (2015),[41] the percentage of the global population who have access to the internet globally rose from 23.2% in 2008 to 38.1% in 2013 and is forecast to be at 71% by 2019. This rise is driven by the increasing availability of internet access through rapidly expanding infrastructures, improvements in bandwidth, decreasing prices, ease of use through increasingly intuitive software packages, and recently through the rapid growth in the availability of cheap mobile technologies. Improvements in digital literacy also enhance the internet's utility as a global communications tool and improve the opportunities for global citizens to engage in sustainability discourses. Further, the increased ease by which individuals can publicise their opinions to a global audience has the potential to empower individual citizens by enabling them to articulate their specific interpretation of an event, exercise some control over the construction of the framing of the narrative. These new global communications mediums promote discourses "involving new social movements and an

[41] Global Internet Report: http://www.internetsociety.org/globalinternetreport/?gclid=CjwKEAjwqdi7BRCL6Zmjk5-rsTwSJABmrVabnIJ7U9FUZKBEQx__e0ewSGRvFGku5zP34MSfJCGzRhoCaNvw_wcB

increased intensification of communication about locally significant global issues" (Strydom, 2004c). For example, sustainability as a meta-narrative can now be democratically expressed by multiple social actors (Snow and Benford, 1998) through the rights-based discourse. The encouragement of this form of discourse, I argue, is fundamental to cosmopolitan ecological democracy and at the heart of the responsibility of the ecological citizen. By extension, supporting functional collective responsibility and promoting an active European civil society is the role of ecological citizens. This implies that participation in the cosmopolitan public sphere (Archibuigi, 1998) represents citizen engagement in sustainability discourses across many societal levels at the same time. New communications technologies offer increased access to information and open new possibilities for participation in ecological politics which can promote the emergence of new forms of local and transnational communication. New ICT's make this possible by improving access to new communication spaces which promote social action. They are not, however, a singular solution which offers equal access to all.

Howard and Schwartz (2010) argue that ICT innovations in isolation do not answer societal challenges. They do, however, offer world disclosing functions through interactive engagement with environmental risk discourses for social innovators. Social innovations, in this context, can become engaged in responses to societal risks working with, and adding a public voice to, economic and political interests which have traditionally driven technological innovation and technocratic ideation (Howard and Schwartz, 2010). I argue that the social *and* technological innovation approach, or socio-technological innovation, places social innovation as more than a requirement of technological innovation, and situates it at the centre of contemporary advances in responses to environmental risks as a driving force behind their participative collective design.

For example, the rights to political participation constitute a self-referential model of citizenship that stretches over, between, and through national and international societal constructs. Under the cosmopolitan constellation, globalisation necessitates the opening of national institutions to these new cultural forms (Habermas, 2001). These new structures constitute a highly complex and loosely organised system of proponents and opponents of the sustainability paradigm. Cosmopolitan citizens negotiate this complex discourse, as well as a variety of mediums of communication, through which these discourses take place. The settings in which these negotiations take place range from formal (e.g. a working

environment, a law court, or political meeting) to the informal (discourse or sharing of knowledge- such as a casual conversation with friend or family). These articulations produce a myriad of communicative typologies and require participants to be at least knowledgeable of them, and preferably to know how to negotiate the discourses within them to allow them to participate effectively. New communications typologies open these discourses to all ecological citizens and encourage citizens to become involved in the development of innovative solutions to these risks.

2.5.3. Innovation and the sustainability paradigm shift

Burns (2012) argues that there has been a radical increase in the pace, scale, and spread of human impacts on the global environment which "touches upon every facet of human existence—health, diet, leisure, quality of life, every day practices; production, consumption, education, research, politics, and societal values" (Burns, 2012: 1119). In this context, sustainability can be defined as the ability of individuals and species, and social and ecological systems, to endure over time and continue to exist. This includes the ability of human beings to endure as biological creatures while retaining a quality of life close to those experienced in the 21st Century. In this *Anthropocene*, human beings are all ecological citizens and are collectively responsible for society as environmental stewards. To paraphrase Burns, I ask, which forms of contemporary life are indicators of the growth of risks, such as increases in population and consumption patterns of the late 20th and early 21st Centuries, and are there sustainable alternatives (Burns, 2012: 1121). He argues that the sustainability paradigm shift refers to an emerging awareness of environment risks, and that sustainability is now a political norm which can be operationalised when applied to concrete issues. He identifies one of these issues as the risks environmental damage pose to human health illustrating the utility of employing human health as a human right in sustainability discourses.

These innovative ways of thinking, acting and being, emerge in response to environmental risk events and promote new ways in thinking about governance through risk, rights and responsibility discourses. Sustainability evolves through these niche, or 'bottom-up', transformations: "bottom-up changes in values become incrementally perceptible in the ideas and practices of individuals, associations, communities, business and political networks" (Burns, 2012: 1192). This shift is advanced by new forms of inclusive communication and

"diffuse and collective learning" (ibid: 1129) through new information and communications systems. If the shift towards a sustainability paradigm is to be effective in promoting changes in our ways of living, it requires a socio-political model of governance through which it can be implemented. One way of addressing this challenge is through the effective use of ICT systems by existing proponents of the sustainability paradigm to disseminating the narrative establishing it as a cosmopolitan social norm.

2.5.4. Environmental events, social discourse and unbounded governance

For those with access to it the internet has created the opportunity for them to access a global network of information, including the aforementioned opportunity to publish their opinions to a global audience. Publishing in this way is becoming increasingly simple through social media such as Facebook, Twitter and LinkedIn as well as individual groups sites and discussion forums, e.g. www.boards.ie. As new information is transmitted about local, national and international events across the globe instantly they, in turn, are interpreted through the prism of social, political and cultural constructs. These constructs represent the views of the organisation and the individual rapporteur who presents the information, direct interpretations of environment events (such as camera footage of extreme weather events) shared through the media sources. This has increased the availability of information about climate change, changed the nature of the types of knowledge available, and the role of this type of knowledge.

For example, Lakoff (2010) argues that we need better communication systems through which we can enable social actors to contribute to discourses which include moral values. It is in bringing moral, cultural and social values based on fundamental rights into a socio-political discourse that accredited/scientific (scientific, political, etc.) and experiential/tacit (local, lay, moral, etc.) knowledge can become instrumental in guiding policy-based decision making.

For instance, extreme and sudden climate events inspire the most profound reactions from social actors. As a variety of framing of local events are simultaneously published through social media and other ICT's instantly to global audiences, social actors who find that these events are relevant to them can engage in discourses. In this way, virtual communities begin

to emerge. They consist of individuals who share a similar interpretation of the meaning of a risk event and are actively engaged in promoting awareness of the human rights to be free from these risks. If managed effectively, such mediums establish a consensus-based response to climate risks that are not based solely on individual rights but are socially, collectively and morally focused. This requires new ways of communicating in which: social and cultural responses are a central aspect of the debate; political, scientific and economic systems of communication are revised to be more transparent, accessible, and inclusive; the ways in which technologies are used is questioned; and, new technologies which support sustainability are collectively designed.

2.6. Summary

In summary, I argue that environmental risks represent threats to the health and wellbeing of all human beings and the natural environment. As all human beings are subjects to their biopsychosocial health, and health subject to environmental conditions, it can be argued that all human beings are ecological citizens. I argue for a model of ecological citizenship based on a culture of collective responsibility which involves defining each citizen as an ecological trustee. This can only come about through the development of new participatory forms of democratic, cosmopolitan and ecological governance. Granting fundamental and universal rights to be free from these risks to all citizens who are bound together in morally (and physically) interdependent collectives is central to this form of ecological citizenship. It is together that ecological citizens learn to identify the signs of environmental risk and promote innovative and equitable adaptive strategies to the mitigation of these risks and address democratic deficits which exist in the current systems. Further, socio-technological innovations may emerge from these discourses leading to the development and promotion of new ways to collectively address these challenges. This is a basic outline of the BiMEC model of ecological citizenship.

3. Chapter 3: Theory II: A Biopsychosocial Model of Ecological Citizenship (BiMEC)

3.1. Introduction to a Biopsychosocial Model of Ecological Citizenship (BiMEC)

The previous chapter presented the argument for a human rights-based approach to ecological citizenship which positions health and wellbeing at the centre of a cosmopolitan model of ecologically guided governance. This chapter examines the Biopsychosocial Model of Ecological Citizenship arguing that it is through this that it is possible to promote creative and sustainable responses to societal and environmental challenges.

Embedded within the model are all four interrelated themes of the model of ecological citizenship: health, human rights and sustainability represent the central elements of the model while innovation is a driver of change. For example, human rights anchor health to the socio-political citizenship debates, and innovation supports the development and continued evolution of the model enabling the debate.

The principles of this approach to ecological citizenship suggest that innovation should focus on social and environmental health concerns. In this way, human health and the environment are linked not only to biological risk, but also by the embeddedness of environmental and social risks, situating the actor at the centre of the BiMEC and *sustainability*. The depiction of the BiMEC presented in Chapter 1 is explored here in more detail. I examine how it connects health, human rights, innovation and sustainability across the different societal levels (individual through to macro) and examine the potential for the evolution of the model over time.

Individual level

At the individual level, biopsychosocial health, individual predisposition to sustainability, and their proximity to an event are determinants of the subjective resonance of an environmental risk event for the individual.

Micro level

The world of proximal relationships, including face-to-face or virtual immediate/personal interactions, defines the micro level. Here individual encounters are the most relevant

element. It is an intersubjective space which exists in the real and virtual worlds where one-to-one, or one-to-many, relations are now possible through new communications media (e.g. Skype, Google Hangout, WhatsApp, etc.). The collective interpretation of the meaning of events emerges through discourses in real world settings and online interaction. It is here that the construction of a collective interpretation around an event can connect two or more previously incongruent perspectives, and indicators of individual ecological citizenship are identifiable.

Meso level

The communications space where one moves beyond the proximal and dyadic to the employment of distal relationships as collective identities (Melucci, 1998) to which individuals ascribe is definable as the meso level. The communicative space refers to the space where societal discourses are examined. For example, the communications between a collective, or local group / NGO, and a state organisation. It is here that new ways of thinking about an issue are proposed in the development of the collectively interpreted meaning of events.

Exosystem level

The exosystem relates to the societal structures and institutions in which the individual does not have a direct decision-making role (local government sustainability strategies, legal institutions, economic operators, etc.). Individuals can only operate through their democratic rights to vote, protest, as a representative organisation, etc. It is at the exosystem level where the individual participates in official (legal, political, economic) institutions and organisations. Institutional approaches to sustainability are largely based on accredited knowledge and official reports.

Here interaction is guided by formal rules and regulations. It is here that public participation is practised and challenges are presented to established institutions. For example, community groups employing their collective right to articulate their framing of events may challenge the current institutional structure which does not support their point of view, nor implement policies that are congruent with the environmental risks. It is here that citizens may articulate their interpretation of an event in a social, legal, political, and economic context based on fundamental human rights to health. The institutions which are of most relevance to examining sustainability, and this study, are: a) the political, as they relate to opening up

democratic processes; b) the economic, as they support sustainable practices; c) formal community and collective institutions, as they encourage discourses and innovative solutions to social problems and actions promoting responsibility; and d) the technological, as they can improve access to decision making. The case studies examined in this thesis include institutions and organisations of the state as well as civil society organisations and other collectives engaged in sustainability discourses.

Macro level

The macro level refers to meta-narratives, dominant cultural or societal discourses, and normative structures which characterise a society. In this case, it is the sustainability meta-narrative.

Chronosphere

Finally, in this case, the chronosphere refers to the patterns and changes in the structure of the BiMEC over time and the sociohistorical conditions under which it exists. This change is examined through the influence of key events (major weather events, political decisions, scientific publications, etc.) and how this reframes the sustainability paradigm.

Summary of the BiMEC model

In summary, the illustration presented here is the biopsychosocial model of ecological citizenship (BiMEC) which enables the researcher to examine how climate risk events emerge through individual, local, national and cosmopolitan discourses. It also allows for the examination of innovative responses to them. As these risks are different at each of these levels and are subject to local conditions, it is important to examine environmental risks on all societal levels. This model is situated in the socio-historical context of the current information age, the knowledge society, the ongoing medical revolution, and of the communications, digital and technological revolutions. The four themes of this model are discussed in more detail to elucidate its potential in supporting ecological citizenship.

3.2. Health

Doherty and Clayton (2011) identify three main classes of psychological and social effects of climate change. First are direct and are exemplified by acute or traumatic effects of extreme

weather events and a changed environment. Second are indirect, exemplified by threats to emotional well-being based on observation of impacts and concern, or uncertainty, about future risks. Third are the psychosocial, exemplified by chronic social and community effects of heat, drought, migrations, and climate-related conflicts, and post-disaster adjustment.

For example, the EPA (2016) states that there are:

> "local environmental issues such as air quality, water pollution, odours and noise that need to be resolved [and that] many of these problems can be masked by national level assessments but can have severe impacts on the health and wellbeing of the people in individual communities and on the quality of the local environment."
>
> (EPA, 2016: 10).

These psychological and social effects of climate change define a minimum level of biopsychosocial wellbeing measurable through physical health, psychological wellbeing, and the capacity to act as an active citizen in part defined by an individual's, and communities, capacity to adapt to climate change. This includes asking such questions as: how many people are at risk of food shortages, water shortages, disease, coastal flooding, and extreme weather now and into the future? What is the geographical distribution of risk? Where do people live and under what physical exposures to environmental risks (e.g. for floods, landslides, increasing temperatures, heat waves, disease patterns, storms)? What is the quality of the local infrastructure? What are the social conditions in the locality? Which groups are most likely to suffer the most adverse effects and what are their likely responses (e.g. the elderly and younger populations, lower socioeconomic groups, etc.)? What can be done to prepare for and minimise impacts? What changes in infrastructure and institutions can reduce risk and enhance the capacity to cope? Who is likely to have to bear the costs – or protest interventions? (IPCC 2007, 2013a/b, 2014 a/b; EPA, 2016; Hernes, 2012: 24).

Answers to some of these questions inform how health and wellbeing are viewed as a catalyst for encouraging socio-technological innovations which support sustainable practices based on these fundamental human rights to be free from these risks. This represents an environmental perspective to the biopsychosocial approach to health and wellbeing. I

contend that biopsychosocial measures of health and wellbeing provide the basis upon which a cosmopolitan model of ecological citizenship can be examined.

3.2.1. Ecological citizenship, human health and collective responsibility

In this model, health represents the physical connection between the natural world and human society as they are both subject to the direct repercussions of poor environmental conditions. Risks to health define environmental damage or pollution, or inaction in preventing environmental risks, as an imposition on fellow citizen's universal human rights. These include the right to live in an environment where citizens have access to clean air, land, and water free from pollution and contamination (IPCC, 2013a). Further, the model allows for the examination of substantial physical threats through environmental evidence, the direct psychological impacts of risks (e.g. the loss of one's home, or the fear of the repeated flooding of one's business, destruction of local infrastructure, and risks to the lives of the family)[42] and the social repercussions of environmental damage posed by climate change. These risks negatively impact on the availability of resources. This suggests that society and nature can no longer be thought of as a dualism and must be recognised as inter-systemic.

Addressing these risks requires a collective response. To properly implement a programme of human rights based on the recognition that health risks are natural and societal in origin, institutions such as the UN and EU are required to be formal (institutional) and informal (civic). They must traverse the levels of governance including governments and civil societies (Beetham, 1998). There are normative foundations of human rights claims illustrated by common need (Beetham, 1998): the rights to life, quality of life in the form of health, the right to a healthy environment, security, peace, respect, access to the decision-making process and reflexive choice. These rights are facilitated through sustainability discourses in the form of knowledge of shared risks, increased environmental awareness supporting further access to universal rights, and the freedom and capacity to engage in responsible action.

The challenge of implementing a model based on equal access to human rights, and adaptive capacity for all ecological citizens, lies in the fact that access to resources are not distributed

[42] **RTE News: 'Evacuations in Limerick after severe flooding** " http://www.rte.ie/news/2014/0201/501557-weather/.

equally to all ecological citizens and, by extension, not all citizens have the capacity to act in the same responsible manner. Even in this context, I argue, human rights cannot take precedence over responsibilities (Beetham, 1998; Strydom, 2002; Apel, 1996). The cost of the denial of responsibility is not only direct and immediate but distal, temporal (intra-generational) and cultural (inter-generational). Simply put, while rights may be universal, responsibilities are relative to contexts. These contexts are defined by an individual's capacity to respond to risks relative to their access to resources.

By extension, universal human rights can be interpreted as a set of minimum standards which define an individual's capacity to access resources by which they can mitigate the threats of climate change. Therefore, I argue that fundamental human rights define what the universal access to resources for every individual should be, and the target toward which we should aim. These targets include creating awareness of environmental risks and, critically, encouraging responsible attitudinal and behavioural change. This realisation allows for the cultivation of a global culture of ecological responsibility based on the connection of each human being to every other through natural/biological determinants, and collective social and psychological constructs. Our co-inhabitation in the one ecosystem, and our shared human vulnerability to environmental deterioration, affect and are affected by the biopsychosocial health of all human beings.

3.2.2. The biopsychosocial approach

Engel first proposed a biopsychosocial approach to health in 1977 and argued that the traditional biomedical model ignores the social, psychological, and behavioural dimensions of illness (or more appropriately wellbeing) and that the "biopsychosocial model … provides a blueprint for research … and a design for action in the real world" (Engel, 1977: 129). Although originating with medical science, the model has been adopted by and adapted to other areas such as education (Borrell-Carrió, 2004) and child development (Bronfenbrenner, 1979). While the origin of the model itself is old, new approaches to it are being employed in active research (e.g. Growing Up in Ireland[43]), and it is an excellent model for examining individual and societal determinants of health and wellbeing. The elements of the model employed in

[43] Growing up in Ireland: http://www.esri.ie/growing-up-in-ireland/

this dissertation pertain to the ecological citizen. This approach provides a foundation upon which connections between an individual's physical health, their mental wellbeing, and their social activity can be examined from a societal and environmental standpoint. It also highlights the embeddedness of these layers. The exploration of this biopsychosocial model from a sociological perspective serves to provide a series of themes across societal levels through which I can examine ecological citizenship and individuals and groups adaptive capacities.

For example, the IPCC report (2007- reiterated in the 2014a report) states that:

> *"Health includes physical, social and psychological wellbeing. Population health is a primary goal of [sustainability]. Human beings are exposed to climate change through changing weather patterns … and indirectly through changes in water, air, food quality and quantity, ecosystems, agriculture, livelihoods and infrastructure".*
>
> (IPCC, 2007: 393 – 394)

From a sociological perspective, this problem requires an innovative approach to sustainability. This takes into account: environmental risks to the ecosystem and human beings as physical and biological entities; the unequal repercussions of the effects of these risks on the mental wellbeing of human beings and their ability to act as social beings; and, the influence of these physical and psychological risks to population health. It is for these reasons that a biopsychosocial approach is an effective tool for examining adaptive capacity, ecological citizenship and sustainability. It is also for this reason that the pursuit of innovations which are cosmopolitan (local and global) in their reach are important to the emergence of means of addressing challenges posed by climate change.

3.3. Innovation, innovation spaces, and ecological citizenship

Innovations that support open governance and ecological citizenship are, therefore, driven by the identification of a societal, or collective, need to respond to an immediate challenge or risk, and the realisation that the current systems for managing these risks are inadequate. In this section, I explore what role socio-technological innovations play in supporting the BiMEC model.

3.3.1. Innovation spaces, health and ecological citizenship

Innovation spaces are defined by the capacity of a setting, context or environment to support open and inclusive innovation. They can be both physical and virtual. The concept emerged from business and management studies in the exploration of the potential of new physical and cognitive environments which foster innovation:

> "*Physical space helps promote deep engagement, while the virtual space allows you to capture what you've learned in the physical space and turn it into something real. The mind space cuts across both aspects* "[44].

It is in this context that the emergence of virtual and real world innovation spaces as settings which foster inclusive cosmopolitan ecologically guided democracy should be examined. For example, Collective Awareness Platforms for Sustainability and Innovation (CAPS) are innovation spaces which promote, and allow for the inclusion of, complex interpretations of sustainability through interactive discourses across real and virtual communities. In this example, the risk to life, health and quality of life represents the most profound risk and inspire the most profound responses. Theses risks put into doubt what is currently taken for granted (Schutz, 1967). When 'what is taken for granted comes into question' (ibid), and the boundaries of one's experiences are disturbed by a risk, this stimulates a reflective process upon how one interprets one experience of reality. Reflecting upon resolutions to these threats engages individuals in the process of interpreting risks and seeking out others who articulate their responses to these risks in a way that is resonant to the individual. In this way, one may deem others to be in possession of cultural tools and able to construct collective responses to these risks. Resolutions to these uncertainties are sought through this social interaction, which in turn open up innovation spaces which foster intersubjectivity, discourses and possibly consensus. The risk event, in this way, encourages debate among social actors with whom the event is relevant and promotes a collective resolution to the risk.

By situating innovation in this context, events are located in a timeline, and their resonance commensurate with current social, economic, political and technological discourses. It is

[44] Innovation Excellence: Innovation Spaces – A New Frontier in Collaboration: http://innovationexcellence.com/blog/2012/11/28/innovation-spaces-a-new-frontier-in-collaboration .

through the development and support of innovation spaces situated in these cultural and historical settings that it is possible to make events resonant to as large a group of ecological citizens as possible.

For example, new ICT's and socio-technological innovations based on health *and* the environment present new opportunities through which knowledge can be shared among communities from different geographic locations about risk prevention measures while engaging people in issues that are critical to their existing identities; i.e. risks flooding or poor water quality present to health and wellbeing. These innovations support the evolution of a cosmopolitan culture of collective responsibility in the current era of environmental risk.

3.3.2.Socio-technologic innovation and adaptive capacity and the BiMEC

The basis of a successful socio-technological innovation space is its capacity to enable individual citizens to identify exposure to risks presented by climate change. It should provide the potential for equality in the capacity to access one's human rights and the capacity for individuals to be able to act as a responsible ecological citizen. These are measures of adaptive capacity.

The IPCC (2007 and 2014a) reports suggest that these measures include education, income and health. They also suggest that involvement in innovation is a critical aspect of adaptation, yet they caution that this should not be viewed only in technological terms but emphasise the important role of social supports including human capital and governance structures:

> "*Although economic development may provide greater access to technology and resources to invest in adaptation, high income per capita is considered neither a necessary nor a sufficient indicator of the capacity to adapt to climate change (Moss et al., 2001) … There are many examples where social capital, social networks, values, perceptions, customs, traditions and levels of cognition affect the capability of communities to adapt to risks related to climate change*."
>
> (IPCC, 2007)

This approach to adaptive capacity includes a broad definition of the term *resource* and the effective use of socio-technological innovations to support adaptive capacity.

For example, health, as the central resource in the BiMEC model, is a universal and important indicator of adaptive capacity for all global citizens. This includes identifying the risks to human health that climate change presents to the individual at a local level, their capacity to mitigate these risks through accessing basic health care via institutional structures, technology, social supports, and the capacity to help and support immediate others such as their family and community. It can also be extended to abstract others who are not known to the individual who are also ecological citizens and hence are tied together through the collective responsibility of environmental stewardship; this is the basis upon which a social justice approach to sustainability is established at the cosmopolitan level.

It is in this way that health and wellbeing act as catalysts for promoting socio-technological innovations by finding new ways and means of addressing environmental risks. They coincide with the proliferation of discourses and technologies that empower citizens to be free from these risks. For example, new methods of producing energy on a small scale, or individual level, through the installation of solar panels on one's home. Therefore, socio-technological innovations can enable the emergence of forms of ecological citizenship on a global level and encourage action at the local level.

3.4. Sustainability and collective awareness platforms as drivers of ecological citizenship

I have discussed the conflict and consensus that arise in the process of the interpretation of the meaning of events. To have an effect, the event must be resonant with a variety of individuals and form a discourse around the event. The discourse can emerge from either individual or multiple themes of the BiMEC model. For example, Hernes (2012) suggests that events change outlooks and attitudes. Certain events are diagnosed and discussed by political and scientific experts. Although, he argues, that this is not the main reason that the sustainability paradigm has evolved so rapidly in the late 20th and early 21st century. He proposes several types of events which have significantly influenced public opinion. They include:

- events that promote a sudden change in the status quo or global crises such as extreme weather events;

- events that inspire the critical examination of preconceptions and require the significant reframing of our understanding of climate change, such as new scientific discoveries;
- events that inspire the reinterpretation of social discourse, such as new ways of communicating;
- cohort defining events- e.g. loss of land or homes which leave people homeless and make them environmental refugees;
- events that affect an individual's primary sense of security, such as risks to life and health;
- events that slowly permeate different aspects of society at different times, yet which are resonant- such as local environmental risks that occur on multiple local areas simultaneously but the communication of which takes time for this information to filter through; e.g. the slow deterioration of water quality due to diffuse source pollution;
- events that juxtapose political agendas such as different global risk issues; e.g. risk to food security;
- events that are highly resonant yet are not directly threatening and inspire discourse on a wide level- such as melting of the polar ice-caps, global temperature increase, and habitat destruction for species such as the polar bear (Hernes, 2012: 97).

Articulating risk events in the context of fundamental issues (e.g. health) make them more resonant to individuals. In this way, they have the potential to influence the direction of sustainability discourses of a large number of individuals and across all societal levels simultaneously. The capacity to reach a broad audience can increase the chance of convincing them of the credibility of this argument encouraging them to support it. For example, the EPA (2016) report identifies “our most basic needs [as] clean air, safe drinking water and healthy food” (EPA, 2016: 123), and that “environmental degradation and vulnerability to extreme events, adversely affect health and wellbeing” (ibid). Further, the report highlights “the intimate interconnections between sustainable environments and healthy lives” (ibid). The EPA argue that we do not live in isolation and that the direct impacts of environmental degradation are measurable in the deterioration of the quality of life of individuals and communities. Further, the report states that the regulation of environmental management is only one aspect of risk management and it is through the articulation of these fundamental issues that we can encourage better individual choices: “at an individual level, our choices influence our health and that of our family and neighbours. Choices such as the fuel we use,

the water we drink, how we manage our waste, the chemicals we use in our homes and gardens, household ventilation, the noise we create, etc., demonstrate our values and attitudes to our environment, community, health and wellbeing" (Ibid: 128). Health risks from environmental degradation have become embedded in the Irish, European and global sustainability meta-narratives through these types of actions (IPCC 2007, 2013 a/b and 2014 a/b). For example, the recent protests against the introduction of charges for water in Ireland, which began as a protest by the left leaning political minorities, formed into a national movement led by elected politicians. This movement successfully placed sufficient pressure on the political establishment that the electoral promises of some the main parties in the 2016 election included the abolition of the water charges. This has resulted in the suspension of water charges and established a commission to make recommendations on a long-term sustainable funding model for domestic water and wastewater services[45].

Example of socio-technological innovation: Collective Awareness Platforms for Sustainability and Social Innovation (CAPS)

The Digital Agenda for Europe (DAE), according to the European Commission (EC), is a mechanism which was established to promote socio-technological innovation and empower citizens with tools which enable them to contribute to solving societal challenges by maximising the network effect and collective intelligence. The DAE was established to act as a strategic guide for research to enable the development of an infrastructure supporting sustainable and innovative digital growth. This infrastructure, they argue, maximises the social and economic potential of ICT technologies (most notably the internet) driving activities which form the basis of improvements in the quality of life of EU and global citizens. Key objectives of the DAE include:

a) the digital era should be about empowerment and emancipation;
b) background or skills should not be a barrier to accessing this potential;
c) smart use of technology and exploitation of information will help to address the challenges facing society like climate change[46].

[45] Citizenship Information Bureau, Water Charges: http://www.citizensinformation.ie/en/environment/water_services/water_charges.html

[46] Digital Agenda for Europe: https://europa.eu/european-union/file/1497/download_en?token=KzfSz-CR

In its vision of future innovation scenarios, the European Commission describe digital social evolutions, current multidisciplinary research interests, and the potential of social innovation for impacting on the quality of life of the European citizen, as lying within and beyond sovereign borders[47]. The vision proposes that the digital agenda serves to harness concepts from open information sharing platforms such as Internet of Things (everyday objects have network connectivity) and Big Data (collecting data from the environment), Facebook (social interaction) and Wikipedia (production of new knowledge).

For example, the 'network effect' of the internet allows the evolution for co-production and sharing of content. Platforms for social innovation, supporting informed and sustainability-aware decisions, are based on an extended awareness of the environment and of the consequences of citizen actions. I argue that by including participative co-design as a core component of innovation it is possible to engage citizens who can access these technologies (either personally or through a collective) through open, transparent, and action focused discourses. In turn, this can cultivate better innovations which the equitable use of, and access to, resources at local, national, European and global levels in different sectors (public, private, civil) leveraging the active engagement of society itself through each single ecological citizen.

CAPS are one means of enabling this form of engagement. It is through CAPS that European Commission envisages sustainability as becoming mobilised through bottom-up/niche and social innovations. This coordinated self-regulation is based on collective situational awareness through non-commercially-driven platforms that can support new ecological innovations. I argue that it is through promoting a new form of ecological citizenship based on health as an environmental risk and a human right that innovations emerge from social settings. Further, CAPS may have a role in enabling these innovators to engage in wider discourses promoting sustainability which is, in turn, based on fundamental human rights to health.

[47] Collective Awareness Platforms for Sustainability and Social Innovation: http://ec.europa.eu/information_society/activities/collectiveawareness

3.5. Human rights: cosmopolitan ecological citizenship and ecologically guided democracy

Risks are calculated by reviewing the long-term damage to the environment (for example the costs of repairing the damage caused by natural disasters) and weighing them up against the immediate benefit of industrial and technological growth. Christoff (1996) argues that a hierarchy of universal ecological values (such as the conservation of biodiversity, the basic needs for future generations, and adaptive capacity) should be given priority over particularistic ones and narrow anthropocentric values (such as the right of an individual human, social class, or notions to subdue the Earth) (Christoff, 1996). In this way, ecologically guided democracy (ibid) focuses on the hidden costs of environmental damage/risks and externalises them by measuring adaptive capacity.

In this context, the extension of citizenship to include citizens as ecological trustees can only come about through new participatory forms of democratic governance. I argue that effective governance can be achieved through the formation of collective identities. This approach suggests that it is increasingly important to treat the collective as constitutive of a voice of risk consciousness, the site of reflective and conscious rights-based discourses, and the locus of cosmopolitan responsibility. This includes situating the future of ecological citizenship in socio-technological innovation and placing increased importance on innovation spaces which include real and virtual locations.

3.6. The BiMEC model

Can socio-technological innovation reverse the trends towards the 'tipping point' beyond which the ecosystem cannot recover, and is the damage to the climate irreversible? Westley et al. (2011) argue that strong connections between social actors, institutions and innovation are critical in promoting successful shifts towards radical new ways of thinking about climate change to address these risks as a matter of urgency. They define sustainability transitions as those which:

> "*Require radical, systemic shifts in deeply held values and beliefs, patterns of social behaviour, and multi-level governance and management regimes [which require*

harnessing] human creativity and innovation potential to tip the interlinked social and ecological systems in the direction of greater resilience and sustainability."

(Westley et al., 2011: 762).

Sustainability requires new ways of thinking and living economically, politically, culturally, socially and environmentally. Most importantly, innovation must be rooted in sustainability discourses to prevent economic forces driving innovation programmes towards financially profitable, but unsustainable, practices. I argue that sustainability is driven by ensuring that socio-ecological issues, such as health, are central to innovation (ibid: 764). This proposition will be explored through the BiMEC model.

3.6.1. BiMEC model across societal levels

The model of ecological citizenship presented here includes the four themes and is discussed across the different societal levels.

Individual level

At the individual level, human rights to health and quality of life are based on their existence as a single citizen. From this point of view, contradictions may arise between sovereign and cosmopolitan rights and individual responsibilities and environmental risks. It is through the identification of risks at the individual level (biopsychosocial risks to health and wellbeing) that individual rights are evoked based on risks to the individual as part of a collective. It is through sustainability discourses and collective responses to the challenges they represent that creative responses may emerge.

Micro level

At the micro level tensions and/or consensus may arise through discourses between the various social and technological innovators in their pursuit of creative responses to risks. At this level the biopsychosocial approach to ecological citizenship is a model for achieving sustainability through socio-technological innovation in support of inclusive risk and rights discourses which open innovation spaces and promote collective responsibility.

Meso level

The meso level is where collectives form in response to risk events, and the need to produce a response. These formations emerge in the background of the existing normative conditions as defined by the exosystem level institutions (scientific, economic, political, legal, etc.). They are also influential in the constitution of these institutions.

Exosystem level

An ideal form of innovation should be inclusive and represent the opinions, value and beliefs of social actors, groups, organisations and institutions on all individual and societal levels. This is driven by agency and active participation in the innovation process. While agency is critically important, the subject matter itself must be relevant to encourage engagement in the discourses which surround it: e.g. life, health, and quality of life. This occurs on all levels simultaneously.

Macro level

The macro level is where cosmopolitan collectives employ new communications platforms which are supported by fundamental human rights and form the context in which the global meta-narratives of sustainability emerge. I argue that collective awareness platforms as socio-technological innovations inspire the construction of new normative structures on all levels. At this macro level, different interpretations of ecological citizenship support the normalisation of sustainability as a complex, yet coherent, meta-narrative.

The capacity to support the numerous niche initiatives and innovations (clean energy, conservation, biosphere reserves) through governance based mechanisms, and ICT innovations which promote a basic quality of life for nine billion human beings without transgressing critical planetary boundaries, presents a significant challenge (Hernes, 2012: 775). As different individuals have different interests, they propose different approaches, have different values, beliefs, and attach different meanings to environmental risks which stem from their unique life histories. Consequently it is not possible to adequately predict how social actors are going to react to risks. I propose that creating a coherent and complex model of ecological citizenship that is based on core categories (e.g. health and human rights) and allows for multiple framings of peripheral issues (water, food, risks of extreme weather

conditions) focused on perpetuating the meta-narrative of sustainability is one way of addressing this.

Chronosphere

I suggest that enabling conditions to support durable and inclusive discourses which support socio-technological innovation, the establishment of ecological citizenship, and mechanisms for institutionalising sustainability over time are required. The model, and the boundaries therein, are in a permanent state of oscillation, the BiMEC model is itself sustainable over time.

3.7. Summary

Climate change is the responsibility of human beings as reflected in international treaties and various IPCC reports discussed in this chapter. Further, environmental risks pose risks to human health, to society, and consequently infringe upon citizens' human rights. This represents what Hernes calls "a confluence of crises - climatic, environmental, social and political" (Hernes, 2012: 89). A consensus around what can be done to address these risks is only achievable through the identification of common issues that are relevant to all the worlds' citizens. I argue that health (human and environmental) is a common issue that acts as a catalyst for discourses on all societal levels that (re-)frame sustainability and promotes innovative solutions to social and environmental risks. This establishes health as a catalyst for socio-technological innovation and supports collective responsibility in the risk society.

I contend that a biopsychosocial approach to ecological citizenship and sustainability based on socio-technological innovation is likely to appeal to many (if not all) societal innovators in Ireland and globally. BiMEC, as presented in this thesis, is used to critically examine the role of CAPS in supporting sustainability discourses based on the adaptive capacities of individuals and local communities. In what follows, an evaluation of case studies of social innovators in Ireland is carried out through qualitative fieldwork. A review of case study materials provided an analysis of CAPS and CAPS-like projects and initiatives in Ireland and Europe. Finally, a critical examination of the strengths and weaknesses of their approaches was carried out through the prism of socio-technological innovation.

I use these approaches to examine the power of the BiMEC model, illustrate the current status of ecological citizenship, and explore the way in which this research can point to new means of supporting equitable sustainability now and into the future.

4. Chapter 4: Methodology and Research Design

4.1. Introduction

Qualitative methodology supports the researcher in exploring, understanding, interpreting and mapping emerging social phenomena (Ritchie et al., 2013), focusing on the 'how' and 'why' rather than 'how many' of the quantitative field. It allows for flexible and responsive examination of emergent concepts and narratives, and yields rich and detailed content which captures a depth and breadth of the experiences of participants.

Qualitative research identifies specific ways and approaches taken by the subjects of the study and makes no claim to representativeness (in the statistical sense of the term). The rationale for the research design is to "understand, explain, explore, discover, and clarify situations, feelings, perceptions, attitudes, values, beliefs and experiences of a group or people" (Ritchie et al., 2013: 132-3) and situate those in their discursive, institutional and socio-political contexts. The sampling and data collection methods are described below.

The purpose of taking a new approach to collective responsibility in the risk society is to explore how society, and individuals, can best form collective responses to the risks posed by climate change. It was the conceptual launching pad for the derivation of the four themes of the theoretical BiMEC model. The idea is that situating health at the centre of the sustainability discourses would make it resonant and that employing ICT's would enable social innovators to engage in these debates as ecological citizens more effectively.

As a fundamental basis of all good research, I designed a research protocol which included desk research and appropriate primary data collection methods. I examined a series of case studies located in Ireland, specifically North Tipperary, due to its an ease of access for qualitative interviews and the high number of social innovators[48] in sustainability. I chose case studies which represented a range of approaches to the main themes of the BiMEC model Interviews were carried out with representatives of the case studies. The approach is illustrated in the following diagram:

[48] It is the site of a high concentration of sustainability initiatives including the Cloughjordan Ecovillage "registered educational charity and an internationally recognised destination for learning about sustainable living", the Tipperary Institute, and a number of socio-ecological innovators.

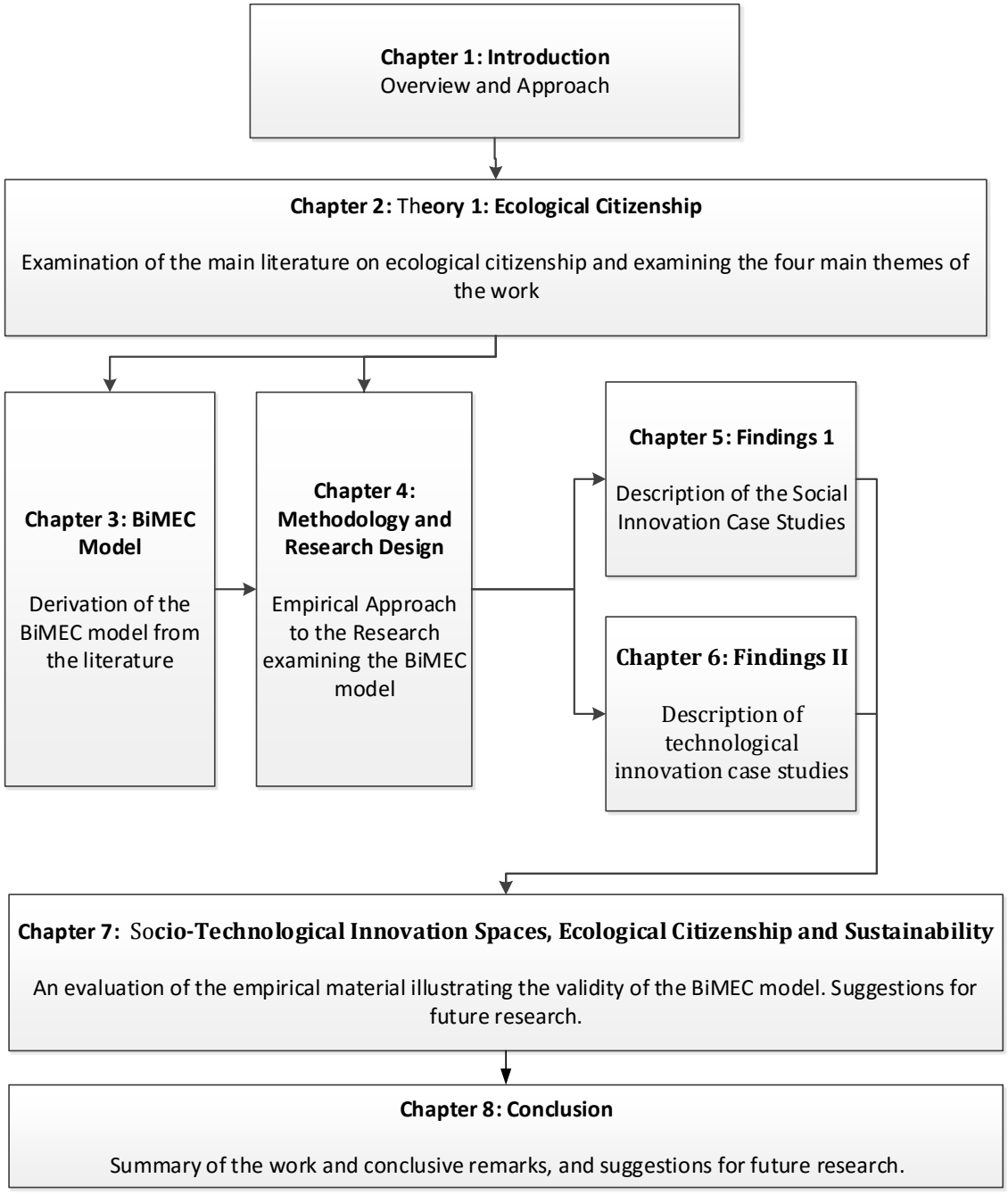


Figure 2: Study design flow diagram

In this chapter, I outline my methodological approach to examining how discourses around health, human rights, sustainability, and innovation emerge from the arguments put forward in scientific publications, government strategies policy and legislation, political and legal texts. An exploration of the academic literature included social and behavioural sciences,

citizenship, sustainability, and public health texts. The main goal of this study was, to test the empirical validity of the BiMEC model through real cases of socio-technological innovation. Situating health as the central concept which connects sustainability to citizenship via human rights discourses is central to the empirical phase of this research. This desk research informed the choice of the qualitative approach taken.

I hypothesise that establishing health as a driver of human rights based sustainability discourses, also requires that we explore the means of how socio-technological innovation can become a driver of new ideas to address ecological risk in a collective way. I examine how these innovations promote collaboration and open new avenues to collective problem solving, knowledge sharing, media use, social exchange and community-wide participation at local, national and cosmopolitan levels in the real and virtual worlds.

4.2. Desk research

In conducting the desk research, I choose documents relating collective responsibility in the risk society; examples include risk and sustainability, citizenship, and community and collective responsibility. From an examination of these works, cognitive frame theory and Bronfenbrenner's model of bioecology (1979), the idea of developing a model that would enable analysis across all societal levels and focused on a collective form of ecological citizenship built upon human rights and access to decision making through public participation emerged. Social innovation as a driving force of collective responsibility also emerged from this literature. Social movements proved to be the most interesting case studies, while also fulfilling the criteria of being involved in innovation. In the interest of examining new and emerging models of citizenship, I then decided that examining the forms of communication that they used allowed for the examination of the formation, and evolution, of these discourses. The concept of employing health as a core element to define ecological citizenship emerged from scientific reports in the area; mainly the IPCC reports in 2007, 2013 and 2014. As the study evolved, it became apparent that examining how ICT's can enhance the capacity of these social innovators to improve their access to resources emerged in my examination of CAPS.

This constitutes the empirical approach to examining how technological and communications innovations enable individuals and groups to open up new discourses, share information, and frame the sustainability debate at all societal levels from the grassroots.

4.2.1. Desk research approach

The *Formal Analysis Process* (FAP) derived by Ritchie et al. (2013) was the method taken to the project design, empirical research, and analysis. It involved the construction of initial themes from desk research (as described above); indexing and sorting perspectives about the same issue/event; reviewing data extracts and organising them into subthemes; summarising data and displaying synopsis of analysed data; constructing categories and identifying linkages between sets of information; and, determining patterns emerging from communication and discourses (Ritchie et al, 2013).

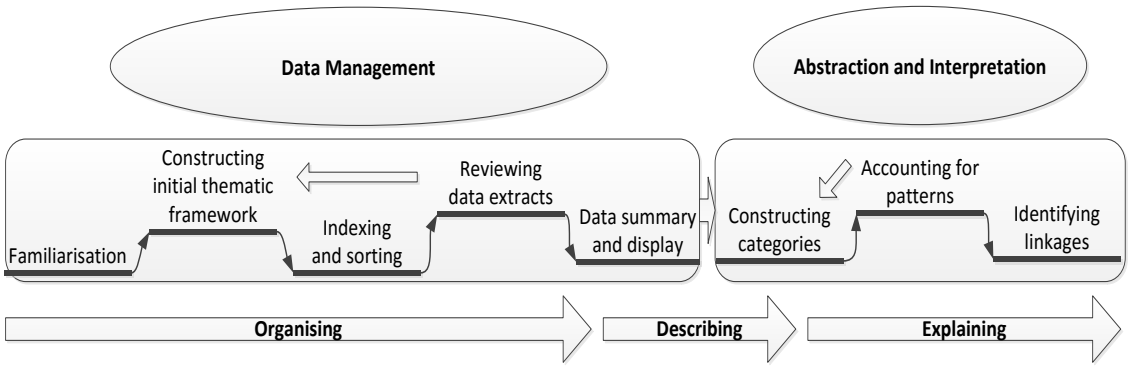


Figure 3: The Formal Analysis Process

'Framework' is a formal qualitative data analysis method (Ritchie et al., 2013). Its sequential approach aims to order data which facilitates the exploration of the data based on the interpretation involving thematic analysis, typologies and explanatory analysis. It was derived from a review of existing qualitative research methods and derived for the *UK Governments Chief Social Research Office* by Ritchie and Spencer (2004) to appraise the quality of qualitative evaluations concerned with the development and implementation of policy, programmes and practice. The authors have systematically updated it in their 2013 publication *Qualitative Research Practice* (Ritchie, 2013). As such it is designed to allow for the systematic thematic analysis and collation of desk research findings and primary research.

4.2.2. Academic

Initially, I chose academic documents which discuss each of the main themes. After a review of core articles, I examined some of the most relevant references in each of them. A snowball approach was taken to identify new articles and books. It allowed me to gather a variety of relevant publications across the topic areas.

The connection between human rights, citizenship and sustainability, emerged from my exploration of the academic texts. These documents guided me to make connections between some previously unrelated concepts and extrapolate a new approach to the combined analysis of these themes. For example, exploring community and social movement theories illustrated the importance of *access to knowledge*, the capacity to engage in the *decision-making process*, and the value of *social innovation* in the advancement of *contemporary models of citizenship*. It became clear that the advances in the *availability of the internet*, *new technologies* (particularly mobile phones), new *free and open access software*, improved *access to education*, and *new means of interactive communication*, laid the foundations for the radical transformation of the *cosmopolitan public sphere* in which the contemporary citizen has become a prosumer[49]. The rise of the prosumer prompts a fundamental shift in the way ecological citizens access and experience information. By including them in active sustainability discourses, they are encouraged to become more active social innovators. This assumption led me to examine public documents that provided examples of current scientific approaches to these issues and policy and legal positions taken by the Irish and European institutions to ecological citizenship.

4.2.3. Official documents: scientific publications and official reports, and strategy statements, policy documents and legislation

In addition to the academic research, the desk research included a comprehensive review of official reports, strategy statements, policy documents and legislation. Documents from both national and European organisations were gathered and screened for relevance to the main themes. They included international conventions and treaties, European and national policy documents, non-legislative policies and publications, and legislation which influence policy

[49] A person who produces and consumes media content.

directly on EU and national levels. For example, particular attention was paid to documents that addressed a combination of the themes of the BiMEC model (health, environment, innovation, sustainability) in parallel (e.g. the IPCC reports, UN Declaration on Human Rights, European Union Convention on Human Rights etc.) allowing for an exploration of the interrelationship between these themes. The outputs of this review provided a summary of the institutional approach to the environment, human rights, and health which allowed for the construction of an overview of the political, legal, and scientific framing of sustainability.

Cumulatively, the analysis of the literature and reports provide an overview of the current view of these themes as they relate to sustainability and ecological citizenship. These documents are particularly useful in illustrating the institutional approach to sustainability, and the meta-narratives of health and environmental sustainability. The results of this study influenced the process of choosing empirical case studies.

As a result, this research does not attempt to review and analyse global socio-political processes in the formation of institutionally based models of sustainable development. It explores the ideas emerging through European and Irish sustainability discourses which involve grassroots activists, scientists, researchers, and political and economic actors. As such it can be examined through qualitative sociological methods.

4.2.4. BiMEC model: themes and subthemes

By employing the FAP approach to structure the desk research, I analysed the relevance of the four main themes to the model and was able to derive a structure by which to analyse the social innovator and technological innovator case studies which were chosen as the empirical data for this thesis.

Finally, a social network analysis (Scott, 2014) was carried out examining the links between case studies based on these subthemes. At this stage, several links between the main topics began to emerge; e.g. between health and sustainability, health and collective responsibility, ecological citizenship and sustainable development, etc. The diagram below represents a basic network analysis of how these the main themes and subthemes of the BiMEC model relate to each other with each node representing a link between themes and subthemes found in the data.

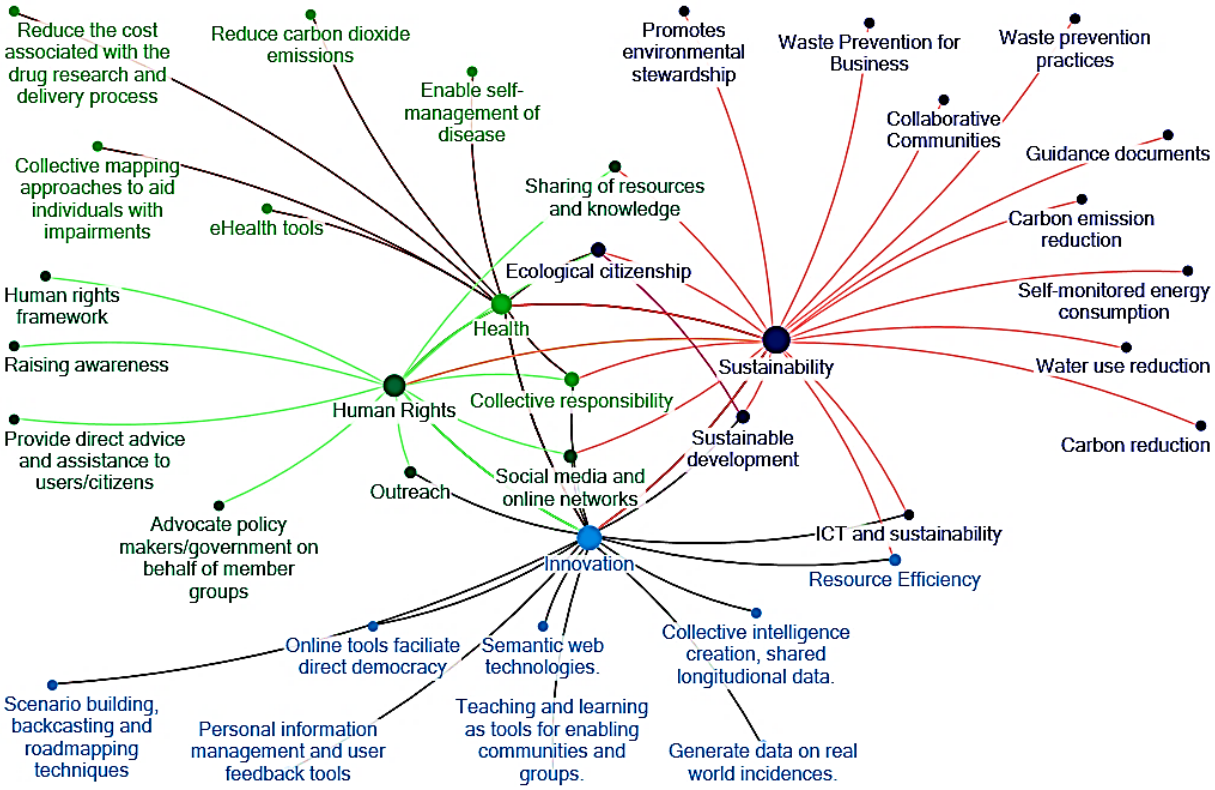


Figure 4: Thematic network representing connections between the themes found in the desk research

The themes and subthemes emerging from the desk research are summarised as follows:

Health:

- Biological: physical health of the individual human being.
- Psychological: mental health and wellbeing of the individual.
- Social: health as a human right and the social context in which one lives including the micro level connections, family, community, as well as the national, international and virtual collectives of which one is a member.

Human rights

- Grassroots processes
- Promoting environmental awareness
- Establishing participatory democracy processes

Sustainability

- Resource management
- Production and consumption of information

Innovation

- Forms of innovation and new opportunities
- Changes in lifestyle/choice

For example, while not always obvious or explicit, concepts such as inter- and intra-generational responsibility and governance are illustrated by the inclusion of advocacy and human rights, raising awareness, sharing resources and knowledge, online tools, and links to sustainable resource management through the model above. Applying this method allowed me to build the connections between health and sustainability through this rights-based model of citizenship. This thematic analysis can be portrayed in the BiMEC model as follows.

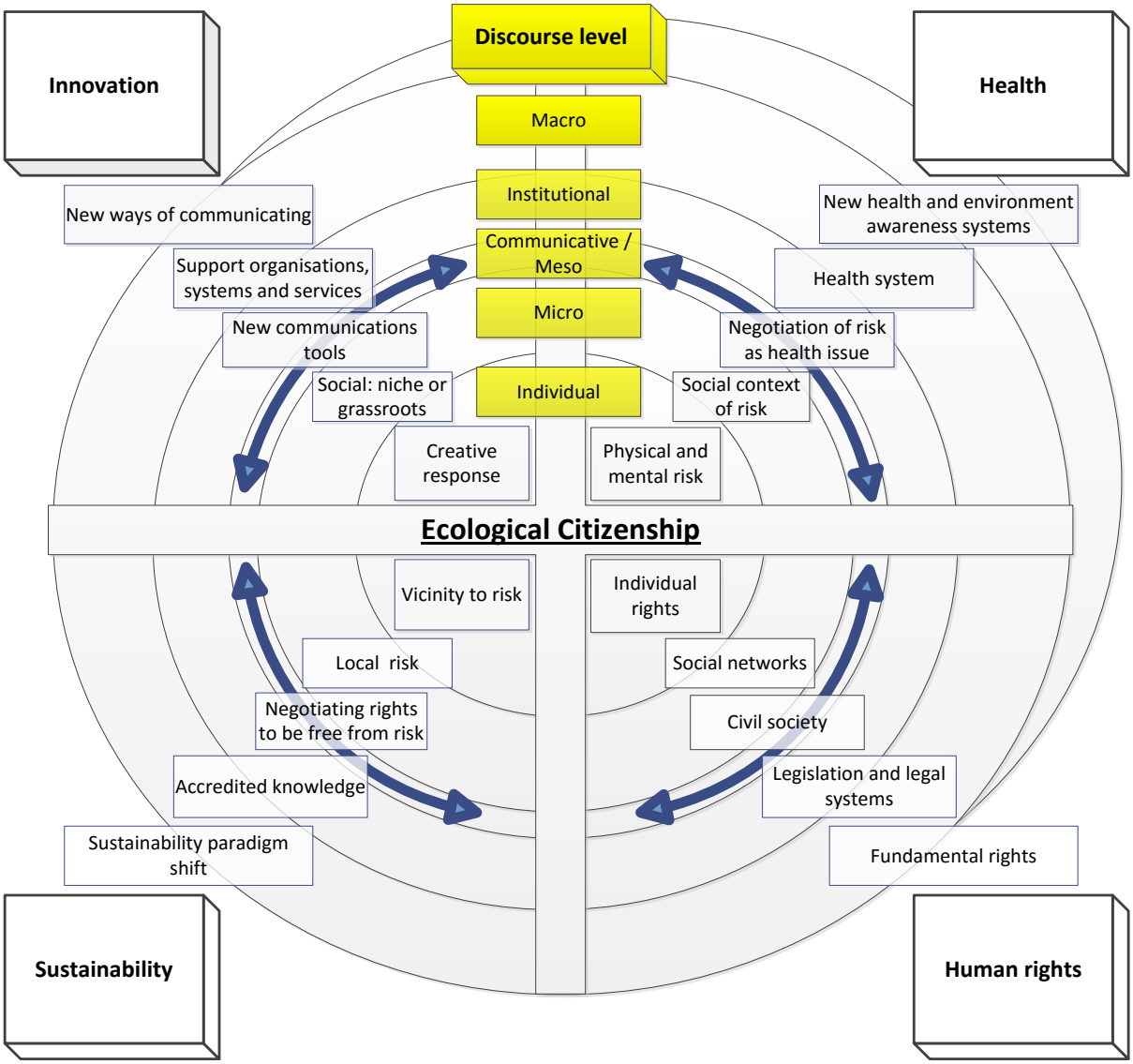


Figure 5: Themes and subthemes emerging from the desk research by societal level

The case studies presented below illustrate the relevance of these themes and subthemes in the emergent governance structures, and the remaining challenges for the emergence of ecological citizenship in Ireland.

4.3. Primary research

4.3.1. Sampling and Data Collection

Sampling is defined as the identification of a subset of the population that will take part in the research. In qualitative research, one targets a subgroup of the sample population who can answer the research questions most effectively and provide useful information. The three questions that sampling should answer include: a) which group or sub-population is of interest and will provide the richest and most relevant information? b) should any sub-sets of the central population be excluded? c) should any additional groups or sub-populations be included? (Ritchie et al., 2013).

The selection of sampling units (e.g. participants, case studies) is criteria based and purposive. The sample units for this research were chosen deliberately to represent characteristics deemed to be relevant to the main themes of the BiMEC model which emerged from the desk research. The sample frame was defined by two purposive non-probability samples. They were taken to represent a breadth and depth of expertise within the study populations: social innovators and ICT/technological innovators.

The study design allowed for a thematic analysis of the different approaches taken by social and technological innovators, as well as identifying the traits that are common to both. It enabled the measurement of the importance given to health as a catalyst for innovation in both sets of case studies, and across them. It also highlighted their different approaches to sustainability and the existing challenges to the establishment of ecological citizenship.

Sample 1: Social Innovators in the field of Sustainability in Ireland

Social innovations are defined as new ideas (products, services and models) that simultaneously meet societal requirements (more effectively than alternatives) and create

new social relationships or collaborations[50]. Innovation in this thesis refers those new ideas and practices that emerge in response to an environmental risk.

Relevant organisations which represented a variety of social innovators in the area of sustainability were selected. They include NGO's, policy makers, politicians, technologists, scientists and researchers, education, industry, and grassroots/local environmental groups. Case study materials were taken from their websites and any official reports and publications publicly available. In total, thirty case studies of organisations that were involved in sustainability and innovation and that contribute significantly to the sustainability discourse in Ireland were examined. All were reviewed to provide an understanding of their role in the promotion of sustainability discourses in the Irish public sphere.

One-to-one, face-to-face interviews were carried out with a selection of eight of case studies that represented organisations with different interests who approached the main themes of the BiMEC model emerging from the desk research from different perspectives. Interviews were conducted with between one and three members of each organisation and lasted between forty-five and ninety minutes. All interviews were recorded, transcribed, summarised and reviewed. A thematic analysis of each interview was carried out. The findings were then summarised. The results were categorised. All analysis was carried out employing framework method defining the contribution to the sustainability discourse made by each case study.

In choosing the social innovation cases, South Tipperary was selected as it was physically accessible, has a long history of engagement in the sustainability movement, and had a concentration of grassroots level initiatives involved in niche sustainable innovations.

In addition to the qualitative research carried out, an extensive web search of Irish environmental NGOs was conducted which included environmental networks and their participants. From this position, I established an overview of some of a range of grassroots environmental movement actors and social innovators in the area of sustainability in Ireland.

[50] Code of EU Online Rights: https://ec.europa.eu/digital-single-market/sites/digital-agenda/files/Code%20EU%20online%20rights%20EN%20final%202.pdf

Sample 2: Technological innovators in the field of sustainability

Innovations in Information and Communications Technologies (ICT's), generically referred here to as technological innovation, include digital, technological and communication innovations. These innovations use collective intelligence and mass collaboration enabled by the internet's network effect to enhance the capacity for communication. It is a collaborative and social environment in which innovators, users, and communities engage with each other using technologies to co-create knowledge and solutions for a wide range of social needs and at a scale that was unimaginable before internet-based communications[51]. While desk research, case studies and in-depth interviews were possible in gathering the data from social innovation, interviews with ICT innovators were not possible due to access issues. I studied eighteen ICT/technological innovations. While no interviews were carried out, I analysed materials available online and publications from these organisations, as well as their connection with other groups. The empirical questions were asked of these case studies also. The implementation of the tools and methods described above allowed for the collection of rich data across the main themes identified in the desk research.

When choosing the case studies, I began with active CAPS and CAPS like projects. These projects include networks of individuals that produce and promote sustainability discourses and practical solutions to environmental risks through the implementation of the initiatives or individual projects.

[51] Ibid

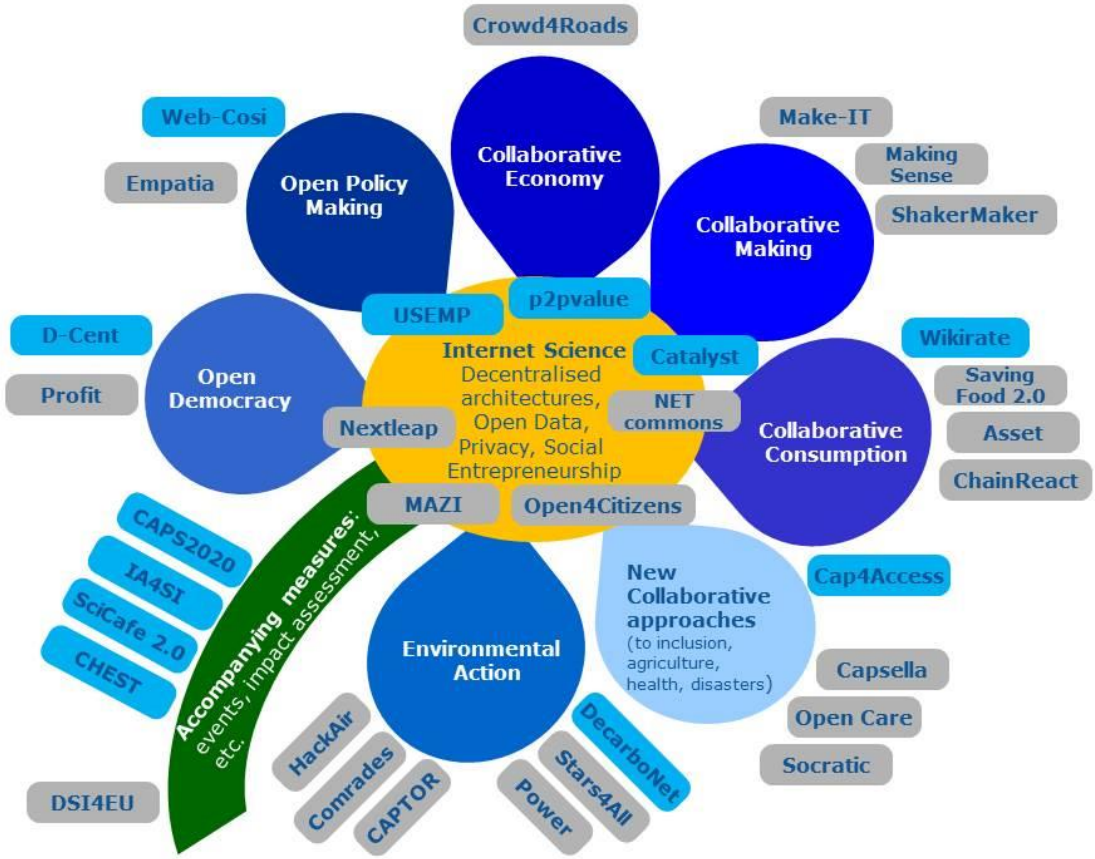


Figure 6: Illustrative Graphic of CAPS projects[52]

Material from online sources was examined including reports, documents and publications. In total eighteen projects were examined.

4.3.2. Selecting questions

The relevance of their activities, and the importance they place on the individual themes and subthemes of the BiMEC model were examined for each group. This approach allowed for the examination of the case studies and their contribution to the sustainability discourse. A thematic analysis was carried out via a series of questions which cumulatively provided for a picture of the relevance of the themes to each case study.

Several questions emerged from the desk research under each theme which allows for the investigation of the relevance of the theme to the case studies. These questions also allow

[52] Currently active as per July 2016: https://ec.europa.eu/digital-single-market/en/collective-awareness. This is not a representation of the projects examined but the means of accessing the sample of projects to be studied.

the examination of how the findings of the desk research might reflect the case studies. For example, while health is connected to the environment frequently in scientific literature, is this a common occurrence within the NGO groups, communities, social innovators, among technological innovators? Examining the case studies through these questions allows me to ultimately define how they frame sustainability and what form ecological citizenship takes within these groups/organisations. They are organised under each theme below:

Health

- Is health a central issue in sustainability discourses?
- What connections are made between health and the environment?
- Does this refer to biological, mental, or social aspects of health and wellbeing?
- What are the main risks to health reported by actors interviewed and in the case studies?
- What do those involved understand the key concepts which link health and the environment to be?

Human Rights

- What are the main environmental risk factors identified?
- Who are the main actors involved in discourses around sustainability?
- Is this initiative improving environmental awareness?
- Who produces the knowledge that promotes further debate and how do they do this?
- What knowledge of sustainability is most important: lay/tacit/experiential, political, and scientific/accredited (ecological research, earth sciences, medicine, and economics)?
- How have local communities been engaged in designing sustainable policies?
- How do grassroots discourses influence and (re-) direct policies and development programmes in the areas of health, the environment and innovation?
- What mechanisms are effective (e.g. local government, public participation practices, European Citizens Initiative, etc.?)
- What changes do grassroots discourses have in directing knowledge paradigms/worldviews such as the *Anthropocene*?
- How have human rights frameworks been implemented to support participation?
- What form is the emergent culture of collective responsibility through collective awareness platforms taking?

Innovation

- What forms of innovation have emerged in response to environmental risks? Do they include 1) social media, online communities, forums to engage citizens through shared knowledge information; 2) teaching and learning as tools for enabling communities and groups; and 3) do online tools exist to facilitate participatory democracy?
- What role does social media play?
- Do knowledge sharing platforms support governance?
- What activities are evolving and what priorities are changing through innovation?
- What role does the wider community play in the innovation?
- What role do technologies play?
- Does this include collective intelligence creation/shared longitudinal data; scenario building, backcasting and roadmapping techniques; generating data on real-world incidences; mobile; future internet; internet of things; 3D printing; etc.?
- How is knowledge transferred and how are the application of innovations organised?
- Are citizens taking more responsibility for the environment on local and global levels?
- What behavioural changes have emerged as a result of collective action?
- Does this have an influence on social policy?

Sustainability

- What resource is the focus of the organisation: water, carbon reduction, air quality, energy production, food, waste prevention?
- What is the emphasis on sustainability?
- Does this place the environment at the centre of social and economic policy?
- Does the sharing of collective knowledge support sustainable and collective consumption?
- Are there practices of self-monitored energy consumption; food management; waste management; water preservation and other resources?

4.4. A Framework approach to data analysis from multiple sources

The Framework approach sort data from different sources (e.g. desk research, case studies) by theme portraying findings of a matrix with themes displayed vertically and data sources

and case studies horizontally. It allows for a reduction of data through a synthesis of critical issues emerging from it. It allows for a review of links to original sources producing outputs which allow for comprehensive and transparent data analysis.

Data Sources	**Themes**				**Horizontal Analysis**
	Health	**Human Rights**	**Sustainability**	**Innovation**	
Desk Research	• Summary text	• Summary text	• Summary text	• Summary text	**Compare and contrast findings across themes** **Identify subthemes** **Linkages between themes**
Social Innovators	• Summary text	• Summary text	• Summary text	• Summary text	
ICT Innovators	• Summary text	• Summary text	• Summary text	• Summary text	
	• **The frequency of issues that arose and emphasis on issues.** • **Thematic links between data sources.** • **Compare and contrast findings.**				

Figure 7: Example of simplified table to support Framework

The data is ordered in descriptive 'categories' (columns) which aids question-focussed and thematic analysis. The matrix keeps the context of the data in these categories and supports the search for an explanation (looking across rows). The analytical process is systematic, comprehensive, and transparent, and encourages the display of diversity and the avoidance of bias. The outputs produced are not a single, definitive explanation but a framework or model that accounts for all cases in the sample (ibid). This approach systematically reduces the quantities of data into manageable sections.

Situating the subthemes which emerged from the desk research into this framework allows for the establishment of the following framework:

Data Sources	**Themes**				**Horizontal Analysis**
	Health	**Human Rights**	**Sustainability**	**Innovation**	
Desk Research	• Biological • Psychological • Social	• Grassroots processes	• Resource management	• Forms of innovation and	**Compare and contrast**

Case Studies A **Case Studies B**		• Promoting environmental awareness • Establishing participatory democracy processes	• Production and consumption of information	new opportunities • Changes in lifestyle/choice	**findings across themes** **Linkages between themes and subthemes**
	• **The frequency of issues that arose and emphasis on issues.** • **Thematic links between data sources.** • **Compare and contrast findings.**				

Figure 8: Framework for the analysis of themes and subthemes

The analysis of the different subthemes allowed for the cross-referencing of any commonalities across the case studies and between themes. Further, it allowed for a comparison of the approaches to, and effectiveness of, the employment of health as a catalyst for the promotion of sustainability as a contemporary meta-narrative. The analysis of social innovations and technological innovations in this way allows for the identification the different aspects of each form of innovation which are most effective in promoting sustainability, the factors that differentiate one from the other, and what aspects constitute good practice. This approach allowed for the examination of social meaning emerging from data as it illustrates the discourse around events. Further, it allowed for an exploration of the relevance of these social phenomena by examining the resonance of key events with a variety of ecological citizens (represented here by the case studies) and their attitudes and opinions to these events.

This approach situates the case studies in the context of the different perceptions of the same event, the societal debates, and allows for a comparative analysis of the perceptions of innovators and scientific, social, political and economic narratives within the sustainability discourse at different societal levels. This comparative analysis defines the boundaries of the sustainability discourse and identifies where to target new actions to promote further engagement with environmental responsibility (e.g. through technological innovations).

4.5. Summary

This Framework approach is a suitable qualitative analysis method from which to explore the themes of the BiMEC model individually and how they contribute collectively to the model. It

is through the examination of a risk discourse in the context of human rights and collective responsibility that sustainability emerges as a cosmopolitan discourse in response to, and through, ever-changing knowledge constructs which promote innovative solutions to these risks. These solutions include the exploration of how innovation opens decision-making processes to the public by creating vehicles for communication which inspire environmental responsibility. In this thesis research findings are analysed in the context of the legal, policy and scientific dominant discourses/meta-narratives, constituting a sustainability meta-narrative. The following two chapters present the findings of the empirical research.

5. Chapter 5: Findings I: Social Innovation for Sustainability in Ireland

5.1. Introduction

This chapter presents an overview of the current socio-political context in which the sustainability debate exists in Ireland and examples of social innovators active in creating and promoting sustainability discourses. I provide an overview of each of the social innovation case studies and examine them in the context of the main themes of BiMEC model. The purpose of this is to illustrate the usefulness of the model via empirical examples that either proves the prevalence of these themes in the public sphere discourses or highlight their absence. The latter illustrate areas where social innovators can improve their capacity to act as ecological citizens through the better use of knowledge to access public participation mechanisms in decision making.

The case studies illustrate the main organisations involved in driving sustainability as a contemporary meta-narrative, the emphasis placed on different themes within the model by these different actors (who are themselves ecological citizens), and how this illustrates the current state of the sustainability discourse in the public sphere. This information allows for the examination of prominent social innovators and the forms of communication employed in driving the sustainability agenda. Finally, I also identify the main challenges which remain for social innovators.

Specifically, this highlights the importance of the concepts of health and human rights in driving the sustainability discourse, and the role innovation plays in opening these spaces up to ecological citizens who themselves support democratic processes. This model of ecological citizenship allows for the critical evaluation of collective responsibility in the risk society.

This chapter sets out the socio-political landscape in which social innovation driving sustainability are emerging; namely Ireland.

5.2. Ireland, the environment and health: a background and policy context to the sustainability discourse

The following sections provide an overview of Irish civil society, the use of media among the general population, the state of the sustainability discourse, and the role of health and sustainability as it exists in this Irish context.

5.2.1. Overview of the Republic of Ireland

The Republic of Ireland covers 26 of the 32 counties on the island, the remaining six being under the jurisdiction of the UK. The Constitution adopted in 1937 gave the state a republican character, with an elected but non-executive President as head of State. There are two houses of the Oireachtas (parliament) which is the supreme law-making body, subject to the Constitution and since 1973, to the EU. The Constitution can only be changed by referendum. The Republic of Ireland has been a very stable liberal democratic state, influenced by the beliefs that power resides in the people and is exercised only on their behalf by elected representatives inspired by the American and French revolutions (Mooney et al., 2008).

The government department responsible for environmental law and sustainability in Ireland is the Department of Communications, Climate Action and Environment. Other departments who are heavily engaged in the development and implementation of policy relating to the main themes of the BiMEC model are the Department of Agriculture, Food and the Marine and the Department of Housing, Planning, Community and Local Government. The Department of Health oversees health policies and state bodies. Innovation policies are mainly under the remit Department of Jobs, Enterprise and Innovation. Human rights law and access to justice are within the remit of the Department of Justice and Equality. Other important actors include the resource management, energy and waste sectors operators such as Electricity Supply Board (ESB), the Environmental Protection Agency (EPA), Sustainable and the Energy Authority Ireland (SEAI).

Science Foundation Ireland and other research focused institutes, universities and private innovators represent the scientific and academic sectors. Innovation within Small to Medium Enterprises is supported by Enterprise Ireland, Ibec and the Irish Small and Medium Enterprise Association, and the Small Firms Association. There are also a plethora of large businesses

and organisations/groups in Ireland (e.g. Google, Facebook, IBM, the Dublin Chamber of Commerce, etc.) who contribute to the sustainability discourse.

Finally, the media play an important and central role in Irish life with a large newspaper readership and a very high number of the population online, a high smartphone saturation, and a high volume of the population active on social media: this is examined below in more detail[53].

5.2.2. Traditional and contemporary media and Ireland

Ireland traditionally has had a high rate of newspaper readership and a wide range of both local and national newspapers. Public service broadcasting on radio and television remain the most popular way to receive news[54]. Several radio stations support public discourse through the practice of live phone-in, RTE's Liveline, or interactive programmes where listeners participate directly in discussions, submit questions, or offer comments to the presenters to read out or ask of guests. It is an important public service in Ireland and heightened the awareness, and resonance, of issues of public concern via a vibrant national public sphere. The employment of online communications (e.g. Email and Twitter) have become a central aspect of these shows where members of the public can send an immediate response, share their thoughts, or opinions about news items.

Between 2000 and 2015 the number of households in Ireland with access to the Internet increased from 60% to 81%, while the number of households with access to computers rose from 25% to 83% (OECD, 2015)[55]. As of the 4th quarter of 2013, there were over 1.5 million internet subscriptions in Ireland, with 99.5% of these being Broadband internet connections[56]. There was also 5.6 million registered mobile phone SIMS, 2.5 million were smartphones, and just under 4.5 million of these SIMs had 3G access[57]. However, as of 2013/2014 only 16% of Irish adults claimed to read the newspaper online, with 80% preferring

[53] Virgin Media Digital Insights Report: https://www.virginmedia.ie/pdf/VM_IE_Digital_Insights_Report.pdf

[54] Special Barometer 78: http://ec.europa.eu/public_opinion/archives/eb/eb78/eb78_media_en.pdf

[55] OECD Innovation and Technology Data: http://data.oecd.org/ireland.htm#profile-innovationandtechnology

[56] Commission for Communications Regulation- Irish Communications Market: http://www.comreg.ie/_fileupload/publications/ComReg1419.pdf

[57] Joint National Readership Survey: http://www.jnrs.ie/pdf/Intro2013-2014.pdf

the printed copy. These percentages equate to over half a million and 2.9 million adults respectively. The Joint National Readership Survey (JNRS, 2014) states that online access is maintaining levels of readership of newspapers[58].

The Irish Digital Consumer Report tells us that there are over 2.3 million active Facebook users in Ireland as of 2013, with 1.7 million people accessing Facebook via their smartphones. There are approximately 600,000 active Twitter users in Ireland as of 2013. 33% of Irish people do not use social networks (Ibid).

The Special *Eurobarometer 416* shows that 62% of Irish people report receiving information about the environment through television, 45% through newspapers, and 43% through social media[59].

These findings demonstrate the importance of the internet as a form of communication and medium of information sharing between individuals and between businesses. The large growth in access to the internet combined with ever increasing social network use highlights this. It is, of course, not an Irish but a European and global phenomenon. 65% of the EU population use the internet daily in 2014, compared with less than a third (31%) in 2006[60]. Eurostat figures also show an increase in the percentage of individuals participating in social networks with an increase of individuals creating profiles or posting messages on social media sites such as Facebook and Twitter by 10% over the last four years[61]. The fact that 65% of individuals use the Internet daily demonstrates the growing importance of the internet in the day to day lives of Irish citizens. For example, the percentage of individuals who never use the internet has halved from 32% in 2008 to 16% in 2014[62].

5.2.3. Ireland, civil society and the environmental movement

Between 1922 and the 1950s Ireland was essentially a subsistence farming country (Baker, 1990). In the period between 1922 and 1958, the prevalent policy was of economic nationalism or self-sufficiency evident in the Republican-Nationalism of the time. From 1958,

[58] Ibid.
[59] Special Barometer 416: http://ec.europa.eu/public_opinion/archives/ebs/ebs_416_en.pdf
[60] Internet usage by individuals in 2014: http://ec.europa.eu/digital-agenda/en/news/internet-usage-individuals-2014
[61] Eurostat: http://ec.europa.eu/eurostat/web/information-society/data/database
[62] Ibid.

the Industrial Development Authority (IDA) was re-orientated to attract foreign investment. The economic strategy changed welcoming the newly emergent multinational companies to establish themselves in Ireland. By the late 1960s, the island had undergone a radical change. It had developed an urbanised economy through the growth of export-orientated economic expansion. Changes in economic policies reflected other radical social changes including population growth for the first time since the 1840s, a rise in the general standard of living, the introduction of non-fee paying secondary level education and increase access to third level, the arrival of television in 1962, and a decrease in Irish censorship. These were the first signs of the emergence of a non-Irish centric cosmopolitanism spurred on by increased employment, and an increase in travel and cultural exchange. Ireland remained far behind its European neighbours at this stage regarding industrialisation.

As many Multi-National Corporations (MNCs) began investing in Ireland from the mid to late 1970s, the early 1980s saw substantial opposition to the perceived risks these companies brought with them. The rapid pace of development from this time until the end of the Celtic Tiger era in 2007 prompted a rapid onset of ecological problems for which Ireland and Irish legislation was unprepared and ill-equipped. A national risk consciousness grew out of these single issues and, concurrently, general environmental awareness arose which was mediated through the potential health risks from climate change. This encouraged an early sense of collective responsibility on a national level.

Historically, Irish civil society has been deeply influenced by two key 'non-state' arenas, which are religion and sport (Mooney, 2008; O'Sullivan, 2007). A third key element of the social dimension developed around political organisations. Between them, these three institutions provide dense networks, at both national and local levels, within which practices of community-building take place (Mooney et al., 2008). A second tier of the institutional system in Ireland are the social partners - a formally established committee of representatives from business, trade unions, and farming who lobby the government on behalf of their representatives. In 1996, an additional pillar was added to Social Partnership, the 'community and voluntary pillar' representing NGOs and community groups (for environmental protections and heritage groups). This pillar valorises the implementation of policies that require public participation which corresponds to risks to human rights. A vibrant civil society

does not, however, imply that Irish citizens have access to political decision making. It is retained by centralised government structure (Mooney et al., 2008).

Social Partnership was established in 1987 as a way of improving governmental policy decisions by incorporation the advice of the members from different sectors of society including enterprise and business, and trade unions. Social partnership emerged in Ireland in response to an economic crisis and collapsed in the face of one. After its collapse, there was little to discuss in the context of the worst recession in the history of the state, under the conditions of the bailout programme and the diktats of the Troika. The main labour relations agreements active in the public sector during this period were the Lansdowne Road and Haddington Road Agreements.

Two strands in state policy towards civil society in Ireland still exist. On the one hand, the state is prepared to fund much voluntary effort, recognising that this is an economically effective way of achieving goals for society. Voluntary groups are funded alongside the provision state of services. In return, the positions of voluntary groups are considered within the parameters laid down by the state for defining 'important social problems' and the appropriate way to deal with them. The practice is most evident in the areas of poverty, health, drug and alcohol use, and rural development. On the other, the state has taken organised interest groups within the society into an official 'partnership' arrangement which allows them to provide input in public policy-making. In theory, this approach enables the establishment of a 'consensual' form of policy making and secures the compliance of the membership of the interest organisations with policy decisions. In reality, policy and decision making remains the remit of political actors only. Improvements in the access to decision making is a central issue for ecological citizenship and grassroots social movements/niche level innovators.

New social movements (NSM's) began in Ireland in the 1960s and 1970s (Baker, 1990; Peillon 1995; Clancy 1995). Examples include the women's movement, single issue groups (e.g. against the establishment of the incinerator at Ringaskiddy in Cork), consciousness raising, gay rights and the environment. NSM'w brought a variety of issues to the Irish public sphere including health risks, lifestyle and quality of life, economic reform, alternative energy resources leading to Green Politics. Comhaontas Glas, an alliance of environmental groups,

became the Irish Green Party. The Green Party represents the formal institutionalisation of the rise in environmental awareness in Ireland. Their remit was to engage environmental discourses across a wide range of issues on national and international levels.

In Ireland, social movements and the NGO sector represent one part of civil society. Cohen, in 1999, argued that this underestimates its capacity 'as a dynamic, innovative source for articulating new concerns, developing projects, forming new identities, and generating and contesting new norms' (Smelser et al., 1999: 266). Informal social networks and social movements provide dynamism and innovation in the public sphere. Grassroots, institutionalised social movements, and networks define this form of civil society. They are less focused on ameliorating the effects of Irish socio-economic development on marginalised groups, and more focused on interventions which encourage public awareness and behavioural change. These groups include social justice and development aid groups (Amnesty International, International Organisation for Migration), a wide range of environmental groups and networks (see case studies below), food (Irish Organic Farmers and Growers Association, Irish Farmers Markets), cultural and civic (Migrants Rights Centre Ireland) groups. Many of these groups advocate an alternative vision of Irish social, economic or cultural life to that which they perceive to be endorsed by the state. They often achieve high public visibility but lack the access to policy communities which would give them some influence over policy makers.

The environmental movement in Ireland remains fragmented, complex and duplicitous, even disparate and contradictory. This history suggests that the movement towards ecological citizenship is a series of projects responding to the environmental crisis creating a governance based political system that, as of yet, does not exist “premised upon global or species solidarity...and co-responsibility” (Falk, 1996: 139). I argue that it can become coherent by situating the core issue of health as a human right at the centre of environmental discourses. If this process is to be imagined as a political project, and not the expression of ideology, it will need to develop a constitutive character.

The making of decisions leading to policy formation in a democratic society involves the multifaceted interaction of many groups including government ministers, civil servants, politicians, media and lobby groups / collective organisations (Barry, 2009). In theory, it is

open for any citizen to make a case to government for changes in policies. In theory, the government also listens carefully, weighs options and makes the best decision for everyone. In reality, an individual's capacity to influence policy decisions is dependent on other factors including their access to key resources (e.g. education, social class, current socio-economic status, finance), and related peripheral factors (having access to policy-makers, understanding how the political and legal systems work, and the capacity to communicate a message in an articulate and effective manner). The failure of the traditional centrist decision-making procedures which involved the legislation for, and implementation of, policies relating to environmental protection can be viewed, in part, as a failure to incorporate the broader opinions of the public into proceedings. Inclusive actions have the potential to improve decision-making procedures and encourage innovations in democratic processes.

Since 2008 there has been a momentum within Irish civil society to address the risks posed by climate change and around sustainable energy production (Davies, 2005). An increasing number of new environmental grassroots initiatives are emerging which address local issues, but who also use new sustainable technologies to address climate risks, promote their causes by using new communications technologies to disseminate their message, and empower themselves by accessing larger communities of interest. In some cases, these were, as a result, autonomous initiatives, in others, they were projects and networks facilitated by government agencies and funds from the EU (ibid). Meanwhile, Irish environmentalism became integrated into social partnership structures and now constitutes the fourth societal pillar.

A systematic governance based model that enables open and consistent public participation has yet to emerge in Ireland. Proper governance could define the parameters of social policies which support the effective administration of social services. To examine the dynamics of sustainability discourses, I examine networks of organisations engaged in health and environmental discourses in the public sphere, as well as those involved in the design of strategies and policies. It is at the communicative level that mechanisms can be identified which support the engagement of groups with the formal state, and semi-state, institutions in decision-making processes. In the next section, I examine the history of the environmental movement in Ireland, the challenges that it has overcome since its inception, and current trends towards ecological citizenship in Ireland.

5.2.4. Environmental governance in Ireland

A landmark in Irish environmental policy was the establishment of the Environmental Protection Agency (EPA) in 1993 and the adoption of a new approach to the regulation of industry and other bodies which had significant environmental impact. Local authorities continue to have responsibilities for implementing environmental policy, including EU policy. The EPA has a monitoring role and powers of sanction over local authorities and economic entities operating in Ireland. They also have a central role in disseminating information about the Irish environment to the public and policy makers alike.

The EPA report on Irelands Environment (2007) summarises the main challenges for Irish environment as: a) addressing the risks presented by climate change (e.g. flood prevention); b) reverse environmental damage was already done (e.g. water pollution, soil contamination, air quality); and c) make environmental considerations an integral part of everyday life[63]. In 2012, the EPA report on Irelands Environment focuses on the following revised goals: a) valuing and protecting our natural environment; b) building a resource-efficient low-carbon economy; c) putting the environment at the centre of our decision making; and d) implementing environmental legislation[64]. The recent EPA report on the Irelands Environment (2016) refocuses its main goals as: a) environment, health and wellbeing; b) national response to climate change; c) the implementation of legislation; d) the restoration and protection of water quality; e) sustainable economic activity; f) preservation of biodiversity; and g) community engagement[65].

While there have been improvements through the inclusion of environmental issues within a diverse range of policies (e.g. energy, housing, health, transport, waste, and transport)[66] there remains a need for greater integration of environmental considerations across all areas which would bring Ireland into compliance with international and European legislation and agreements. Even as these policies are ratified in Irish law, their enforcement has been

[63] Environmental Protection Agency: http://www.epa.ie/#&panel1-1

[64] Environmental Protection Agency: http://www.epa.ie/media/Executive%20Summary.pdf

[65] Environmental Protection Agency: http://www.epa.ie/pubs/reports/indicators/irelandsenvironment2016.html

[66] Department of the Environment, community and Local Government: http://www.environ.ie/en/Publications/StatisticsandRegularPublications/StrategyStatements/FileDownLoad,41001,en.pdf

applied poorly. There is a need for a stronger willingness and culture of compliance to advance and effectively implement environmental legislation in Ireland. The focus of 2016 represents a welcome approach to the implementation of policies which have direct impacts on the quality of life of individuals and communities.

This reflects the contemporary state of environmental sustainability which is recognised in government policies and national development programmes[67] and the increasing appreciation of the importance of collective responsibility for the environment by a growing number of social actors in Ireland[68]. What remains a challenge is the inclusion of sustainability as a fully integrated feature of Irish citizenship.

For example, while Ireland generally has good quality air and water, in some instances, a variety of respiratory and gastrointestinal illnesses can be associated with poor air and water quality. Continued action to enhance air quality and to limit public exposure to pollution, hazardous chemicals and noise are key priorities in reducing the impact of environmental factors on public health[69]. While the EPA are highly effective in monitoring the Irish environmental and polluters, the Irish government can still do more to engage the local knowledges of their citizens in the promotion of innovative ways of identifying and addressing environment risks. The failure of successive governments to engage the people fully, and promote ecological citizenship, represents a failure of the current models of governance to address these democratic deficits and support a new model of ecological citizenship which focuses improving these governance structures. The BiMEC model invites all citizens to take part in decision making processes.

The empirical evidence examined here illustrates the current state of social innovation and ecological citizenship. By analysing this data, we can explore the democratic deficits and suggest means by which this form of citizenship can be implemented. In this case grassroots activities represent an existing momentum exemplified by niche innovators which may be dispersed at present and may be more effective when coordinated- e.g. anti-austerity and

[67] Ibid

[68] Special Eurobarometer 416: http://ec.europa.eu/public_opinion/archives/ebs/ebs_416_en.pdf

[69] Department of the Environment, community and Local Government: http://www.environ.ie/en/Environment/SustainableDevelopment/PublicationsDocuments/FileDownLoad,30452,en.pdf: 74

anti-water charges campaigns in Ireland which have proven to be a platform for left of centre political movements such as the Anti-Austerity Alliance, and the People Before Profit political parties.

For example, the *Community Renewable Energy in Ireland*[70] (2011) report by Comhar provides a comprehensive overview of community-based energy generation arguing that it is now an emerging phenomenon in Ireland and can play an important role in job creation, income generation for local economies, enhancing support for renewable projects, and ensuring community involvement in Ireland's transition to a low carbon society (2011:1). Other examples include the SEAI *Sustainable Energy Communities Network* and the *Energy Smart Communities* in Dublin and the EPA *BeGreen programmes*. Each of these programmes provides information freely available to individuals and communities interested in employing new techniques and technologies to make their home and community more sustainable through energy saving, waste management, reusing and recycling, and developing community-based programmes. The connections between climate change and human rights are also prominent in the work of organisations such as *Social Justice Ireland* who are increasingly integrating sustainability and deliberative democracy into their narratives supporting equity in adaptive capacity.

These case studies illustrate the growing attempts to integrate and experiment with deliberative democracy in Ireland. There is also considerable resilience within the socio-political and socio-cultural domains that may prove inertial. Niall Crowley, former CEO of the Equality Authority, in 2012 argued that the community sector in Ireland had become 'lost in austerity'. He suggested that it was embroiled in the agenda of survival and it had failed to transform itself into a movement in society and remain a vibrant force for the advancement of values of equality, justice, environmental sustainability and participative democracy. Therefore, one can argue that while support for deliberative democracy gathers momentum, distinct structural and cultural barriers to ecological citizenship exist in the Irish context (Hardiman, 2012; Mullally, 2012; Fox and Rau 2017).

[70] Comhar: http://files.nesc.ie/comhar_archive/Comhar%20Papers/Comhar_Paper_11_2011.pdf

5.3. Case Study of Irish social innovators in the field of sustainability

Employing the Framework analytical approach to social innovation, it becomes possible to identify the gaps between strategies which support sustainability and their implementation to (e.g. health as a human right). Identifying these gaps illustrates the strengths and weaknesses of each theme at each societal level and identifies where democratic deficits exist. It also allows for the identification of deficits in this draft BiMEC model, highlighting areas that require refinement. In this way, the BiMEC model becomes efficient in identifying and supporting the management of democratic deficits.

5.3.1. Case study overview

While many of the case studies could be used to illustrate multiple themes, I chose to analyse the case studies in the context of individual themes most clearly represented by the main aims of the innovation. Conducting a qualitative analysis of this type allowed for clearer interpretations of the data and what it says about the BiMEC model. I present a brief outline of the case studies below.

#	Theme	Name	Description
1	**Health**	Cahir Farmers Market	The Cahir Farmers' Market is a prime example of a local economic collective involved with the agri-food industry supporting sustainable development through the production and distribution of local food to local people, often sustainably produced.
2	**Health**	The Suir Fishermen's Federation (SFF)	The SFF is an independent social movement that works to ensure the sustainable use of Ireland's inland waterways (with emphasis on the protection of inland fisheries) by carrying out a range of monitoring and regulatory actions.
3	**Human Rights**	Shell to Sea	The aims of the Shell to Sea project include renegotiation of the terms of pipeline that will not expose the local community in Erris to health, safety and environmental risks. They also seek justice for the 'human rights abuses' suffered by their campaigners.
4	**Human Rights**	COMHAR and NESC	Comhár was a social partner whose operations have been taken over by the National Economic and Social Council (NESC). NESC is a social partner that advises the Department of An Taoiseach on environmental and sustainability issues.

5	**Human Rights**	Eco-Unesco	ECO-UNESCO is Ireland's Environmental Education and Youth Organisation affiliated to the World Federation of UNESCO Clubs, Centres and Associations (WFUCA). Its key aims are to promote understanding and awareness of environmental issues as well as the protection and conservation of the environment.
6	**Human Rights**	Environmental Pillar	Environmental Pillar is made up of 28 national environmental NGOs who work together to represent the views of the Irish environmental sector. Its primary function is to act as an advocacy coalition.
7	**Human Rights**	Friends of the Irish Environment (FoIE)	FoIE is a group of environmental activists that seeks to ensure Ireland implements European environmental law adequately, through various monitoring and advocacy actions.
8	**Human Rights**	Heritage Ireland	Heritage Ireland remit is to maintain the built heritage in State care. It has an active role in the presentation of, and facilitation of access to, these heritage sites.
9	**Human Rights**	Irish Environmental Network (IEN)	IEN is an advocacy group that represents a variety of environmental, social innovators in matters of capacity building and funding needs to policy makers at the government level.
10	**Innovation**	Cloughjordan Ecovillage	Cloughjordan Ecovillage is a registered educational charity and an internationally recognised destination for learning about sustainable living. The ecovillage has over 100 residents living in high-performance green homes, over 20,000 newly planted trees and Ireland’s largest renewable energy district heating system.
11	**Innovation**	Cultivate	Cultivate is a practical sustainability organisation that operates out of the Cloughjordan Eco-village in Co. Tipperary, operating a variety of credited and formal education programmes in areas such as permaculture and sustainable building design. Additionally, Cultivate operates a national network of partners, strengthened by associations with industry experts, entrepreneurs and educators, which spreads awareness about sustainability practices with which they are involved.
12	**Innovation**	Foundation for the Economics of Sustainability (Feasta)	FEASTA is an independent social enterprise that operates as a think tank, exploring the characteristics of a truly sustainable society, while disseminating the results of this exploration to the widest relevant audience.
13	**Innovation**	Friends of the Earth (FoE)	FoE is an international network of social innovators that campaign for environmental justice and sustainability via coordinated actions at national level.
14	**Innovation**	Green Business	Green Business operates in conjunction with the EPA to provide free advice and resource efficiency services to all types of SMEs in Ireland.
15	**Innovation**	South Eastern River Basin Management (SERBMD)	The SERBMD is an administrative body that is responsible for the protection and improvement of all surface waters in the South East of Ireland, in accordance with the EU Water Framework Directive.

16	**Innovation**	South Regional Fisheries Board (SRFB) / Inland Fisheries Ireland	Inland Fisheries Ireland and the South Regional Fisheries Board are responsible for the protection, management and conservation of inland fisheries and sea angling resources.
17	**Innovation**	Teagasc	Teagasc is the agriculture and food development authority in Ireland whose main aim is to support science-based innovation in the agri-food sector and the broader economy that will underpin profitability, competitiveness and sustainability.
18	**Innovation**	The Tipperary Energy Agency (TEA)	TEA was established in 1998 as a collaboration between the various Local Authorities in Tipperary and Limerick IT, as a 3rd level education institute and an independent social enterprise with a goal to support sustainable energy use in all sectors.
19	**Innovation**	Tipperary Institute (TI)	TI is an offsite campus location of the Limerick Institute of Technology that, due to its situation in the environmentally progressive area of South Tipperary offers a range of 3rd level and professional courses in sustainability.
20	**Sustainability**	An Taisce	An Taisce is the *National Trust for Ireland* that works to preserve and protect Ireland's natural and built heritage.
21	**Sustainability**	Bird Watch Ireland	Bird Watch Ireland is a registered charity dedicated to protecting Ireland's wild birds and their habitats.
22	**Sustainability**	Carraig Dulra Organic Farm	Carraig Dulra is an independent social enterprise in Co. Wicklow which assists and educates people in day to day sustainability practices.
23	**Sustainability**	Consensus	CONSENSUS uses social science and collaborative research methods to explore innovative solutions for sustainable household consumption in Ireland with research centred around six key themes: Water, energy, food, mobility, lifestyle and governance.
24	**Sustainability**	Coomhala Salmon Trust	Coomhola Salmon Trust has produced the innovative and compelling 'StreamScapes' Aquatic & Biodiversity Education Programme which is used throughout Ireland and internationally, hosts important freshwater biology research projects, and contributes to the development of the Integrated Catchment Management approach in supporting the implementation of Water Framework Directive.
25	**Sustainability**	Ecobooley	Ecobooley was established in 1998 as an Eco-Tourism initiative supporting the idea of the Irish Eco-Cottage as a sustainable destination for holiday makers.
26	**Sustainability**	Global Action Plan Ireland	Global Action Plan (GAP) is an environmental NGO focusing on people and how they can take practical action in their everyday lives for a better world. GAP is part of an international network of organisations working for a common goal: to empower people to live and work increasingly sustainably.
27	**Sustainability**	Irish Seal Sanctuary	The Irish Seal Sanctuary is a professionally run wildlife hospital, rescue and rehabilitation facility that operates as an independent charity acting to protect and conserve various marine mammals (including seals) and birds.

28	**Sustainability**	Sustainable Water Network of Ireland (SWAN)	SWAN acts as a coalition of various environmental organisations involved in the protection and conservation of Ireland's water resources and advocates for these organisations at national level.
29	**Sustainability**	VOICE	VOICE is a member-based Irish environmental charity that empowers individuals and local communities to take positive action to conserve our natural resources. It also lobbies at a governmental and corporate level for the development of stronger policies, particularly about waste and water issues.
30	**Sustainability**	Waterways Ireland	Waterways Ireland has responsibility for the management, maintenance, development and restoration of inland navigable waterways principally for recreational purposes. The waterways under the remit of the body are the Barrow Navigation, the Erne System, the Grand Canal, the Lower Bann, the Royal Canal, the Shannon-Erne Waterway and the Shannon Navigation.

Table 1: Brief overview of the social innovation case studies analysed.

I analysed the case studies presented above in accordance to the emphasis placed on the main themes of BiMEC model and what this says about the promotion of sustainability and ecological citizenship.

5.3.2. Health: social innovation case study analysis

The subthemes that emerged during the examination of the health theme from the desk research include *biological/physical health*, *psychological,* and *social health and wellbeing*. I made connections between health and the environment are in the areas of water (Suir Fishermen's Federation) and the local food chain (Cahir Farmers Market).

Example 1: Water and Health: The Suir Fishermen's Federation (SFF)

The Suir Fisherman's Federations (SFF) was set up by a Dutch national who realised the potential for water and fisheries as resources to be used sustainably in Ireland. The SFF is primarily an umbrella organisation that represents the views of anglers in the South Tipperary. The group comprises of a board of five full-time members and liaises with the other members through their activities as fishermen and their individual clubs.

The interviewee from the SFF identified that water quality in the area was in decline. The SFF was established to combat this decline, to maintain fish stocks, the quality of water in the

Suir, to add to the development of angling tourism, and improve the quality of life for the local population.

> *"Managing fish stocks is the main thing. That's completely out of our control. All we can do is try to influence the people who have the influence on who do it. We see what's there and what should be there and we try to influence the politicians."*
>
> (Founding member of the SFF)

Several small fishermen's clubs in the local region comprised this group. They have regular contact with the Inland Fisheries Ireland (the state agency responsible for the protection, management and conservation of Ireland's inland fisheries and sea angling resources).

The SFF are engaged locally, with national bodies, and other groups in different countries (anglers, water preservation communities, etc.). They also bring together diverse stakeholders such as farmers, fishermen, individual, local and national policymakers, engage in local and global discourses and are advocates for the national and international implementation of sustainable practices based on experiential and accredited knowledge. They are social innovators whose remit is to protect water and have a locally specific yet globally relevant remit.

> *"The rivers and streams are an amenity for the area, and that resource was sliding back, it was getting worse every year. On the other hand, there are more people who want to enjoy the water; there's more leisure time, there's more time to stand at the river bank, or at lakes or whatever. Mostly for catching fish or just walking there. So that was our aim."*
> *(Founding member of the SFF)*

I discussed the potential for angling tourism with the interviewee. He suggested that it is a sustainable economic model which would be the basis of protecting water quality while focusing on economic activity. Focusing on the development of sustainable salmon fishing on the Suir would improve the quality of life of the community.

One of the main challenges to sustainable salmon fishing, they identified, was driftnet fishing off the coast catching salmon in the sea on their return journey to spawn upriver. Catching the salmon in this way prevents them from replenishing their stocks in the river. A member

of the SFF provides an analogy: “we are building a beautiful highway [but] there’s no point in building it if there are no cars to use it”. He suggests that the sustainability of the fish stocks relies on their immediate protection, precluding fishing with drift nets, and the commercial fishing of salmon in offshore fishing for 5 to 10 years.

Inland Fisheries Irelands position:

> “*The ICES [International Council for the Exploration of the Sea] Advisory Committee on Fishery Management has advised that both Southern European Sea Winter and Multiple Sea Winter stocks are considered to be at risk of suffering reduced reproductive capacity and has recommended, that: reductions in exploitation are required for as many wild salmon stocks as possible to increase the probability of the complex meeting conservation limits*.”[71]

The SFF argue that angling can be a lucrative sport with individuals venturing as far as Russia, Alaska or Iceland, where there is not enough availability for the current angling tourism market. Individuals are willing to go to extreme lengths to avail of these facilities paying €7,000 or 8,000 for a week to fish rivers in these countries. Ireland is considered a more accessible country/area and, at roughly €5,000 a week, could prove substantially cheaper to the aforementioned markets while also providing better facilities in the local communities than these other resorts.

Among the Suir Fishermen’s Federations membership, directly links to health and human rights were not made in their responses. They did, however, focus heavily on awareness raising, encouraging participation of the local community in sustainable projects and innovations, the importance of good water quality to the quality of life of the individuals and the communities in the area, and public participation in the discussion to solutions to these problems. Encouraging actions which address environmental risks to health indicates that it is the biopsychosocial approach to wellbeing is, in fact, commensurate with their philosophy.

The SFF promote increased consciousness of environmental risk, their awareness of their civil, economic and political responsibilities to act on behalf of the community and the

[71] Fisheries Ireland: http://www.fisheriesireland.ie/Salmon-Regulations/salmon-regulations.html

environment itself building a better quality of life that is inclusive of sustainable economic and environmental resource management. The continuous decline in commercial fishing catches, in size and number, are illustrative of the increasing unsustainability of existing fishing practices. Awareness of the interconnectedness of nature and society must be recognised. Actions need to be taken to ensure that awareness is translated into collective responsibility. Damaging rivers and fish have social, economic and cultural repercussions for the quality of life for ecological citizens. Consequently, I argue that they should have a say in determining the future of their natural resources. Therefore, adaptive capacity is measurable by ones' access to resources and their access to the decision-making processes that determine how their management.

In summary, good water quality is a fundamental indicator of environmental wellbeing and links the social and environmental health on a basic level. It links the quality of the local water sources with the individual citizen by their consumption of the water, the aesthetically pleasing quality of water on mental health, the availability of water as a basic resource for consumption, the availability of water as an amenity for the community, and economic activity (e.g. agriculture, manufacturing, pharmaceuticals). Finally, the SFF promote innovative ways of protecting this fundamental resource by encouraging others to engage in the discourses around water quality, illustrating why it is a fundamental resource which supports all human being's quality of life.

Example 2: Food: Cahir Farmers Market

Cahir is a small town in South Tipperary about 18 miles from the county seat, Clonmel. It is sited on the banks of the river Suir and has grown up around a 16th century fortified castle which attracts a lot of tourism, mainly day-trippers, during the summer months. There was a centuries-long tradition of 'fair days' in small towns around Ireland when farmers brought their cattle into town to sell. Cattle fairs often included street entertainers (musicians, ballad singers, etc.) and some stallholders selling butter and other home produce, or clothing for farm work (overalls, Wellington boots, etc.). These fairs came to an end in the 1970s, when the national farmers' organisation (IFA) established a series of marts at which cattle are auctioned. Cahir Farmers' Market was set up in 2001, the first one in Tipperary. The Cahir Farmers' Market is a prime example of a local agri-food collective supporting sustainable

development through the production and distribution of sustainably produced, and local food to local people. It has been followed by markets in Clonmel and Carrick on Suir and has inspired the establishment of more food markets in Tipperary Town, Thurles, Nenagh and elsewhere.

The Cahir Development Association established the Cahir Farmers Market as they felt that "*there should be some focus on bringing people into town on Saturdays because the town of Cahir every Saturday was practically deserted*" (stallholder informant) and thought a market would be the answer. They envisaged the market at which a wide variety of produce, particularly products which were *'indigenous to the area', were sold*. They found a suitable site, in the car-park of an old grain store which had been converted into a craft shop, and persuaded the county council to provide water and electricity to the site. Most of the stallholders come from within a 10-mile radius of Cahir:

> *"As the [shopkeepers] will tell you now that Cahir on a Saturday morning is as busy as it is on a Thursday, it is every bit as busy as it is on Thursday. Saturday morning is just as good, and there is as much traffic in town from 9 o'clock onwards…We have brought people back into town, we have done what the traders wanted, and we are doing for ourselves something as well. We are doing a service for ourselves."*
>
> (Trader and Development Association Member)

I interviewed stallholders and engaged customers in informal discussions through which I gathered perspectives on the purpose of the market from representatives of both producer/seller and buyer groups. More than half of the customers I talked with were regular customers at the market. This is commensurate with the stallholders' perception that they sell largely to known and regular customers illustrating the discourse around food existing as vibrant in the process of '*re-traditionalising'* the local concept of community. For most of the stallholders, the Farmers' Market does not offer a full livelihood, but it does offer a better and more convenient return on production than other outlets such as selling to retail shops or even at the Country Markets. Traders rely on other sources of income (a pension from previous employment, cattle and other commodity farming, off-farm work, farm support payments and REPS payments, small LEADER grants, etc.) to supplement their income.

Networks of producers and direct sellers in Tipperary appear to have a high degree of 'local embeddedness' (Winter 2003). Besides relationships within Cahir market, many stallholders have extensive relations with traders at other markets and take a keen interest in how they are progressing. They also build up a considerable knowledge of other artisan food producers in the region, whether or not these are selling at Farmers' Markets. Local organic networks support relationship development. Visits are encouraged between producers, such as farm walks, and create occasions for the sharing and exchange of knowledge of organic growing and producing practices. Wider networks deriving from LEADER, local authorities or semi-state agencies also help to bring local producers and direct sellers into contact with each other.

All the Farmers' Market stallholders are, to a greater or lesser degree, embedded in local networks of relations, between stallholders, with other producers, and between producers and customers. However, these local networks are overlaid by larger regional and national networks, which both shape and support local patterns of interaction and create tensions within them. The tensions arise particularly around the idea of 'local food' itself, and what it is expected to contribute to rural development.

Most of the Cahir stallholders are interested in the re-localising the food system, even if there is some ambiguity around what to define as 'local'. The aim of the stallholders is to build up a regular pattern of transactions with residents and to convert their communities to the idea that ‘local food is better’. Other higher-level networks which shape the opportunities and practices of local food producers include the local authorities and their development and regulatory officers. The Environmental Health Officer regularly visited the Cahir market. They pay particular attention to anyone selling food products processed ‘at home’. There are those who are interested in it as the expression of an 'alternative' food movement and want to assess how much of a challenge it represents to the social organisation of 'conventional' food systems. There are others whose primary interest is in evaluating the contribution local food systems make to rural sustainable development. Without these movements, it seems probable that a local food project would not have been present at all in South Tipperary, and it is almost certain that networks around re-localised food exchanges would not have come into being.

The Healthy Ireland Report (2015) suggests that 37% of the Irish population are now considered overweight and a further 23% obese. The Cahir Farmers Market represents local social innovation heavily involved in the improvement of the physical health of the community through the production, and provision of, local and healthy foods. Readily available locally produced natural foods represent a benefit to the physical health of the individual through the reduction in the consumption of artificial pesticides, additives, sugars, salts, fats and other preservatives found in processed foods which have proven to contribute to a poor diet and in many cases increased weight.

The market also has a direct impact on the psychological and social health and wellbeing of the community. Specifically, health and environmental issues are now recognised as beginning to change consumer tastes: they are making links between the consumption of organic and natural food, the physical health of the individual, and the sustainability of the environment. These connections are exemplified by the impact of the Slow Food Movement in Tipperary. It acts as a catalyst for promoting a sustainable way of thinking about food and food production, and reinforces social and cultural connections through local activities, improving the quality of life and the wellbeing of the local inhabitants. It also provides opportunities to supplement incomes for local producers and farmers. Collectively it constitutes a physical innovation spaces. It is in these spaces that various stakeholders can engage in sustainability discourses focusing on innovation, and develop active sustainable practices. It also serves to connect the wider social community with the physical environment through an improved understanding and appreciation of food as a basic and valuable resource.

Summary of Health and the Environment Case Study Findings

The depletion of salmon stocks in the river Suir was the single issue around which The Suir Fishermen's Federation was founded. They engaged different actors involved in the management of water quality in Ireland across all levels of society. Other examples from the case studies illustrate active networking and collaboration in this area. For example, the Cahir Farmers Market link closely with networks of producers, and direct sellers in Tipperary thus appear to have a high degree of 'local embeddedness' (Winter 2003). Besides relationships within Cahir market, many stallholders have extensive relations with traders at other markets

and take a keen interest in how they are progressing, such as local organic food and artisan networks. Visits to producers, such as farm walks, create opportunities for the sharing and exchanging of knowledge of organic growing and producing practices.

Each of the case studies presented above illustrates the connections between health and the environment as catalysts for social innovation and how health is framed as an environmental issue. They illustrate the networks which emerge through the sustainability discourses and the effective the framing of risk events (evident in social interactions). They also highlight how these discourses support innovative solutions to environmental risks and promote the sustainable use of finite resources. Collectively, they confirm health that is a central category in the framing of sustainability and ecological citizenship. They also exemplify the potential social innovations spaces in promoting active ecological citizenship.

The second theme of the BiMEC model argues that health is a human right.

5.3.3. Human Rights: social innovation case study analysis

The subthemes which emerged in the desk research under the main theme of human rights included *the support of raising environmental awareness*, *grassroots processes and practices to share knowledge*, and *establishing more participatory democratic processes*. Few organisations were focused on the establishment of more participatory democratic processes as it relates to the environmental and health and wellbeing.

The case studies reviewed were found to be active in promoting *behavioural change as a result of collective intelligence*. Few, however, used interactive sharing platforms to help empower individuals who indicate a suboptimum use of technologies by organisations examined in their communications strategies. They were found to be mainly active in promoting environmental stewardship and self-efficacy.

Example 4: Raising Environmental Awareness: Irish Environmental Network

The Irish Environmental Network receives funding from the Department of the Environment, Community and Local Government. It supports and coordinates NGO activity and increases the impact of their individual efforts through engagement with sustainability discourses. They

also raise the public awareness of environmental risks and conservation challenges through campaigning and lobbying and practical conservation work:

> *"These organisations make a difference to the local environment through active research, conservation and protection programmes … They encourage current decision makers to take care of our natural resources through advocacy, planning and submissions to government policy. They help educate the decision-makers of the future through an array of individual education and awareness programmes, and they work together through liaison and co-operation to become ever more effective in ecological and environmental protection."* [72]

They are involved in "*capacity building and funding needs of its member organisations, all of whom are involved in one way or another in the well-being, protection and enhancement of the environment*"[73]. They achieve this through the support of individual projects and organisations who are involved in conservation work and protection of biodiversity, raising public awareness and education directly and in support of their organisations and national initiatives- e.g. through their support of the Green Schools Initiative. Advocacy, supporting individual and collective campaigns and lobbying at the local, national, and European level, also constitutes a central goal of the IEN.

The IEN acts as a form of broker between the micro level collective NGO organisations groups and the societal institutions as well as influencing the macro level sustainability discourse. They identify the health and well-being as fundamental rights, and the protection and enhancement of the environment as a valuable resource.

Example 5: Policy Implementation: The Environmental Pillar[74]

The Environmental Pillar creates and promotes policies that advance sustainability. It acts as an advocate coalition, promoting the agreed joint policies of its members to government at national, regional, and local levels. It also provides a channel for government and the other social partners to engage with the environmental sector on policy matters.

[72] Irish Environmental Network: http://ien.ie/
[73] Ibid
[74] Environmental Pillar: http://environmentalpillar.ie/about-2/

It is again a socio-legal collective which enables engagement between collectives and sustainability networks. They are also engaged in Public Participation Networks (PPN's)[75], an initiative launched by the Local County Councils enabling organisations from these groups to engage with each other and act on behalf of the public to ensure that these initiatives are more than discussion groups but are participatory. It has a network of 28 Irish environmental NGO's.

They have a significant online presence disseminating national and international research and recent reports, policy changes and new legislative measures. Their representatives speak at national and international fora on climate matters. They are also promoters of the local participatory democracy through the PPNs.

> "*[Local] Council will look to for nominations to all the local authority bodies/committees that the public is included in, as well as the new Local Community Development Committees (LCDCs). Local groups when registering with the local authority will self-select into one of three "Electoral Colleges" in the PPN, Community and Voluntary, Environmental or Social Inclusion*".[76]

Through these mechanisms, they meet their role as advocates on behalf of their members. They represent an important and well-connected voice in the sustainable discourse. As an advocate group of a large number of organisations, they would benefit from the additional communications capacity an online discussion platform would offer. It would open the discourse up to daily and weekly interactions enabling their members to engage in active discussions. It would also enable them to moderate discussion with other organisations and policymakers at the local and the national levels. It could represent a PPN type network based in the public sphere. It would enhance the provision of the mechanisms of governance they currently support for their members and their capacity to act in support of their member's rights to health and wellbeing.

[75] Ibid.
[76] Environmental Pillar: http://environmentalpillar.ie/public-participation-networks/

Example 6: Biodiversity and Heritage: The Heritage Council

The Heritage Council is a statutory body which acts as a policy advisor to the government and coordinated actions of other state bodies and International NGO's. Its main priorities include providing advice to the government, education through their Heritage in Schools Scheme and professional programmes, and their work with local organisations and communities and local partners. Through these mechanisms, they engage with lay actors, civil society, the national government, and the EU.

They are environmental advocates for the Irish citizens, engaging with the political institutions of the state providing policy advice and submissions to national government. They promote research through the provision of funding for projects in the areas of heritage management, walled towns grant, grants supporting County Heritage Plan projects, traditional farm building grants, and other projects which support the preservation, promotion, and enjoyment of Ireland national heritage. They also work with industry, helping to develop national biodiversity plans, working with NGO's, and making the links between experiential/tacit/lay/local and accredited/expert/scientific knowledge.

The national advisory function of the Council appears to be the one where the highest number of difficulties arise in their attempts to implement their strategic goals. An interviewee suggested that in its early years the Council tried to be too independent; *'in retrospect, I can see it was quite naïve, the way that we went about our business*'. When they *'hit a brick wall'* with their advice to some government departments, they decided to circumvent the state and, in some cases, turned to lobbying the EU Commission for support. From 2000 on, however, the then Department of the Environment *'clipped their wings'*, and they were brought *'a lot more under the cosh of the department'*. However, they retain good links with European Commission officials.

Ambivalent relations with the central state contrast with the close relations the Council is building up with local authorities. They argue for the management of heritage at the lowest, or most local, level appropriate. For example, under the *Actions for Biodiversity 2011-2016* local authorities are required to develop Local Biodiversity Plans for their areas in support of increasing public awareness and participation.

The Council also works closely with NGOs (Birdwatch Ireland, Eco-Unesco, etc.) and voluntary groups. It operates a local heritage grants scheme, where it invites applications from local community groups to apply for funding, assesses the applications, and assigns officers to work with the successful ones. One staff member argued that *'the only future for nature conservation [is through] empowering people and tapping into what's out there and making it into a feel-good factor, stop focussing on what they're doing wrong but focus on what they're doing right*'. The interviewee reviews an example of a local conservation project with mixed views:

> *"They were hugely committed, and they have great energies to achieve what they had, but I felt that they probably didn't see the potential for the site… I'm not too sure they appreciated just how important it was because of its geographical location, I mean there's very few wetlands in the vicinity, and the nature of birds is that any little bit of wetland acts as a magnet in the area... If they wished to try to attract wildfowl, for example, you do need quite specific habitat requirements, I mean with wet grasslands, you do need to know things like water level, what kind of vegetation, does it need to be heavily grazed in winter… They did have, you know, they wanted to do something in the locality, and they'd achieved a huge amount, I was impressed with what they had done there you know, but … the area could have benefited I think from a clear concept of the land, what could we use it for… I mean do they want to increase the areas for a different range of species, do they want it to become more important for breeding waders for example, then they'd have to implement a series of fairly specific management regimes."*
>
> (Interviewee from The Heritage Council)

The Council acts as a mediator, as a scientific body established to give sound advice to government agencies, and as an agency which is semi-independent from government and working to expand conservation on the ground promoting the inclusion of lay input and experiential knowledge. The approach taken by the council proves that accommodating public participation in decision-making processes is an effective platform for encouraging environmental awareness and socio-ecological innovation through sustainability discourses on a variety of societal levels. The activities of the council could be simplified and enhanced

by the provision of new forms of ICT which support better communications and encourage the implementation of their projects across a wider network of community groups, local authorities, and organisations in Ireland, and possibly Europe.

Example 7: Shell to Sea

The Shell to Sea campaign directly linked the risks to the environment and the health of the local individuals and the local community. According to their website:

> *"The Corrib Gas Field is a reserve of natural gas situated 80 km off the west coast of County Mayo containing at least 1 trillion cubic feet (TCF) of natural gas. The Corrib Gas Project, directed by a consortium of companies led by Royal Dutch Shell, seeks to bring the gas ashore at Glengad in the Barrony of Erris in North West Mayo and to pump the unrefined gas 9km inland through an inhabited area to a refinery located on a boggy hill where it would be cleaned and depressurized for sale and export... The Enterprise Consortium sought a site to build a gas terminal, and in 2003 they purchased 400km^2 of state forestry land from Coillte the state forestry agency...*
>
> *Instead of processing the gas at sea, the consortium intends to pump high-pressure raw gas to an unprecedented inland refinery where it would be processed for sale and consumption. The design concept of an inland refinery was drawn up to facilitate the further exploitation of Ireland's offshore oil and gas reserves. No other development models were meaningfully explored by the Corrib consortium, nor did the relevant government authorities ask the consortium to seriously examine other models. The main work on the ground began at the refinery site in spring 2005. Preparatory work began, and attempts were being made to stake out the route of the pipeline. All the problems regarding environmental and community concerns result from the refinery location."*[77]

The main risks identified include:

- Raw, unprocessed gas carried at extremely high pressure through a pipeline in an unstable bog where landslides are common.

[77] Shell to Sea: http://www.shelltosea.com/content/overview-corrib-gas-project

- Waste water from the refinery flowing into Carrowmore Lake, the source of drinking water for 10,000 people in Erris.

These represent real health and safety risks to local communities. The aims of the project include the renegotiation of the terms of pipeline that will not expose the local community in Erris to health, safety and environmental risks. They also seek justice for the 'human rights abuses' suffered by their campaigners to date. The organisation has arranged protests, brought court cases to the Irish courts based on the human rights and health risks, and promotes action through their provision of information on their website. It is the failure of this discourse to be engaged through participatory democratic discourses that represent a failure of the existing governance systems in Ireland.

Summary of Human Rights and the Environment Case Study Findings

Overall, human rights are a central issue for the case studies presented here. Through their networks, they act as advocates for the ecological citizens who voice concerns about the health risks posed by direct and indirect risks to the environment and heritage in which they live. These groups make a link between wellbeing and the environment and "a safe, clean, healthy and sustainable environment as integral to the full enjoyment of a wide range of human rights, including the rights to life, health, food, water and sanitation."[78]

They interpret these rights as the right to the sustainable management of the natural and built heritage, the right to decision making, the right to engage in collectively responsible social innovations and action, and the right to effective legal representation. These rights are enshrined in national and international legislation, and evident in policies, conventions and treaties (UN, EU, and Ireland). For example, in Ireland, access to information on the environment is a fundamental human right under international, EU and Irish law. The right to participate in decisions which may affect the environment is a basic human right secured by international, EU and Irish law. Detailed rules define when Irish citizens must be consulted on activities, plans, programmes and policies relating to the environment.

[78] Office of the High Commissioner for Human Rights of the United Nations: http://www.ohchr.org/EN/Issues/Environment/SREnvironment/Pages/SRenvironmentIndex.aspx

The findings of the case studies suggest that these grassroots movements, for the most part, support open, communicative forums with defined boundaries where the meaning of events are collectively interpreted. They suggest that a discourse promoting health as the foundation for sustainability as a fundamental right could serve as the basis of a platform upon which to build sustainability discourses which promotes practical action and social innovation. These collectives emerge at the cosmopolitan and the local levels and are the basis for the establishment of collective responsibility through the real and virtual public spheres.

5.3.4. Sustainability: social innovation case study analysis

The subthemes emerging from the desk research under the theme of sustainability included *resource management* and *the production and consumption of information*.

Example 7: Water and the Water Framework Directive: Sustainable Water Network (SWAN)[79]

The Sustainable Water Network (SWAN) is an umbrella group of 25 leading environmental organisation groups whose agenda includes the maintenance and improvement of Ireland's water resources.

> "*Ireland's waters are the final recipient of many of the chemicals & pollutants that we release while going about our daily lives & business.*
>
> *Our business, domestic, leisure & development activities all have impacts on the water environment. A change in the way we treat our waters is essential if their wildlife, amenity & economic values are to be protected.*
>
> *SWAN is a network of Ireland's leading environmental organisations working to ensure that new Water Framework Directive water management plans provide this protection*."[80]

The Water Framework Directive (WFD) is a piece of EU legislation that aims to improve the quality of all waters (river, lake, estuarine, coastal, marine, surface waters and groundwater) through management at the river basin level. This legislation has implications for industries

[79] SWAN: http://www.swanireland.ie/about/swan-%E2%80%93member-details/
[80] Ibid

and communities that are likely to have significant impacts on water quality (household, agriculture, power generation industries, etc.). The monitoring programme of the EFD in Ireland provides information about threats posed to water safety, legislation and directives, water safety and preservation advice for a range of social actors, and information about monitoring and the current state of the quality of Ireland's rivers lakes, and coastal waters environment.

The implementation of the WFD is a project involving inputs from all levels of society. SWAN's expressly stated aims and objectives reflect this approach. They refer to cooperation between and contributions from national and local groups with a wide range of specialist and local knowledge and expertise in all areas of Ireland's aquatic environment. SWAN aims to facilitate the participation of its member groups in the implementation of the WFD and improvement of water quality at local and river basin district levels by representing: *"the SWAN position to government, statutory bodies and other agencies in all relevant matters and to advise and assist, where possible, the statutory authorities in the exercise of their responsibilities in relation to implementation of the Water Framework Directive*."[81] They facilitate participation through the exchange of information between members and through information workshops, seminars and other events. SWAN also seeks to make representations for its cause at the national level to the government, statutory bodies and other agencies. In this way, they have advisory and support roles. SWAN also aims to increase public awareness around the importance of water quality and its links to health. It specifically highlights the importance of the WFD and the sustainability of water resources and points out the dangers and pressures that are present upon Irish water resources such as eutrophication and contamination from sewage and point, and diffuse, sources of pollution.

By acting as an advocacy group for its member organisations, SWAN aims to influence policy at the national level. Under the sustainability theme, SWAN acts as a meso level communications platform allowing grassroots movements to engage effectively with institutions. They promote sustainability discourses which focus directly on water as a primary resource for the biological, psychological and social health and wellbeing of the individual, society and the environment across all societal levels. They also represent an institutionalised

[81] Ibid

form of public participation as defined in Section 14 of the WFD[82]. In this way, they represent the socio-legal discourses around sustainability and health as a human right which promotes improvements in the application of models of governance.

Example 8: Tourism: EcoBooley

EcoBooley was established in 1998. It began with a response to an advertisement seeking submissions to the Department of Tourism, Sport and Recreation for a 'Pilot Initiative on Tourism and the Environment' taken from the Irish Independent of April 2nd, 1998. The overall concept was for the owners of such properties, who are mostly farmers, to reinstate some old and unused rural homesteads using eco-friendly technologies and materials, and turn them into desirable places for tourists to engage in a sustainable and immersive experience in rural Ireland. These self-catering accommodations would expand the eco-friendly tourism market. The plan was to brand-label the concept, using a symbol scheme method like the organic food industry, and thus maintain the integrity of the product. The brand name chosen is EcoBooley. It is taken from Booleys, the Irish 'Buaile', which were temporary upland summer milking places of old Ireland. The concept behind the project was to develop a sustainable form of tourism through the retraditionalisation of an 'authentic Irish experience': to stay in an EcoBooley is to stay in an old place in the knowledge that one "*will leave the environment as you found it*".

While the government played an important part in the initial set up of the company through Teagasc and Departmental grant aid, their ongoing interest in the project was lacklustre:

> *"There is a problem there between the agencies that they are not connected together that you have maybe an agency thinking one way another agency going the other … there is a need for coordination of all these groups and information, and so forth, you have an awful lot of different groups doing different things, but there is no coordination."*
>
> *(Farm Owner)*

[82] S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003: http://www.irishstatutebook.ie/eli/2003/si/722/made/en/print#article14

One of the main expenses and problems with the small enterprise business is in marketing. The website and links to other websites such as Bord Failte, advertising in some organic magazines and tours of the space itself have been the main contributors to marketing the project, using technologies to widen the awareness of eco-tourism and sustainability. The Internet[83], via is the main means of dissemination of information on the project.

> *"It is very important as well that people pull together, for example, when we tourists here we send them to Keating's Cheese in Clogheen they are a small cheese makers, that makes the experience of the holiday, you have X making apple juice, it is very important to have a network of people organic farmers and stuff, the type of people that come on holidays want and to experience the natural food, natural environment"*
>
> *(Farm Owner)*

This quote illustrates the importance of informal networks of communication in the development and success of small sustainable enterprises.

A series of reports were produced which:

- Explore and set out the concepts (e.g. eco-aware, design and build), justifications (e.g. tourists - who are the paying guests - generally love old, quirky buildings, add to that the opportunity to experience living simply, in the physical surroundings of our forefathers, tempered by eco-aware technology and design influences), and strategy (e.g. scenario - buffered design).
- Describes all works carried out and the materials used and acts as a definitive technical report on the project which can be used as an information source for all who seek to replicate the concept elsewhere in Ireland.
- Support strategic direction of the rehabilitating for the eco-tourism market segment.

Branding the EcoBooley label as a new environmental standard for eco-tourism was a goal of the founders of the project, leading them to go beyond the existing building and regulation standards and create some of their own. For example, the location of the cottage must be an unspoilt area of the countryside, and it must be an existing old homestead. The immediate

[83] EcoBooley: www.ecobooley.com

area (i.e. gardens) around the house must be to organic standards, all materials used in construction must be natural and renewable, and all services (lighting, heating, cooking, etc.) must only use renewable energy sources i.e. wood, solar, wind, water, geothermal, etc. The wood for fuel and construction must be taken only from managed and sustainable forests (preferably from the immediate local area). The furnishing and fittings used to decorate the cottage must, likewise, use natural and renewable materials. All materials and products used on an ongoing basis (toilet paper, washing up liquid, etc.) must be to the highest environmental-friendly standards available.

The project aims were to (1) provide an income from an alternative source for the farmer, and (2) attract some social activity and contact with the non-farming community to an isolated area. It was an attempt to introduce new, and external, forms of environmental knowledge in addition to, not in conflict with, local experiential knowledge. Its aim was to help preserve the historical heritage of the area and refocus this to contribute to new environmental awareness.

As a business and an environmental project, the marketing of EcoBooley included the dissemination of the information to the widest possible audiences using workshops and open days including on-site workshops with suppliers of the technology presented to organised groups. Further, many individuals have visited the Cottage, open days and project members are available to give illustrated talks and lectures on the EcoBooley project and concept.

> *"I know when we were involved with the local community development group there is a tendency to lean towards environmental projects for the community, so that is the knowledge that we have gained filtering out to the community."*
> *(Farm Owner)*

Relations are good with the local community. The founder of EcoBooley is a member of the REPS, Galtee Vee Tourism Group, the South Tipperary Tourism Group, and maintains an official liaison with Tipperary Institute regarding environmental matters i.e. willow cutting, energy generation, etc. He has become increasingly environmentally aware since the commencement of the project. There are no conflicts in the market or with business partners. There was an array of special constraints and conditions at planning and design stages;

sometimes producing conflicts that needed attention and resolution regarding financial constraints, planning regulations, self-catering guidelines, eco-friendly/organic guidelines, conservation/architectural considerations, general environmental, and location and safety issues.

The local context is imperative to the branding tool of EcoBooley. The owner himself is on hand to answer questions and to introduce visitors to the local surroundings. The entire concept of EcoBooley is particular to its rural setting, is an environmental experience, is individual due to the renovations of one off cottages and has a deeply traditional and historical value inherent in the history of the cottage and the surrounding area. All goods, where possible, are also sourced locally due to the transport costs and effects on the environment, integrating the local setting as part of the ideological concept of the environmentally friendly tourist experience.

> *"[The EcoBooley concept] has to be connected up to foods, and maybe even organic food, but definitely local food maybe local culture. The whole thing needs packaging and integration … not only is a thing green but you can get local food locally be they organic or conventional, but at least they are local or specialised. [Simultaneously] you are connected up to local festivals or local music or culture, so maybe the package needs a bigger package than just green maybe has to really have to be sustainable in a social and cultural way as well."*
>
> *(Teagasc)*

Ties of reciprocity and exchange, either within localised business networks or other social networks facilitate collective learning and collective responsibility, and organisational agility. Informal networks are of paramount importance to the ongoing EcoBooley project. For example, building techniques came from official research and informal discussions. Other interested parties in the location have heard about the project through conversations with neighbours or other members of the community. Originally, traditional farmers in the area were sceptical as they thought that it would focus the attentions of the EPA on them. However, as they have seen the project grow they have become more and more interested and enthusiastic:

"Conventional farmers … had an idea maybe that you were going to bring real "greenies" to the place, they were going to cause some environmental problems, bring the EPA or something down on top of them. But as the project went on they saw the type of people that had turned up, and I think …a lot of the people of the community are very happy with … the whole thing."

(Farm Owner)

EcoBooley represents an experience of the environment in the Irish countryside. It represents a retraditionalisation of existing cultural models, specifically tourism. It uses existing resources and repurposes them using sustainable techniques, engaged in innovative practices to do so, and produced a socio-economic service that preserved the environment and culture of the area. The plan was to patent the concept and the innovative techniques (building, restoration, energy production) and promote it across Ireland and further as an alternative income source. In this way, this case study illustrates the potential sustainability as an economic practice, driven by innovation, and one which promotes sustainability through the repeated implementation of the innovation across multiple sites.

Example 9: Resource Management: Voice[84]

VOICE is an Irish charity that encourages environmental awareness and individuals and local communities to take positive action to conserve natural resources; primarily in the areas of waste management and water issues. It also advocates on behalf of the public engaging the government and the corporate sector. They promote the adoption of environmentally responsible behaviours and the development of strong national policies. VOICE acts as a leading lobbyist making policy submissions to the Irish government including issues such as the operation of waste incinerators in Ireland and various resource management policies including the plastic bag tax (2001). It helped to co-found the Irish Environmental Network (IEN) and has significant connections with other Irish environmental groups including the Sustainable Water Network (SWAN), Stop Climate Chaos, the Environmental Pillar and the Environmental Protections Agency (EPA).

[84] VOICE: www.voiceireland.org

They are an important environment actor engaged in encouraging and guiding grassroots movements to become actively engage in resource management activities and acting as a medium enabling sustainability discourses across all societal levels.

Summary of Sustainability Case Study Findings

The concept platform of sustainability in the Irish context, as above, is borrowed directly from the standard as defined in the Brundtland Report. Political actors use this standard to encourage greater awareness of sustainability. The networks of innovative organisations such as VOICE and SWAN represent grassroots initiatives which need to be encouraged in their local social innovations. Critical for the sustainable management of environmental resources are open and transparent mechanisms for the engagement of these collectives with institutions and decision makers.

Access to knowledge illustrates the resonance of an event, the initial emergence of discourses around events, and the negotiation of the meaning of an event. It opens access to social discourses in the present and may promote new ways of thinking about resolutions to risk events. It also promotes niche level innovations across a wide spectrum of activities ranging from local solutions to improving water quality (Suir Fishermen's Federation) or new means of communicating and disseminating information (IEN, Environmental Pillar).

It is important to remember that the environmental movement began as a fringe movement represented by individual scientists and individuals affected by climate changes. The effectiveness of the individual actors, collective organisations, and institutions in establishing sustainability discourses at the centre of global politics are a testament to their tenacity. A collective of cosmopolitan citizens including scientists, legal professionals, political activists, lay citizens and industry representatives have successfully articulated this discourse positioning it at the top of the global socio-economic and political agendas. It has become resonant with a majority of Europeans (with 95% of citizens questioned consider that protecting the environment is important to them personally[85] and 85% of Europeans believing that they can play a role in protecting the environment) and is embedded in local politics and national policies. Different grassroots actors and institutions engage in this sustainability

[85] Special Barometer 416: http://ec.europa.eu/public_opinion/archives/ebs/ebs_416_en.pdf : 9

discourse from different perspectives, which is a testament to the effectiveness of ecological citizens in establishing it as a meta-narrative of the 21st century. The sustainability movement could, however, benefit from a more coherent and consistent approach which would give its voice more credibility in political debate. I argue that these social innovators exemplify the potential for local level initiatives and effective environmental communications in building mutually beneficial economic, social, cultural and political relationships.

5.3.5. Innovation: social innovation case study analysis

The subthemes emerging from the desk research examined were *forms of innovation* and new *opportunities and changes in lifestyle/choice*.

Example 10: Education: The Tipperary Institute

The Tipperary Institute (TI) is a third level institute which teaches rural sustainable development and business development programmes. The integration of these courses ensures that learning relates to real-life environmental and economic contexts. The primary goals of the TI are to promote sustainable social and economic development by educating the next phase of graduates. The Institute utilises leading-edge information and communication technology (ICT) in the delivery of its learning, rural and business development programmes.

They run courses in business, technology and sustainable rural development, liaising with European agencies, national government departments, local County Councils, local businesses and individuals. They provide education courses which promote sustainable business practices which are, in part, aimed at the Small to Medium Enterprise sector. The EU recognise SMEs as the most significant sector for the future economic development of Europe. They are particularly important to Ireland where 98% of businesses are SMEs who employ 68% of all employees[86]. In response to the demand this creates for skilled business enterprise graduates, the Tipperary Institute has designed its business studies courses emphasising both the traditional and emerging aspects of business. The courses also include additional subjects which TI has identified as important to business in Ireland and Europe, such as languages, entrepreneurship, ICT, eCommerce, and project management.

[86] Central Statistics Office: http://www.cso.ie/en/releasesandpublications/ep/p-bii/businessinirelandabridged2012/smallandmediumenterprises/

Sustainable development is defined as recognising a national and international need utilising scarce environmental resources preserving them for the future while meeting social and economic needs of the present. Its status reflects the importance of sustainable development as a strategic direction for the Institute. Graduates of the institute's course in Sustainable Rural Development (SRD) are equipped with the skills and insights necessary to assist in this decision-making process engaging in the discourses around the sustainable rural communities of the future, and the policies and structures that will support them. Although the Institute is a national body, the recruitment of students is 75% from the local area, adding directly to local development. Networks of knowledge exchange and the development and promotion of innovative solutions to the challenges presented by environmental risks are, therefore, a central remit of the Institute. Consequently, they act as conduits of knowledge transfer through education of students and supporting small rural sustainable projects.

There is also a rights-based discourse prevalent within the institution. For example, they view energy as an inalienable right for all. They also view some of their most important work to be helping to provide innovative solutions for those who in situations of fuel poverty (such as those from lower socio-economic groups- e.g. the elderly or infirmed).

Through their schools' programs, they encourage citizens to engage with and learn about sustainable energy, encouraging knowledge of sustainable practices. It is in and through education that citizens imbibe power through knowledge as capital.

The agencies role is, therefore, a promoter of innovation. They view their remit not only as including fundamental responsibilities for the community but being responsible for empowering the community to become responsible for themselves and encouraging practical, economical, and innovative solutions to environmental risks.

Example 11: Innovation and Lifestyle: Cloughjordan Ecovillage

Cloughjordan Ecovillage, Cloughjordan, Tipperary, is an example of the implementation of a practical active grassroots programme which promotes an innovative, holistic, and biopsychosocial model of health and wellbeing.

Supported by Sustainable Projects Ireland, it is a neighbourhood demonstrating best practice in community development and rural regeneration. It is a registered educational charity and an NGO. It is founded on the concept of collective responsibility toward the environment and advocates consensus-based decision-making within its organisational structures with all important decisions made communally at the monthly Members' Meetings.

The goal of the Ecovillage is to provide a practical example of the sustainable living, promoting environmental awareness, education, and attitudinal and behavioural change. These include energy conservation and production, reduction and recycling of resources, sustainable livelihoods, sustainable (local) food production and broad community understanding of the converging environmental, social and economic challenges. They nurture relationships with other agencies across Ireland at the local, regional, national and international level and to innovate, and forms connections with other key environmental organisations in Ireland including Cultivate, the Irish Environmental Network, the Environmental Pillar and many others. They have a pragmatic approach to economic sustainability and host 'laboratories for economic experimentation' (including FabLab manufacturing base offering co-working, shared workspaces for local businesses, entrepreneurs and projects). They are actively involved with local enterprises (RiotRye bakery, Sheelagh na Gig, a bookshop and coffee shop on Cloughjordan's main street), ecotourism (Django 34 bed eco-hostel), and social entrepreneurs and innovators (VINE -Village Internet Network Engineering- provides internet and telephone services to ecovillage residents). Eco-education also constitutes a central remit of the Eco-Village (running courses in low-energy and sustainable building techniques, and renewable energy and working with local schools).

The main aim of the Cloughjordan village is to illustrate, by example, that a sustainable way of living which is "democratic, healthy and socially enriching"[87] supports a holistic model of physical and psychological health and wellbeing through an immersive social experience. This demonstrates that this way of life is possible and represents a good quality of life. Through the process of building this village they have collaborated with a wide range of actors (political, academic, economic, etc.) involved in the development of innovative solutions to environmental challenges. They not only develop these innovations, but they also have well-

[87] Ecovillage: http://www.thevillage.ie/

established education and training courses across a wide range of discourses in the areas of sustainability and health and wellbeing (e.g. Bees and Willow, Measuring our Ecological Footprint, food production, Lucid Dreaming and Mindful Sleeping, Permaculture Design Course, etc.). In this way, they share their knowledge which may be employed in other areas and by other communities. They also do this by publishing strategies, promoting services and products online, and by hosting a series of education courses.

Summary of Innovation and Sustainability Case Study Findings

While engaged in innovative practices, there is such a diverse range of sustainability initiatives they run the risk of lacking coherence as a force driving a change towards sustainability and supporting ecological citizenship. Some organisations attempt to establish effective networks through these groups, which is useful. They could, however, more effectively promote and encourage engagement with local innovations at national and international levels. Innovative communications technologies, such as the CAPS, represent a mechanism through which a more coherent approach could.

5.4. Summary

At the policy level, the definition of sustainable development in Ireland follows the Brundtland Report. Political actors use this standard to encourage greater awareness. Sustainability appears to have the same meaning for all actors, political or lay. However, the case studies suggest that while all parties are interested in achieving health, wellbeing and environmental security, political actors support policies which may be contrary to this.

The case studies presented here are of organisations who exemplify and promote, innovative solutions to sustainability. Employing health as a link connecting the environment throughout these societal levels is not an attempt at creating an idealistic cosmopolitan community of ecological citizens. This is the premise upon which environmental discourses become embedded within an existing normative construct resonant with, and important to, all human beings.

The case studies presented here show that a basic network of communications around different approaches to sustainability exists which highlights the complexity of the sustainability debate. For example, the Suir Fishermen's Federation developed a local

connection with Ecobooley through tourism, which further engaged parallel issues such as energy production (the Tipperary Energy Agency), resource and water management (VOICE), food producers and farmer's markets (Cahir Farmers Market,) and education (Tipperary Institute). They also establish connections to other environmental collectives engaged in discourses around other water and resource management issues (SWAN, SFF). The local nature of the collective allows them to act and think locally, while these approaches can easily apply to other settings. The challenge is, therefore, not only to derive innovations but to improve the effectiveness of the employment of existing ideas.

While I argue, that the case studies represent examples of environmental innovation, a remaining challenge is to promote improvements in the ways in which these innovators act and think locally and globally. Interactive communications technologies can facilitate this. Sharing the experiences of local innovators can encourage these discourses exploring the potential these innovations have for other citizens in other localities.

For example, water is fundamental to the quality of life of all EU citizens. Access to a clean and healthy water supply adds greatly to the economic viability of an area, the quality of life of the residents, and environmental sustainability. Water and air quality are now major concerns of the EU and Irish Environmental programs, ensuring that these two resources are of 'good or high status' ensures that other resources must also be sustainable managed.

Policy does not always, however, necessarily translate into responsible action. The challenge is to suggest ways in which the empirical evidence may highlight the real-world challenges faced by citizens and how the lack of implementation of environmental policies affects them. Actionable procedures and methods which allow individuals access to decision making which empowers communities to determine actions need to be defined and implemented.

I suggest that what is required is the examination of the extent to which participants in local projects for sustainable resource draw on the 'platform' character of the concept of sustainability. How is it used at national and regional policy levels as a means of generating support for their project? To what extent is the concept of sustainability at regional levels negotiated by the stakeholders?

At the individual and micro levels, the network effect of the promotion of sustainability in the case studies analysed shows an inconsistent and impermanent, yet integrated, a network supporting sustainability in Ireland. Some attempts to bring these disparate groups together are now emerging through the Irish Environmental Network and the Environmental Pillar with limited success. Innovators are constrained by a lack of resources and a lack of a coherent national and interactive platforms. For example, in the Suir Fishermen's Federation case study interviewees identified risk as the depletion of fish stocks and the deterioration in water quality as a threat to a quality of life (individually and collectively) and environmental destruction, loss of a natural resource, loss of cultural heritage, and aesthetic and economic community resources. They have identified water, and other resources, as resources which are fundamental for the biological and psychological health of the individual and the social wellbeing of the community. Innovative solutions to its preservation and sustainable management were also encouraged.

Overall, the case study material illustrates how social innovators articulate ecological and rights-based discourses by connecting health and the environment, which supports innovative ways of thinking about environment risks, and promotes sustainability as a fundamental aspect of ecological citizenship.

It is my contention that new communications platforms (e.g. CAPS) can open discourses and connections between groups and organisations allowing for the widespread application of innovative ideas in other localities. Further, sharing these ideas can support the co-creation, or participative, collaborative design, of better responses to environmental risks by sharing knowledge across wider groups of citizens.

6. Chapter 6: Findings II: Socio-Technological Innovation and Collective Awareness Platforms

6.1. Introduction

The previous chapters have established the status of the ecological citizen in Ireland and described the types of social innovations currently employed in driving sustainability. This chapter examines where existing democratic deficits lie in the communications systems employed by social innovators across all societal levels. I make some suggestions as to how technological innovations can bridge these gaps and enable ecological citizens better access to resources (ranging from water to accessing governance mechanisms) and reduce the risks posed to them by climate change. In short, I argue that they represent the capacity to share existing ideas, engage a wide variety of social actors in sustainability debates, and promote innovative solutions to environmental risks on a cosmopolitan level.

The basis of the argument presented in this thesis is that technological innovations enhance the capacity for social innovators to act as ecological citizens. They are a means of improving communications system by opening them up to more people from different social, cultural, and political backgrounds who have access to different levels, and types, of resources. This reduces the inequalities between those with little access, and those with abundant access, to resources by providing access to information, enhancing their capacity to articulate their experiences within local, national and cosmopolitan discourses. They allow individuals convert that information into usable knowledge and that knowledge into action.

Socio-technological innovations can involve local social actors in local projects which include the use of advanced communication and digital technologies by which to better support cosmopolitan collective responsibility and communicative action (Habermas, 1987). At present, the inability to make connections between global issues and the individual interpretations of risk events represents a significant barrier to sustainability. To engage stakeholders from different backgrounds who are concerned with different environmental issues in sustainability discourses requires effective open, democratic ways in which to manage these discourses. To achieve this the derivation and establishment of *shared cognitive-normative frameworks* (Burns, 2012: 1120) at all societal levels is required. I suggest

that barriers, and boundaries, to these frameworks, are broken down by making these issues resonant to other core societal challenges which are already resonant to the individual and groups. By analogy, this approach encourages people to realise that they are directly affected by the health of the environment and that they affect it in their actions and inactions. I suggest that access to resources allows individuals to mitigate the risks to environmental health by promoting changes in attitudes and behaviours. Personal efficacy is promoted through collective empowerment maximising the adaptive capacity of the individual and collective.

Addressing these deficits are, at least partially, achieved by empowering those with fewer resources by improving their access to better information, sharing innovative solutions, and opening access to governance mechanisms. This, I suggest, can be accomplished by engaging individuals in sustainability discourses, sharing knowledge and encouraging participative co-design of innovative action-oriented solutions to environmental risks. These solutions emerge in the form of social innovation and are facilitated through new ICT's. The examples of new socio-technological innovations which may be most effective in achieving this goal explored here are the Collective Awareness Platforms for Sustainability and Innovation (CAPS).

A central goal of CAPS projects is to have a clear societal impact as a central deliverable by supporting the improvement of collective awareness of environmental risks and promoting realisable solutions to these risks with special emphasis on innovative mechanisms which support open governance (Arniani, 2014: 13)**.** Valid research supports the political aspects of CAPS programmes which include the identification of the root causes of a problem, the identification of the relevant stakeholders involved, the experience of those it affected, and the objectives to be pursued to resolve it (ibid: 47). These projects include local groups by whom the programme (and its implementation) must be accepted at the local level to make it effective. These types of innovation are by their nature social and technological (or socio-technological) and work across local, national and transnational levels.

The case studies examined above illustrate some of the activities of social innovators. In exploring the utility of CAPS, it becomes possible to explore the relationships established between the collectives and the local, national and cosmopolitan institutions and what influence can ICT's have on the implementation of sustainable practices at the local level.

This chapter sets out the background for the relevance of CAPS to the BiMEC model and presents the benefits of the utilisation of ICT platforms by social innovators, and the promotion of socio-technological solutions to social and environmental problems. It also explores empirical examples of these types of initiatives and project as they illustrate how the model relates to the promotion of the sustainability discourse as a contemporary 21st Century paradigm.

6.2. Sustainability, social and technological innovation: a European perspective

The Bureau of European Policy Advisors (BEPA) report *Empowering people, driving change* defines social innovation as the "new responses to pressing social demands by means which affect the process of social interactions" (BEPA, 33). Further, the BEPA identify three categories of social innovation:

- Niche, local, or grassroots social innovation (at the individual level);
- Local/national level social innovation addressing a wide societal need (e.g. NGO's at the micro, meso and exosystem levels); and
- System, or macro level change that "relates to fundamental changes in attitudes and values, strategies and policies, organisational structures and processes, delivery systems and services" (Ibid) (at the macro level).

This approach to innovation allows for the examination of the reaction to events and their societal repercussions across all societal levels as well as the communications mechanisms employed in the discourses, and innovations they inspire. BEPA suggest that as ICT plays a leading role in enabling communication, energy efficiencies, scientific data gathering, and other societal challenges in transport, climate, and resource efficiency.

Sagar (2013) describes technological innovation as:

> *"The process through which new (or improved) technologies are developed and brought into widespread use. In the simplest form, innovation can be thought of as being composed of research, development, demonstration, and deployment, although it is … not a linear process [and] there are various interconnections and feedback loops*

between these stages, and often even the stages themselves cannot be trivially disaggregated") (DAE, 2014)

Technological innovations can, therefore, be driven by the interests of the innovators, the identification of a gap in the technology market, scientific interest, curiosity or economic need. In addition to a response to economic issues, social innovations have emerged from grassroots movements which effectively employ innovative uses of new technologies.

6.2.1. Digital Agenda for Europe (DAE) revisited

The Digital Agenda for Europe (DAE) is the EU's strategy through which it endeavours to "deliver smart sustainable and inclusive growth" (ibid). It targets individuals and economic actors encouraging them to employ digital and technological innovations in support of social and economic development. Development is achieved "most notably through the internet as a vital medium of economic and societal activity for doing business, working, playing, communicating and enable discourses and decision making processes freely and openly" (Ibid). It also identifies some of the main barriers which may reduce the capacity for social innovators to participate in societal wide discourses such as privacy and security, insufficient internet access, insufficient usability, a lack of accessibility, and a lack of relevant skills. These issues need to be addressed by the co-design of social and technological innovations by all stakeholders.

For example, the DAE suggest that the broad deployment and effective use of new technologies will enable Europe to address its key challenges and will provide Europeans with a better quality of life. Improved quality of life may be achieved through access to better health care and health care information which open up discursive spaces to debate the implementation of environmental policies. It may also involve the advancement of new media and communication mechanisms, and, easier access to public services and cultural/digital content and media.

The DAE's goals include:

- promoting more effective interoperability between IT products and services to build a digital society increasing and promoting better standards in ICT;

- fostering of greater trust and security and hence willingness of citizens to express their opinions freely without fear of repression by ensuring the right to privacy and protection of personal data;
- providing fast internet access to all citizens;
- greater investment in R&D to ensure ICT ventures include joint technology roadmaps defining the steps from research to harnessing innovation for social need;
- effective management of knowledge transfer activities;
- empowering and emancipating users in the digital age by enhancing participation and digital competence which are increasingly fundamental in the knowledge economy; and
- supporting the smart use of technology and information/data in enabling social innovative.

Further, the DEA suggests that socio-technological innovation works with, and supports, "collective intelligence and mass collaboration enabled by the internet's network effect"[88]. It supports collaboration and "innovation in which innovators, users, and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale that was unimaginable before the rise of Internet-enabled platforms… [such as] the capacity to reduce energy consumption, support ageing citizens' lives, revolutionises health services and deliver better public services"[89].

The rise of social media as a global information provision system illustrates the potential of employing ICT's in the dissemination of social innovaitons. For example, as of the 28th of August 2015, Facebook reported having over 1 billion users in a single day[90]; this represents 1/7 of the world's population connected to a single form of social media.

The case studies presented in this chapter examine the validity of these claims, identify where gaps remain in the projects and the approach of these innovators, and suggest a model of good practice.

*[88] New Study On Digital Social Innovation: http://ec.europa.eu/digital-agenda/en/news/new-study-digital-social-innovation

[89] Ibid.

[90] BBC: http://www.bbc.com/news/world-us-canada-34082393

6.2.2. Collective Awareness Platforms for Sustainability and Innovation (CAPS)

In the CAPS programme, technological innovation is a driver and facilitator of social innovation. The challenge to the CAPS model, at present, is that there are relatively few social innovators who are aware, and capable, of using these platforms (as compared to the total number of social innovators who are actively engaged in environmental sustainability). Therein lies the challenge for technological innovators: to engage the 'user groups' in employing the innovation to support its main purpose. It is in making these platforms accessible and easy to use and making them appeal to a wide user group, which may become possible to encourage users to modify their existing practices and participate in the co-design of new ones. For example, if existing NGO network organisations (e.g. IEN, SWAN or the Environmental Pillar) promote their messages around collectively resonant definitions of sustainability, they can engage social innovators in virtual discourses through interactive platforms. Promoting knowledge sharing can radically increase the potential for the implementation of local sustainability programmes across multiple sites simultaneously. Consequently, they become central catalysts for broad-ranging sustainability discourses supporting ecological citizenship.

In this way, CAPS represent innovation spaces which allow new forms of collaboration to emerge. They represent environmental risks as global risks[91]. These challenges need new ways of thinking from the grassroots which can propose "models to open and collaborative innovation that can unleash the power of collective intelligence, generating social awareness"[92].

From this perspective sustainability:

> *"Consists of a socially shared cognitive-normative framework—in values, norms, beliefs, and strategies—and typically entails new principles of social organisation... It need not be coherent or complete… [it need only be] a paradigm concept [that] is very suitable to the analysis of societal, institutional, and public policy developments which are shaped and*

[91] Sestini, F: http://caps2020.eu/wp-content/uploads/2013/11/CollectiveAwarenessPlatformsEngineforSustainabilityandEthics-1.pdf: 54

[92] Ibid: 54/5

governed by societal agents (scientists included) sharing and developing cognitive-normative frameworks."

(Burns, 2012: 1120)

The fundamental goal of CAPS is to create these real and virtual innovation spaces which can generate awareness and use this awareness to lead to positive attitudinal and behavioural changes.

> *"A strong enthusiasm and passion for citizen engagement in several facets of society is the common denominator for the CAPS community. Ranging from better-informed deliberation, collaborative decision making, grassroots movements, new currencies, sustainability, behavioural change and social inclusion, the CAPS community brings together researchers, industry and community networks to build a new engine for sustainability and ethics in the digital world."* [93]

The CAPS model aims to promote collective responsibility as follows:

- incorporate social innovation through the engagement of local individuals in local projects,
- support the promotion of scientific and technological innovation through addressing critical environmental risk issues,
- support the promotion of political innovation through European Union mechanisms,
- promote participation and inclusivity,
- allow for individuals to debate critical sustainability issues at cosmopolitan levels,
- promote local discourses while encouraging the derivation of methods which apply to a wide variety of problems and project types in a variety of locations.

These goals for CAPS projects help evaluate how socio-technological innovations promote an innovative and a more sustainable model of ecological citizenship. Consequently, this form of citizenship supports an open, credible, transparent, and inclusive model of ecological

[93] Planet News: http://news.kmi.open.ac.uk/11/18587

governance. It considers how innovation can spread across the entire society through new communications media which enable the wider distribution of cultural and creative content.

The next section examines some case studies of CAPS, or CAPS-like, platforms and how socio-technological innovations can best support ecological citizenship.

6.3. CAPS as a means of supporting social - technological innovation

To reiterate, the main aim of this thesis is to present a model which investigates the validity of employing health as a catalyst for human rights based argument promoting socio-technological innovation as a driver of ecological citizenship. From this point of views, CAPS have the capacity to open innovation spaces up to coherent, transparent and ongoing communications situating health at the centre of the sustainability and ecological citizenship discourses. It explores the different approaches taken in these initiatives to addressing: a) biopsychosocial measures of health at the individual level); b) access to resources and the capacity to participate in social innovations; and c) the availability of resources to different stakeholders.

The BiMEC model does not try to compartmentalise the case studies into the main themes but emphasises the different approaches taken to address these themes in the context of health and ecological citizenship.

Number	Theme	Case Study	Summary
1	**Health**	DecarboNet	DecarboNet is a research project funded by the European Commission to investigate the potential of social platforms in mitigating climate change. Particularly DecarboNet aims to adjust people's behaviour about energy consumption and reducing individual's carbon footprints.
2	**Health**	CAP4Access	CAPS4Access is a Collective Awareness Platform that utilises collective knowledge sharing and Open Maps to highlight accessibility issues for disabled members of society.
3	**Health**	Patients Like Me	A communications space where people with chronic health conditions get together and share their experiences living with disease
4	**Health**	fit4cancer	A fitness training programme specifically designed to promote exercise as part of recovery programmes for patients in remission from cancer.

5	**Human Rights**	Scicafe 2.0	Scicafe 2.0 will manage sharing by enabling and enable more efficient participation of citizens in the discussion through the management and organisation of online debate using semantic web technologies.
6	**Human Rights**	IA4SI	IA4SI (Impact Assessment for Social Innovation) is a support action aiming at developing a structured methodology able to evaluate the potential socio-political, economic and environmental impacts of collective awareness platforms for sustainability and social innovation.
7	**Human Rights**	Edgesense	Drupal module that adds social network analytics to Drupal forum and community sites. By augmenting online conversations with network analytics, we hope to be able to foster collective intelligence processes. The vision behind all this is to contribute to building a format for participatory democracy that works at the global scale.
8	**Human Rights**	Assembl	A software application that allows hundreds or even thousands of people to work together productively simplifies working with a large group and facilitates the emergence of innovative, new ideas. -Move quickly from an unstructured discussion to a structured debate -Stimulate members of your community with our creativity widget - Bring in outside discussions and information from the Web -Capitalise knowledge through syntheses after each cycle of the debate.
9	**Human Rights**	LiteMap	This platform allows online communities a place to map out visually a debate that may be happening in other forums or Website.
10	**Human Rights**	DebateHub	Developed by the Open University's Knowledge Management Institute, DebateHub is a tool for online communities to: raise issues; share ideas; debate the pros and cons; and prioritise contributions in order to organise and progress good ideas forward collectively. DebateHub is distinctive in its use of advanced analytics to show the best-argued ideas and visualisations of a community.
11	**Innovation**	Loomio	Loomio is open source software, built by a worker-owned cooperative social enterprise. It supports groups in practising effective, inclusive decision-making can change organisational dynamics on a global scale. Loomio exists to make it easy for anyone, anywhere, to participate in decisions that affect their lives.
12	**Innovation**	Collective Intelligence Dashboard	This is a tool aimed at mon monitoring, measuring and understanding the nature and quality of the collective intelligence processes emerging with the community debate. In other words, it is the place in which advanced analytics on social and conversational dynamics can be made visible and fed back to the community for further awareness and reflection on the state and outcomes of public debate.

13	**Innovation**	SPREAD Sustainable Lifestyles 2050	Different societal stakeholders – from business, research, policy and civil society – are invited to participate in the development of a vision for sustainable lifestyles in 2050. This process will result in a roadmap for strategic action for policy makers and will deliver innovative ideas for business, research and society, regarding the enabling of sustainable lifestyles in European society.
14	**Sustainability**	Catalyst	Catalyst is a CAPS project funded under the FP7 that seeks to support grassroots initiatives in the area of social innovation and sustainability through the organisation of online debate into clear arguments that will hopefully enable and promote collective discussion and influence policy decisions.
15	**Sustainability**	Wikirate	Wikirate is a CAPS project that provides a platform for users at all societal levels to increase awareness and create collective intelligence about various ethical issues associated with private corporations. In doing so it is envisaged that users/contributors will make sustainable and ethical consumer choices and businesses will become more socially and environmentally conscious.
16	**Sustainability**	D-Cent	D-Cent (Decentralised Citizens Engagement Technologies) will see the development of new open source, decentralised and privacy-aware digital tools and applications for direct democratic and economic empowerment. D-Cent will enable citizens together with social innovators and developers to create a distributed social networking platform for large-scale collaboration that will solve social problems such as climate change.
17	**Sustainability**	USEMP	USEMP (User Empowerment for Enhanced Online Management) is a project that seeks to empower individuals regarding privacy of personal data in online interactions.
18	**Sustainability**	CHEST	CHEST (Collective Enhanced Environment for Social Tasks) is a collaborative project that aims to provide a forum that will enable social innovators to realise their potential in tackling societal issues through collective discussion and provision of funds.
19	**Sustainability**	P2P Food Lab	P2P Food Lab is a collaborative platform that aims to help citizens produce and consume food in a sustainable manner through collective knowledge sharing and facilitation of local level social innovation.

Table 2: Overview of socio-technological innovation case studies

6.3.1. Health: technological case study analysis

The intrinsic connection between health and the environment in sustainability discourses is evidenced by the desk research and implied in the social innovation case study analysis. Of

the case studies examined only a few included health as a central theme. The key concepts which relate to health and the environment emerging from the case studies include:

- the reduction of the use of water,
- social and economic sustainability,
- the sharing of resources and expertise/knowledge,
- collaborative sharing of ICT resources and the self-monitored/self-reported resource management; and
- waste prevention practices.

For example, the *reduction of carbon emissions* (*Decarbonet*) arose as a key issue which identifies the biological wellbeing of the citizen as a key concern. *Caps 4 Access,* and *Patients Like Me* focus on the biological, psychological and (by the nature of the social aspect of the platform) health and wellbeing of the individual and community as key issues for ecological citizens.

I argue that if health is employed as a central concept (as in the case studies examined), this concept can be used to anchor other discourses to sustainability. Further, they show that the main reasons why individuals become engaged in CAPS include:

- a pre-existing interest in climate change and sustainability;
- the nature of it as climate change as a risk to the individual, their family and community;
- the issue as a global meta-cultural risk (e.g. climate change);
- the availability and format of information;
- the credibility and salience of its source; and
- the individual's capacity to become engaged in societal debates measurable by indicators of biopsychosocial health and their access to resources.

The DEA suggest that the main benefit of advances in this area are that they can empower citizens to be increasingly aware of their health care needs. They argue that the future of health care removes the patient from a hospital and towards a patient-centred health care model as exemplified by Connected Health approaches.[94] According to University College

[94] Managing Health Data: https://ec.europa.eu/digital-agenda/en/managing-health-data

Dublin,[95] there is no standard definition of Connected Health. It is about connecting people and information within a system:

- "Connected health consolidates information from many different spheres of one person's world to give a more complete picture of their health. This includes biological, genetic, medical, lifestyle and sentiment/mood data.
- Connected health puts the patient at the centre of the healthcare system gathering, linking and interpreting information from many different sources to enable informed patient-centred care decisions.
- Connected health allows the clinician to make decisions in a context, to communicate better with patients and to aggregate data to inform practice/system-level decisions."[96]

Connected Health includes terms such as eHealth, Digital Health, mHealth, Telehealth, Telecare, remote care, and assisted living. The biopsychosocial approach to health and wellbeing clearly illustrates the potential for socio-technological innovation in support the model of ecological citizenship presented here. Connected health approaches include: a) the identification of environmental factors that influence health and wellbeing; b) expanding the individuals involved, the types of data included, and the subjects which are prevalent in the sustainability discourses; and c) establish biopsychosocial indicators of health and wellbeing by which to measure adaptive capacity. It provides a subject specific example of a field that is now well developed and which in many cases combines ICTs and a biopsychosocial approach to health and wellbeing.

Connected Health tools offer the potential to gather large-scale personal health data using mobile wearable devices on the person which measure a range of biological data (heart rates, illness, temperature, etc.), psychological data (recording feelings and mood), and social data (GPS data, network activities, socialising/taking part in community activities). This information can be collected using an anonymised identifier which allows the researcher analyse the complex factors which support a holistic (biopsychosocial) model of patient centred health care. This information is increasingly important, for example, allowing clinicians and other researchers to identify contemporary risks to health and trends in

[95] UCD - What is Connected Health: http://www.connectedhealthireland.com/what-is-connected-health/
[96] Ibid

population health (e.g. obesity, cancer treatments) including environmental factors (e.g. the effects of living near incinerators, extreme weather conditions, poor water quality, poor air quality). I argue that connected health illustrates the strength of the argument that consciousness of health risk posed by environmental conditions (e.g. air pollution contributing to annual mortality rates) connects the health of the environment with individual health and embeds the two systems as one part of a single normative construct in support of ecological citizenship. I suggest that this implies that as innovation is a medium for development, information and data are the currencies of innovation.

For example, *fit4cancer* which is a fitness training programme specifically designed to promote exercise as part of recovery programmes for patients in remission from cancer has recently begun the process of including Connected Health tools in the implementation of the programme. The strategy includes: a) monitoring the physical wellbeing of the individual; b) linked to a practitioner who can monitor the health data; c) being used by a group of individuals in the same situation who can organise group exercise programmes; d) acting as a support group in dealing with the psychological issues relating to the disease; e) providing feedback to the designers and implementers of the mechanism in the process of co-design; and f) act as a mechanism to gather, analyse and interpret reliable data supporting the refinement of the programme and the institutional procedures to best support them.

The example provided above highlights the promotion of health and sustainability as issues of risk to the self and the immediate other. The provision of information is an effective way of engaging individuals to whom an issue is not currently resonant. This is achieved by establishing links between a risk event as a risk to the health of the self and health as a human right. Socio-technological innovations create a series of real and virtual innovation spaces through which individuals can, with the minimum of disruption and drain on their resources (financial, political, cultural and biopsychosocial) become actively engaged in communities of interest which develop and implement innovative solutions to environmental risks. This requires the inclusion of social innovators in the design of technological innovations. The next section examines the role of socio-technological innovations in promoting human rights.

6.3.2. Human Rights: technological case study analysis

The subthemes which emerged in the desk research under human rights included *the support of raising environmental awareness, grassroots processes and practices to share* knowledge and *establishing more participatory democratic processes*. Also, the case studies were actively engaged in the *support/advocacy for group members* and *providing direct assistance to user groups*. This highlights the importance of the role of technological innovations in the creation and sharing of collective knowledge.

These subthemes point to the importance of the relevance of collective intelligence and knowledge sharing to the functioning of technological innovation. Many of the case studies examined included the establishment of more participatory democratic processes. They created and used knowledge sharing platforms to help empower individuals. Other goals included collecting and making better use of citizen-generated data. *IA4SI* and *SciCafe 2.0* were particularly focused on these themes.

For example, in an online platform, the influence that an individual has within a democratic debate is defined by the rest of the participants and is measurable by the popularity/resonance of their comments and the analytical mechanisms within the platform that prioritises their argument. The more central a concept is to more participants the more resonant the discourse is across the entire group. Linking sustainability to these highly resonant concepts in public discourse increases the resonance of sustainability and the number, and type, of discourses with which it is resonant. New communications platforms elevate these discourses from the local to the cosmopolitan.

Cosmopolitan civil society represents a transformation of the public sphere as a real *and* virtual interactive, open, inclusive, and intersubjective cosmopolitan innovation space. These new communications platforms support this public sphere in becoming innovation spaces where participants can share knowledge, generate ideas, and form collectives. This framing itself stimulates new cosmopolitan characteristics which may include rudimentary institutional constructs supporting arenas of action and allegiance no longer bounded by or centred upon, the formal relationship that an individual has with a community or nation-state (Habermas, 2001). Building this form of citizenship relies upon establishing a stronger global

rights agenda stimulating simultaneous grassroots actions. The main actors involved in sustainability debates include local activists, policy makers, NGO's, scientists, and now ICT and network analysts, moderators, and collaborators from many different localities across Europe and the world.

For example, within the *Edgesense*[97] platform, this is referred to as the 'self-sustainability of debate'. In this instance, comments that are considered poor by the collective will filter into the background of the overall discussion. This balance the influence of different participants on a debate and promotes increased equality and representativeness within debates. It also provides a platform from which governance based cosmopolitan civil society can emerge.

According to CAPS, Web 2.0 is founded on the premise that "social computing principles motivate the importance of placing useful, usable analytical tools in the hands of users themselves" (Arniani, 2014: 34). If individuals (such as social innovators) are engaged at the very beginning of the participative co-design stage of the innovation, it may inform them how to use technologies, and illustrate the power of these platforms in achieving their goals. These platforms, therefore, have the potential to facilitate the inclusion of individuals, communities and organisations in public deliberation and collective intelligence creation through the internet.

For example, in response to a growing demand for information and data sharing[98], many internet based platforms have been created which allow sensemaking in online debates (Collective Intelligence Dashboard). Others enable the construction of meaning emerging from interactive open debate (*Assembl*). Some collate debates from across the web (*LiteMap*), the most popular ideas emerging from debates (*DebateHub*), and even augment online conversations through advanced network analysis (*Edgesense*).

Further to these capacities, some of these platforms include moderators who are responsible for steering the online discourses. As they do not have the same formal rules as face-to-face interactions, these platforms support the formation of collectives around key events and themes with a moderator acting to implement procedures specific to the goals of the online

[97] CATALYST: http://catalyst-fp7.eu/open-tools/edgesense/

[98] Digital Social Innovation: http://waag.org/sites/waag/files/public/media/publicaties/dsi-2nd-interim-report.pdf

discourse. This is achieved through the collection and examination of data emerging from the discourses including text, interactions and networks analysis. The user moderated nature of these platforms means that any individual (or group) can start a discussion on a subject matter of his/her choice which may contribute to the framing of an event. For example, the *Assemble* platform highlights areas where their software may have specific advanced applications, such as in businesses and politics. *LiteMap* has an advantage over other platforms through the ability to drag content from the entire internet, thus gathering information from other communities and data sources.

Many of these platforms focus on structuring debates via the use of data analytics that organise and prioritise user contributions within each platform (*Loomio, LiteMap, DebateHub* and, *DebateHub*). *Assembl* goes one step further by facilitating the co-production of knowledge by (potentially) hundreds and thousands of people. The curation of arguments within a debate by administrators/harvesters on platforms such as *Assemble, DebateHub* and *Edgesense* means that debates are mediated and can be progressive. The *Assembl* platform promotes the use of invite only, privately moderated discussions to enable group communication in this way. It highlights the application of its software to debates where experts in certain topics, or members of a specific organisations or groups, can formulate policies, ideas and action plans. It allows individuals greater access to a wider audience but decreases the relativity of their position as they are engaged in a large group with no immediate personal connection.

The platforms reviewed here are designed to promote environmental awareness and engage with social innovators encouraging open public participation through collective interpretation of the meaning of events through structured discourse. Methods for increasing participation in the wider community include identifying critical societal issues around sustainability (Arniani, 2014: 34-38), inquiring into user's motivations, incentives for participation, and the distributed network effect: or the distribution of concepts/categories through a myriad of communications systems.

One of the greatest advantages of these platforms is the use of advanced software to synthesise and organise debates that are coherent and relevant and then analyse the outputs

from them providing feedback and transparent insight into the collective framing process for all participants. This has the potential for enhanced sensemaking.

These collaborative tools allow individuals play a pivotal role in the production and management of information. Therefore, the benefits of virtual framings lie in the capacity for large audiences to interact, opening discourses up to potential participants at the cosmopolitan level with the purpose of then empowering individuals and communities (social innovators) on local levels. This shared knowledge creates attitudinal and behavioural change by promoting active involvement in the virtual debate about real-world challenges as socio-technological innovators.

A challenge for the development of CAPS is the use of technology to implement value judgment and decision making that benefit the individual and the collective in an emancipatory manner. In CAPS, the communication follows a complex pattern that varies from one-to-one (micro) to many-to-many (meso) relationships. These relationships are horizontal and vertical across and through societal levels. Those engaged in these discourses have the same rights to express themselves and participate on an equal basis in the decision-making process[99]. Translating these outputs into inputs to policy making remains an additional challenge for collective awareness platforms. This requires an innovative way of thinking about the use of the data emerging from these discourses.

6.3.3. Social innovation technological case study analysis

The subthemes emerging from the desk research under the main theme of innovation were: *forms of innovation and new opportunities; changes in lifestyle/choice; promoting integration and collaborative action from the wider community;* and *achieving changes in lifestyle* to bring about changes in participant's quality of life. The area where the greatest number of case studies were active was, unsurprisingly, influe*ncing behavioural change as a result of collective awareness* (e.g. *Decarbonet and Wikirate)*. This indicates a spread of the importance of collective awareness across different initiatives with a range of different agendas: i.e. creating awareness of the harms of carbon emissions and encouraging individuals to make

[99] Speeding up the transition to collective awareness: http://www.academia.edu/3383999/Speeding_up_the_transition_to_collective_awareness

changes in their lifestyles to actively reduce them; and collaborative consumption and responsible consumerism.

There is little awareness of innovative communications platforms among social innovators. Barriers to the adoption of CAPS platforms include a lack of awareness of these technologies, a lack of connection between local issues and global risks, a lack of access to the internet, and a lack of ability to use the internet. Engaging communities represents a significant research challenge:

> *"Communities of interest … may be geographically bound to one location or they may be widely dispersed, but they are all centred around a common interest. The participatory research approach involves them in the conception/development process to reveal some common, shared concerns as well priorities and needs that may be unique for one particular segment.*
>
> *How to approach and mobilise these target groups will be different depending on the role they are given within a CAPS project. Some CAPS projects address localised and contextualised social problems within the community of interest, while others bring to light global problems, but presented and addressed from specific perspectives."*
>
> (Arniani, 2014: 49)

Connecting social innovators with technological innovations, therefore, remains a significant challenge. From the perspective of social innovators it is prudent to ask: a) what is the nature of communication in CAPS and how does it work; b) what methods do CAPS projects use in the identification of individual and/or groups; and c) what influences the perception, adoption and continuous usage of such technologies (ibid: 36).

For example, *Loomio* has a clearly defined interaction mechanisms and procedures as defined by their stated goal: "Loomio empowers organisations and communities to turn discussion into action, wherever people are".[100] Loomio is "a free open-source web app to better enable groups to reach consensus and make decisions together*".*[101]

[100] Loomio: https://www.loomio.org/
[101] Ibid

Through their online platform Loomio enables online debate:

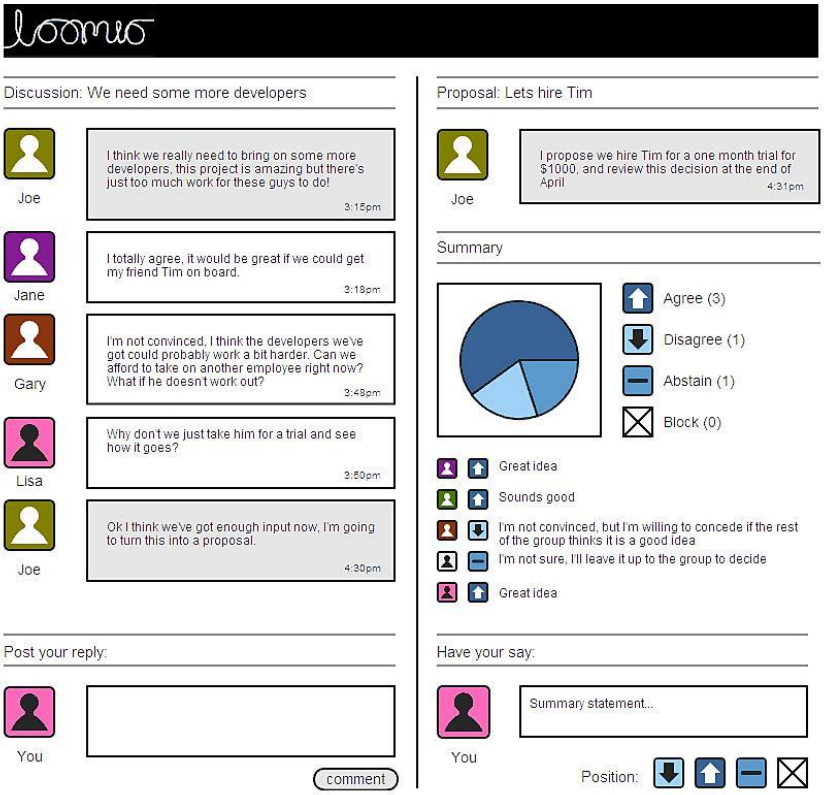


Figure 9: Example of Loomio screenshot

> *"A group member suggests a proposal. Discussion among members ensues, with each person giving a short statement summing up their view, and voting on the idea (yes, no, abstain, block – or other definitions defined by the group). As the discussion progresses, the proposal is modified to try to turn all the No's into Yes's. People can see at any time just how many people are in agreement, who has abstained, etc."*[102]

This simple tool illustrates the interactive potential of the platforms in guiding discourses and collecting data and providing analysed data in real time.

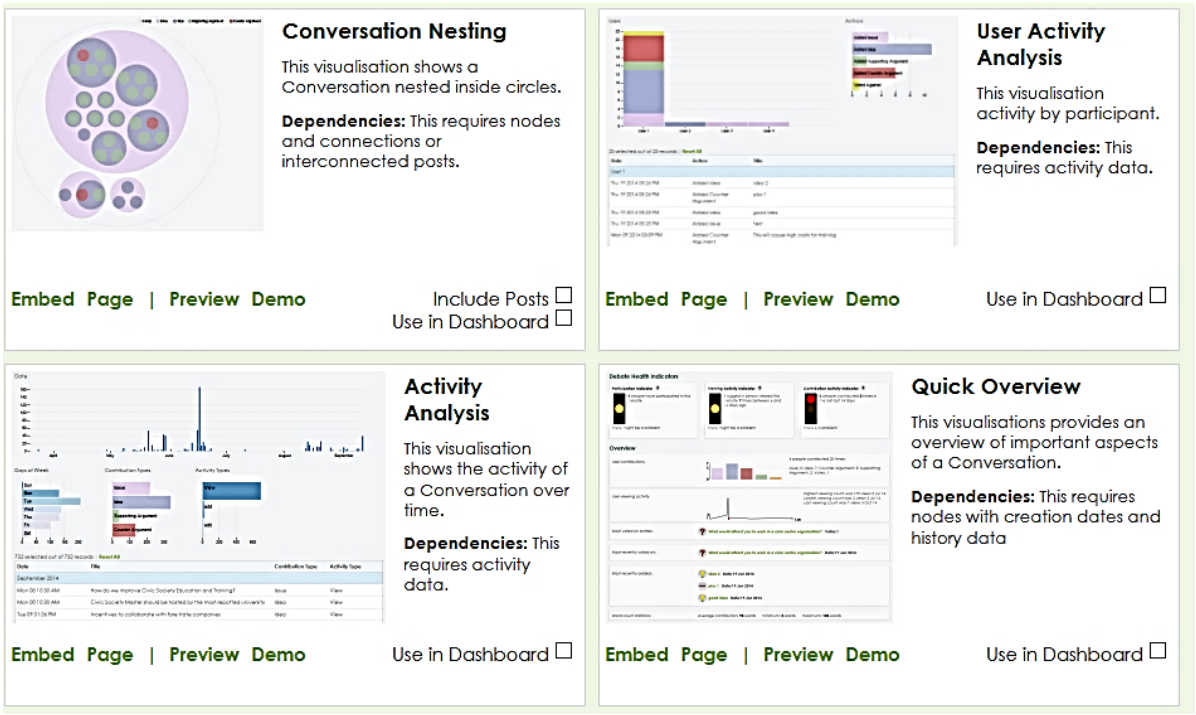
The *Collective Intelligence Dashboard (CID)* takes this further. It can analyse and visualise the nuances of the debates and its participants:

> "*Collective Intelligence Dashboard is a tool aiming at monitoring, measuring and understanding the nature and quality of the collective intelligence processes emerging*

[102] Loomio: http://idealog.co.nz/venture/2012/05/loomio

with the community debate. In other words, it is the place in which advanced analytics on social and conversational dynamics can be made visible and fed back to the community for further awareness and reflection on the state and outcomes of a public debate."[103]

The CID provides several different possibilities for visualising data entered into the conversation. In this platform, each contribution to the discussion is a node, each participant is a node author, each interaction/communication creates a connection, and the frequency of interaction and reaction is monitored. Some of these are illustrated and explained in the pictures below.



[103] CATALYST: http://catalyst-fp7.eu/open-tools/collective-intelligence-dashboard/



Figure 10: Collective Intelligence Dashboard 1[104]

The graphics above illustrates the potential for analysing data quickly and easily. CID provides insights into how different discourses, themes, categories and subcategories emerge (through Conversation Nesting). It shows how individual users are engaging with the discourse (User Activity and Activity Analysis) and the tools available to the moderator/researcher such as an overview of the state of the discourse (Quick Overview). It illustrates the attention that a conversation receives from different contributors across time (Attention Map). It identifies participant clusters based on activity patterns (Activity Bias) which are useful in identifying who may form collectives in the future. It also points to where new collectives may emerge 7 through the shared interpretation of the meaning of events (Rating bias). It also tracks the contributions to a discourse over time (The Contribution River).

These visualisations allow the presentation of data about the subject matter in different ways subject to nature of the discourse; e.g. social network analysis for consensus forming within a specific group; conversation nesting when analysing the most important issues arising

[104] Collective Intelligence Dashboard: https://cidashboard.net/

within a discourse; or conversation networking for identifying the most prominent frame articulators etc.

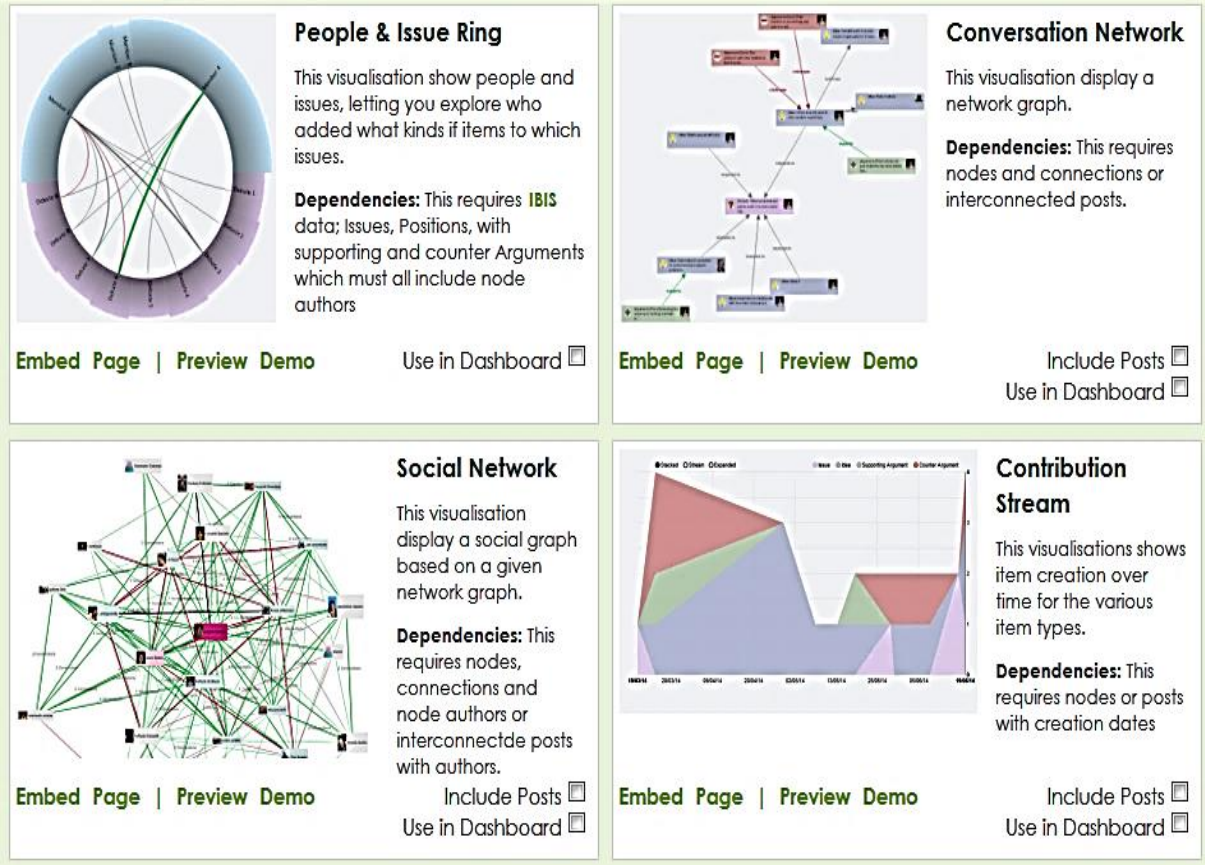


Figure 11: Collective Intelligence Dashboard 2[105]

This new communication and networking mechanism supports:

- the active involvement of social innovation programmes enabling individuals to frame environmental risk as health issues;
- advancing representativeness of the wider contributions to debates informing European policy;
- the provision of robust data which can inform new institutional regulations and procedures; and
- the establishment of sustainability as a social justice issue.

For example, the main objectives of some of these platforms (*CHEST, Decarbonate, Focal, Wikirate, CAPS4Access, SciCafe2.0*) are to motivate individuals to participate in online

[105] Ibid.

platforms by establishing online meeting points for the discussion around specific issues between individuals who may have a variety agendas and adaptive capacities. Once debates are active, the organisation of a debate relies on content curation by harvesters (a system enabling the capture, management and provision of access to digital/web-based content) or moderators (who review content and edit, approve or reject content before publishing it in the space). These harvesters and moderators may or may not also participate in the discussion.

These analytical tools allow the user to examine how individuals and issues are linked (People and Issues), what conversations emerge and evolve, and who is engaged in what discourse (Conversation Network). It allows us to examine the contribution to different discourses and review their importance over time. Most usefully it allows for the mapping of discourses and the frequency of engagement by the participant across the social network. This can be examined to explore the evolution of the ways in which events are framed in and through discourses over time.

All the platforms were reviewed to highlight the important role they can play in providing open innovation spaces which facilitate the contribution of individuals and groups in decision-making processes within collectives, and potentially organisations. The ability for community managers and public representatives to participate in these discussions enables them to identify and prioritise a community's resources and shape plans and policies based on the trends identified within debates and discussions. It represents a mechanism to support socio-technological innovation and allows for better democratic decision making. It is engaging the social and niche level innovators where the current challenge lies. It can also feed into the promotion of active decision making and can define clear inputs into policy making.

6.3.4. Sustainability: technological case study analysis

As with the social innovators, the subthemes emerging from the desk research under the theme of sustainability and ICT's included *resource management* and *the production and consumption of information*. Subthemes, or goals, relating to these prominent in the case studies reviewed include *carbon reduction strategies*, *resource efficiency,* and *the use of local and online forums*. There was a strong link to the use of online forums as a means for raising

awareness, particularly in relation to environmental sustainability and carbon reduction strategies. Over two-thirds of the case studies reviewed focused on collaborative methods for innovative solutions and ICT led sustainability approaches. These case studies attempt to alter users' production and consumption patterns through collective awareness and knowledge sharing discourses, creating awareness of sustainable practices, and in the attempt to reduce carbon emissions.

For example, the *P2P Food Lab* is active in the education and the sharing of knowledge via online communities and the collaborative production/consumption of food. Increased participation of the wider community is promoted on *DebateHub* using the *Collective Intelligence Visualisation Dashboard* which uses analytics to summarise the discussion of content to enable contributions from newcomers. This promotes the scalability and transferability (Arniani, 2014) of ideas, in the journey towards promoting increased consensus, and collective approaches to environmental risk events. Some approaches try to reduce these barriers and overcome individual boundaries through online deliberation which enables large group's debate, share understandings, explore solutions and make collective decisions (e.g. *Catalyst*).

Examples include:

- the self-reporting of environmental pollution (*DecarboNet*);
- empowering and encourage communities to act on sustainability topics, and change their behaviour and reward ethical companies (*Wikirate*);
- the creation of social platforms focusing on sustainable living, moving, consuming, health and wellbeing and setting up a people's forum and an online community in order to host an ongoing dialogue open to the public (*SPREAD*);
- collective assessment which provides the opportunity for contributors to review the outputs of a debate through voting (*SciCafe2.0*) and system ranking (*WikiRate*);
- crowdsourcing which enables groups to reach out to and include specific experts in a topic area;
- e-Democracy, e-Participation, and direct democracy which support the gathering of ideas and examples of actions which may be implemented by others which triggers collective action through online communities (e.g. *Change.org*);

- geo-mapping, geo-planning, and geo-navigation which inform people with mobility impairments of accessible facilities and public amenities and raising awareness of accessibility issues (*CAPS4Access*);
- new economic models for the redistribution of resources (*CHEST, DCent*);
- open Data which supports the integration of user data from different media through media mining producing new and valuable insights (*Wikirate, Web-Cosi*); tools which support increase privacy standards in online networks (*D-Cent*);
- social networking and social media which create new online meeting places/innovation spaces where special interest groups can engage in active debates.

As collective awareness projects and programmes represent new innovation spaces, it is difficult to make any conclusive remarks about their macro-level impact on the sustainability paradigm. What is clear is that they have the potential to reach a range of environmental stakeholders, and most importantly improve the resonance of sustainability among them. For example, as it is an online mechanism, it can also include existing social media platforms to enhance awareness of the discourses that are prominent on that platform. While the majority of these software tools remain open access, they require the participant to sign up with a username and password to encourage those who are engaging in these discourses to do so in critical and constructive ways. In this way, these platforms support the widespread dissemination of environmental risk issues, the emergence of an informed and interactive European public and civil society, actively engaged in cosmopolitan discourses which promote sustainability as a contemporary global paradigm.

6.4. Summary

CAPS and other forms of interactive online platforms represent a vehicle for social innovators to effectively share information and create awareness, engage in citizenship debates, and encourage behavioural change. The main issues which these ICT innovation programmes should address, as identified by the DAE, are sustainability and the democratic deficit in the digital divide by increasing access to technology and ability to use these technologies. The goal of this is to open them up to be used by all ecological citizens. This supports the social, cultural, and political ideological changes toward sustainability on local, national and global levels.

This approach opens new routes to participation in collective discourses, and reduces barriers, opening local and political boundaries to new inclusive decision making processes. It opens possibilities for inclusive discourses that may be hampered by either face-to-face/real world communication (such as access to information, involvement in closed group discussions, the capacity to become involved) or virtual communications (skill sets to engage in virtual communication). These platforms, I argue, can support engagement and involvement in sustainability discourses on all levels simultaneously by creating and supporting these social and virtual innovation spaces as the one and same space. What they lack is the ability to engage individuals and existing communities in these debates in the first place.

The aim of situating socio-technological innovation at the heart of sustainability discourses is to promote an inclusive form of ecological citizenship and allow one to identify the gaps in the strategies and policies and the practical realities of the implementation of these initiatives at the local and cosmopolitan levels. The BiMEC model is structured to facilitate the examination of these main themes and subthemes on each pillar and at each societal level. The analysis of the empirical materials and case studies points to the existence of current democratic deficits in ecological citizenship. The next chapter examines how socio-technological innovation can address these deficits individually and promote an equity of access to resources among ecological citizenship through the effective design and employment of these innovations.

7. Chapter 7: Socio-technological Innovation Spaces, Ecological Citizenship and Sustainability

7.1. Overview

7.1.1. BiMEC and behavioural change

Clear connections exist between human health, environmental integrity and human rights in scientific reports (e.g. IPCC), policies and treaties (e.g. UDHR, Aarhus Convention), and strategy documents (e.g. EPA State of the Environment Reports 2016). These represent the sustainability paradigm at the exosystem level. Moreover, the case studies have shown that there is an awareness among local actors and social innovators of the risks that climate change poses to human health, and that these risks represent breaches of human rights. However, their collective approaches do not explicitly address these risks.

The empirical studies presented in his thesis highlights the lack of connectivity between the themes of the BiMEC model and micro-level sustainability action by niche-level actors and social innovators. This shows that this information is available, part of public policy and strategies, and yet is not being communicated effectively and is not translating into social innovations. The ICT case studies examined illustrate the possibilities that these forms of online discourse offer. They include the presentation of information to individuals encouraging them to engage critical discourses; collect, collate and analyse the data; and the capacity to convert awareness into behavioural change.

The significant difference between the provision of information through digital platforms such as the website, and the capacity to enable interaction and communication via a discourse mechanism, lies in the capacity to analyse and understand that discourse by examining data in a meaningful way. At its core, this understanding includes the capacity to enable those involved drive innovation through meso level communications at all societal levels (from the individual citizen to micro level organisations, exosystem level institutions) and influence the macro level normative construction of sustainability as a contemporary paradigm. The fundamental principle upon which the model of ecological citizenship presented here is established includes all the features of improving awareness and supporting attitudinal and behavioural change.

In this way, the democratic deficit identified by the model exists at the exosystem, or institutional, level and is exemplified by a lack of mechanisms which enable public participation. A lack of awareness of the connections between health as a human right illustrates the risks posed to human health by poor environment conditions, and the individual and collective rights to health and wellbeing as provided for in national legislation and international treaties.

This is not to imply that by applying this model that every ecological citizen will become cognisance of these connections between health and the environment, and therefore translate this knowledge into attitudinal and behavioural change. Nor can it be expected that every citizen can, or would ever, become engaged as a social or socio-technological innovator in the development and promotion of resolutions to environmental risks. The goal of this thesis, and the model presented here is to outline an approach which provides better access to information and describes real and virtual communications mechanisms as innovation spaces which cultivate new and more equitable opportunities for ecological citizens to become involved in sustainability discourses, and promote public participation in policy making.

For example, employing health as the core category of this model ensures that this discourse is resonant with all citizens (as biological, psychological and social beings), and the discourse itself is inclusive of tacit/experiential, scientific/accredit and socio-legal knowledge. Further, these discourses encourage inclusivity. The benefits of the BiMEC model are that it reduces barriers to inclusion in sustainability discourses for ecological citizens. This, I argue, addresses existing democratic deficits by opening access to public participation and the decision-making processes.

Further, the means of communicating sustainability to a wider audience through existing channels (such as NGO's community groups, online websites, etc.) generate connections to issues already resonant with them (e.g. access to resources, health, quality of life). In this way, social actors can be engaged in active participation. The BiMEC model addresses the challenges that social innovators and ICT innovators face individually. It also offers procedures and mechanisms which support collective discourses which focus on the retention of

members of the collective over time. This, I argue, is the next challenge in the socio-technological innovation and the promotion of ecological citizenship.

7.1.2. The BiMEC model and sustainable socio-technological innovation

The socio-technological approach optimises the potential for effective communications and their translation into action. It does this by understanding what motivates people via user-generated information (e.g. offering platforms specific to age, gender, language, physical and mental abilities, the standard of living, the level of education (Arniani, 2014)) and by including them in the design of the tools of engagement. These platforms are increasingly being employed in virtual communications (text, websites -e.g. *WhatsApp*, *MeetUp*, *Facebook*), and can simultaneously promote wellbeing (an inclusive society, cost-effectiveness -e.g. online health systems) and social cohesion (through sharing information; promoting virtual discourses; real life interaction through the identification of other interested ecological citizens located in accessible real-world locations; the generation of information by users which contributes to the collection of social, psychological and physical data; and social network data). These represent means by which ecological citizens may be encouraged to become, and remain, involved and engaged in sustainability discourses through real and online networks via reward mechanisms. They also encourage engagement with the model of ecological citizenship aimed at improving the quality of life of the individuals and communities by increases in their adaptive capacity. I suggest this supports the reconfiguration of the concept of sustainability as a 21st-century paradigm.

The BiMEC model allows for the establishment of ecological citizenship as a normative cosmopolitan construct.

7.2. Human rights to health and the BiMEC model

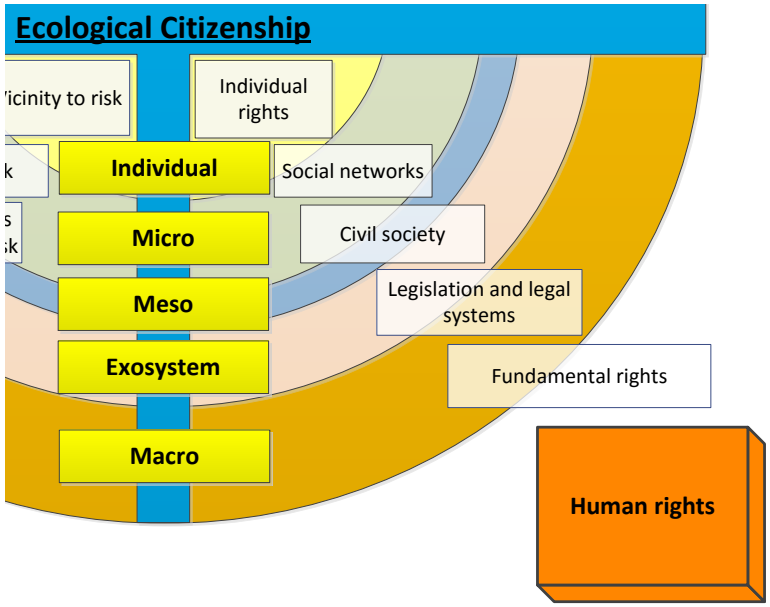


Figure 12: BiMEC model human rights quadrant

Christoff (1996) argues that democracy has become unbounded and that formal citizenship and civil rights have evolved beyond traditional national boundaries. Environmental issues have expanded beyond the conventional borders of political decision making. He implies that civil and fundamental rights must become the core of national rights if they are to protect against environmental risk and set equal standards for all human beings irrespective of their nationality, gender, age, religion and (I argue) adaptive capacity. The extension of citizenship to include citizens as ecological trustees can only come about through new participatory forms of cosmopolitan democratic governance. A formal mechanism which will allow citizens access to decision making beyond the nation state should be established. This will require a new biopsychosocial approach to adaptive capacity which frames the right to be free from risks posed by a poor-quality environment as an issue of social justice.

The abundance of information available in the global knowledge society represents a challenge to this approach. Here the ecological citizen struggles to filter what is relevant from what is not and consequently interpret the meaning of events. This involves the simultaneous management, and negotiation, of real (local and national) and virtual/cosmopolitan identities. Once individuals interpret events and choose to act on them, they are required to articulate their interpretations by choosing from a myriad of performance management

options (Goffman, 1959). This represents an increasingly complex challenge. The values, beliefs, and ideologies that represent the individual, and collective framing of the meaning of the events are formed through this process. Boundaries are drawn. Effective boundary maintenance (ibid) allows for the establishment of normative structures specific to the individual or collective by which to maintain a coherent narrative within a discourse. This form of boundary maintenance is paramount to coherence within the identity of the individual or collective, and hence the effective articulation of their framing of events in communications.

For example, supporting knowledge sharing in social innovation includes effective knowledge transfer activities and the smart use of technology and information. One possible risk of this approach is the de-contextualisation of the collective framing of events by individual groups of social innovators by moving away from the local narrative through an overemphasis on the cosmopolitan debate. CAPS involve the social dimension and real world activity in addition to the virtual discourses. This ensures that the consistent revalidation of the discourse in the local context, the examination of the applicability of the framing to the local agenda, and the influence of the local collective responsibility on the cosmopolitan collective. Shared initial contexts emerging from single issue driven discourses (e.g. health, food, water) are effectively framed within the sustainability discourse ensuring that a normative reference to sustainability. This, in turn, ensures that discourses and actions can be resonant to all participants and that they can engage actively in the discourses. In this way, socio-technological innovations are guided closely by the co-design and governance focused evolution of the platform which increases access to digital resources and reduces the digital divide[106]. This improves equity among ecological citizens by merging virtual and real framing and increases access to decision making.

This innovation space is, therefore, not free from barriers to engagement nor conceptual boundaries. Boundaries exist and are represented by the resonance of an idea or an event to an individual, collective, or with an institution. While these are spaces of rapid change, they area also spaces of rapid innovation, and the rapid evolution of collective framings. They are

[106] See Broadband Commission for Sustainable Development: EU ministers commit to digitising Europe with high-performance computing power: http://www.broadbandcommission.org/documents/broadband_challenge.pdf, the https://ec.europa.eu/digital-agenda/en and Coderdojo: https://coderdojo.com/ as examples.

spaces where new ideas and communicative possibilities emerge. The maintenance of the individual or collective boundary is if anything, more complex in the virtual world. Online worlds include spaces where members can enter and leave multiple communities quickly. They do, however, remain anchored to the real world via social innovators where discourses are framed in actual events and the formation of collectives: it is from these discourses that social innovations emerge and define sustainability as a normative social cosmopolitan construct.

Cosmopolitan ecological citizens are, therefore, concerned with the inequality of the distribution of risks faced by every citizen. Equal access to the decision-making process is a fundamental component of this form of citizenship. They are increasingly aware of the issues that those who are least able to manage these risks face. Collective responsibility, in this sense, now includes the redistribution of resources to balance these inequalities. For example, human rights to health (contextualised by the quality of the environment) are universal to the all cosmopolitan citizens and remain relevant to the future citizenry.

In short, the sustainability paradigm shift includes the establishment of ecological citizenship as a universal form of citizenship based on access to human rights to health and wellbeing. This is supported by the capacity to engage in governance based participatory decision-making processes. It establishes socio-technological innovation as a medium for the inclusion of human rights in the everyday practices of the individual, part of their discourse at the micro level, and between the individual/micro and exosystem levels through real and virtual communications platforms at the meso level. It also establishes attitudes and behaviours which enable access to human rights at social and institutional levels.

Example: health and sustainability as drivers of socio-technological innovation and cosmopolitan ecological governance

A New Global Partnership[107] (EESC) makes a series of recommendations which relate to sustainability, including:

> "Participants from local, regional and national authorities, EU and UN level policy-makers, social partners, environment, development, human rights, agriculture and

[107] A New Global Partnership: http://www.eesc.europa.eu/?i=portal.en.publications.31415

> consumer organisations; industry, business and academia brought a wealth of perspectives into the debate. This summary of key points, prepared by the Conference organisers, will be brought to the attention of EU decision-makers in order to contribute to the formulation of a strong EU negotiating position on the Post-2015 Sustainable Development Agenda."[108]

The main recommendations of the document include a human rights approach to adaptive capacity measures by key indicators of biopsychosocial health and wellbeing as the foundation of sustainability as:

> "…based on social justice, non-discrimination, and the advancement of human rights, equitable sharing of global resources and respect for the planetary boundaries … developed and implemented through global partnership … [founded] on accountability and policy coherence"[109].

They recognise the need to pay special attention to vulnerable groups emphasising the importance of reliable data collection and business becoming involved in eradicating poverty to reduce "inequality, social and [establish basic and fundamental] environmental standards and ensuring corporate accountability"[110]. Their responses to sustainability emphasise "the production of an ambitious, universally applicable and integrated … agenda … [which would transform the current] … fragility into a century of sustainability, and to ensure well-being for present and future generations … including setting social and environmental standards including global resource use goals"[111]. Finally, they recognise socio-technological innovation and education as the tools by which to engage and retain the active participation of cosmopolitan citizens empowering them to inspire the establishment of active sustainable collective responsible communities of "transparent local and national governments empowering citizens … [and] participation … [is] not limited to the design of the framework but be a central piece in its implementation, monitoring and evaluation"[112].

[108] Ibid

[109] http://www.eesc.europa.eu/resources/docs/qe-02-14-295-en-c.pdf: http://www.eesc.europa.eu/resources/docs/qe-02-14-295-en-c.pdf

[110] Ibid

[111] Ibid

[112] Ibid

The following scenario represents the effective implementation of the EESC's strategic goals supported by the BiMEC model. This scenario focuses on social and technological innovators engaging with each other through risk issues resonant to them; e.g. health. This illustrates how ecological citizens might promote sustainability at all societal levels.

- First, knowledge processing mechanisms can be established which identify knowledge, those who accept knowledge from who, and in which format. It identifies who refuses to engage with/uses/accept the validity of/disputes the credibility of certain kind of knowledge, and ultimately how consensus may be reached. In this way, grassroots discourses can be represented in the (re)direction of policies and development programmes in the areas of health, the environment, and innovation at all societal levels. This provides the opportunity to ask whether knowledge sharing platforms support governance, and what forms emergent cultures of collective responsibility are possible. Further, we can ask which forms of collective retain the engagement of local social innovators in the participative co-design of resolutions to risk, and in the formation of socio-technological innovation spaces.
- Second, semi-state organisations whose role it is to engage in, and contribute to, national discourses around sustainability issues (National Economic and Social Council- NESC- in Ireland and the European Economic and Social Committee- EESC- in Europe) provide a bridge between the political establishment and organised civil society. Specifically, the EESC are responsible for:

> *"a) helping to ensure that European policies and legislation tie in better with economic, social and civic circumstances on the ground, by assisting the European Parliament, Council and European Commission, making use of EESC members' experience and representativeness, dialogue and efforts to secure consensus serving the general interest;*
>
> *b) promoting the development of a more participatory European Union which is in touch with popular opinion, by acting as an institutional forum representing, informing, expressing the views of and securing dialogue with organised civil society; and*

c) promoting the values on which European integration is founded and advancing, in Europe and across the world, the cause of democracy and participatory democracy, as well as the role of civil society organisations."[113]

- Sub-committees are set up for specific issues. The EESC maintains regular links with regional and national economic and social councils throughout the European Union. These links mainly involve exchanges of information and joint discussions every year on specific issues. This body, in collaboration with local government representatives and the NESC could easily establish active CAPS platforms to enable systematic, yet open and inclusive, public participation around defined sustainability issues. Members of these groups could be assigned to roles on what could be entitled *CAPS cooperation committees* as part of their overall duties and responsibilities where they could become involved in these debates and work with projects. Also, I suggest, this EESC CAPS Committee or rapporteur could be established whose purpose is to review, summarise and include policy papers and recommendations which emerge from CAPS projects. This would act as a mechanism through which collaborative discourses between policy makers and European citizens could be nurtured. As local, national and European CAPS representatives would also be involved this would establish a clear line of communications between the EESC and civil society at all levels.
- Third, the awareness of environmental risk as a social justice issue should be effectively communicated at all societal levels. Further, when faced with risks to their health and wellbeing, information relating to the mechanism by which an individual can access their human rights through existing systems (Rights Commissioners, Courts) should be included as part of the programme. This would provide the clear delivery of practical information in what is currently a complex legal and policy arena. It would simplify access to information about fundamental rights, increase awareness of the connections between health and environmental risks, and simplify access to justice.
- Fourth, existing public participation mechanisms should be made more transparent and streamlined through these programmes. The current mechanisms by which a citizen can have their opinion heard include lobbying directly through a local government representative, through the Committee of the Regions, through a national government

[113] A new global partnership: http://www.eesc.europa.eu/?i=portal.en.about-the-committee

representation in the Council of Europe, through local MEPs, through European Policy Committees, and through submission to the European Commission. These mechanisms could be simplified through the establishment of the special *CAPS Committee of Regions*[114] at the European level which could report on outputs from CAPS programmes.

These platforms highlight the importance of the inclusion of experiential knowledge and effective procedures for the moderation and mediation of discussions in the formulation of consensus-based ideas which are resonant with, and likely to influence, policies and their implementation. By extension, these platforms offer the opportunity to co-design new institutional structures which themselves streamline public participation processes at all societal levels. In this way, the BiMEC model represents the opportunity for a form of governance to emerge which is inclusive, participatory, transparent, and therefore salient and credible. This, I argue, improves the likelihood of the wider acceptance of the sustainable innovations. It is explored further through the other themes of the model.

7.3. The relevance of socio-technological innovation in creating real and virtual innovation spaces

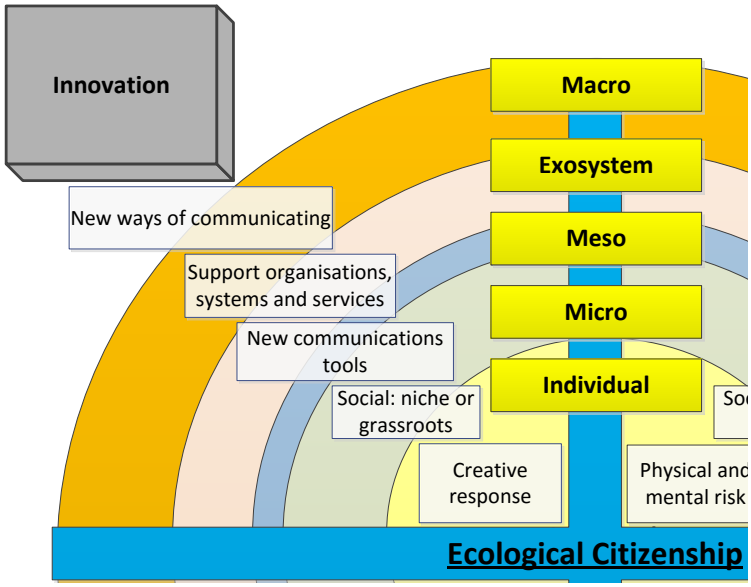


Figure 13: BiMEC model innovation quadrant

I have illustrated the potential socio-technological innovations have for ecological citizens in improving their capacity to access their human rights, by improving their capacity to engage

[114] The EU's Assembly of Regional and Local Representatives: http://cor.europa.eu/Pages/welcome.html

in public participation and decision making. This section explores the potential benefits of this approach to innovation through the main subthemes of *forms of innovation, new opportunities*, and *changes in lifestyle*.

A challenge to the BiMEC model is in helping to identify, examine and deconstruct the barriers to engagement with social and technological innovations which can empower ecological citizens, enable organisations to reach their goals, and support sustainability. Understanding the motives of participants and non-participants and what is resonant with them, supports the strategical direction of campaigns targeted at individuals. This approach should improve the capacity to attract and retain cohorts of social innovators and other interested stakeholders. Existing activists, grassroots actors, and social innovators who are already prominent in climate change debates represent mediums through which local actors may be encouraged to get involved in CAPS. These local actors are trustworthy and aware of the issues in the local setting. This approaches maximises the potential for engaging a diverse group of citizens which more adequately reflects a representative cross-section of society.

> "*To positively impact a social group, identifying the priority real-life issues they face and understanding some of the problems they are coping with are crucial steps. Not explicitly going through this process may lead to solving a non-existent problem.*
>
> *Local organisations or institutions somehow related to the community of interest may help in paving the way to establish a dialogue between people. Community leaders who are trusted can also act as spokespeople or ambassadors for the CAPS project, establishing a sense of trust between the users and researchers. Workshops, seminars, interviews, surveys and online platforms are examples of strategies that can be applied to dialogue. The best strategy for establishing the dialogue differs according to the social groups and to the project, but it is clear that people will only take part in it if they trust and believe in the positive impact to their lives*."
>
> (Arniani, M, 2014: 49)

There is significant variation in how individuals access information, react to risk events, and the forms of knowledge exchange which support the formation of different types of collectives. The identification of the type of knowledge exchange that is most appropriate is

influential in the design of the procedure for engaging and retaining individuals in collective discourses among online groups and in the active inclusion of other social actors such as businesses, environmental networks and policy decision makers. The effective articulation of sustainability discourses requires parallel processes where individual groups form face-to-face links at the local level, and online communities form collectives through mediated platforms. Both groups should have different mechanisms for the engagement of policy makers in these discourses.

The advantage of adopting a socio-technological approach to innovation is that it can involve different contributors concurrently in the same discourse. Some examples presented in this thesis highlight the potential of a new interactive global communications systems which can: 1) open up sustainability discourses to citizens from across the world engaging in local and national discourses supporting the promotion of this form of ecological citizenship; 2) share ideas (create awareness) and innovations which may inspire new collective responsibilities (attitudinal change) and promote active sustainability practices (behavioural change): e.g. improved resource management systems, new socio-ecological and socio-economic models such as environmental tourism practices (e.g. Ecobooley), improving the capacity of individuals to engage as ecological citizens at a local, national and international levels, etc.; 3) inspire local organisations and groups to implement some of these innovative solutions to environmental risks (e.g. the Suir Fishermen's Federation); and 4) inspire the further evolution of the ideology and culture of cosmopolitan sustainability.

ICT's open communicative opportunities and offer the potential for multiple forms of engagement and real and virtual innovation spaces; they also present challenges. As with all resources they are currently unequally available to global citizens; this is the definition of the digital divide:

> *"The digital divide is the gulf between those parts of the population that have access to the internet and other digital technologies, and those sections of the population that do not. There is concern that as so many services (both commercial and governmental) become available online, groups without digital access (caused by, among other*

things, high cost, lack of skills, location, or a combination of these) will be left behind, and miss out on opportunities in life and in work." [115]

Consequently, while new communications technologies can be emancipatory, they also represent a boundary to equality between ecological citizens in their access to adaptive capacity and, by extension, to sustainability. A challenge for socio-technological citizenship is to devise a means of addressing the challenges of the digital divide through increasing access to new technologies and digital communication resources for social innovators enabling them to become socio-technological innovators.

The key challenges identified by the Digital Agenda for Europe (DAE) are summarised in the headings below. The implementation of a collaborative programme which is open and inclusive of all stakeholders will include significant practical and ideological challenges.

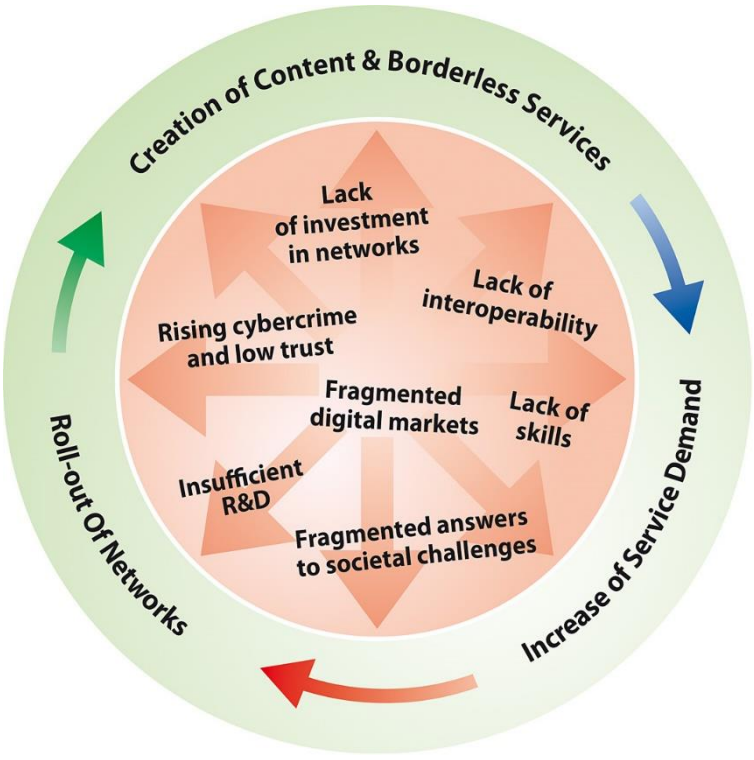


Figure 14: DAE: Virtuous Circle of the Digital Economy: (DAE, 2010:4)

Examples of these barriers include cultural differences, language, internet access, computer literacy, and national intellectual rights. The "Virtuous Circle of the Digital Economy (DAE,

[115] Digital Agenda for Europe Broadband Glossary: http://ec.europa.eu/digital-agenda/en/broadband-glossary#D

2010: 4) suggests that these issues may be addressed individually and through collective innovative approaches. Here, the *flow of activity* (represented by the external three goals illustrates in the external green ring) may become reinforcing and address inequalities of access and hence improve adaptive capacities of all citizens.

Not everyone, however, believes that becoming involved with these discourses is necessarily worth the trade-off of having to engage with a broader range of citizens through online platforms. The level of involvement and commitment required of each individual depends greatly on the nature of the innovation. For example, in Cloughjordan they have been working on innovative ways to recycle waste to make fuel. This is to be open and shared knowledge provided without intellectual property rights and available for free. If they were to collaborate on the development of these technologies with researchers, technologists, academics, and industrial collaborators freely sharing intellectual property rights may not be possible. Projects such as this should, therefore, be supported by mechanisms that allow for the free sharing of information (e.g. open data and open software) which emerge out of the collective discourses and are for the benefit of all ecological citizens.

The parameters for participating in a CAPS platform, or socio-technological innovation project, should be based on several key issues:

- knowledge sharing,
- growth and the development of means of communicating information,
- the promotion of inclusive political and economic practices that reduce inequality,
- situating health at the centre of innovations, and
- be formally, or informally, attentive to fundamental human rights.

The 'open' nature of the innovation needs to be clarified at the earliest stages of the programme. While the same platforms are used to support different discourses and different output/impact procedures for arriving at consensus, the use of the data emanating from the programme should be made clear at the beginning.

The vision behind BiMEC is one in which individuals can collectively support environmentally responsible actions if they are given the opportunity to act socially, based on open, transparent, accurate and trustworthy information.

Examples include:

- empowering and motivating citizens to make informed decisions as prosumers and foster more direct democratic participation,
- accessing real-time and easily understandable information on resource consumption; defining and accessing complex environmental information through models and simulations, and
- promoting sustainable and collaborative consumption as a basis for an effective low-carbon economy.

The provision of open data and open software promotes the development of innovation spaces that can sustain engagement to maximise inclusivity in discourse and the impact of a collective initiative on an institutional and policy levels. The barriers to engagement must be broken down, and appropriate motivations to engagement identified to achieve this. This can be achieved as follows:

- Choosing an effective medium of initial contact,
- Ensure that the issue is presented in a manner that is highly resonant across all social bodies and all social levels (e.g. health),
- Enabling participants to articulate their interpretations in the contexts of their specific socio-cultural settings as evident in the normative language used which makes sense for all participants,
- Interpreting this language and its meanings in enabling collective responses to problems raised allowing them to articulate their framing of events in participatory discourses at the institutional level,
- Measure and recognise the ability to improve the adaptive capacities of individuals, collectives, and institutions, and
- Identify and issue rewards (in a variety of guises) for remaining involved in responsible actions.

Ultimately, these innovation spaces enable the sharing of knowledge through these platforms. This approach enables effective dialogue by identifying the narratives and promoting consensus and promotes public participation and governance. It also includes

outreach to, and the inclusion of, decision makers and policy makers in meaningful and participatory discourses with grassroots movements. CAPS are vehicles for linking individuals and collective grassroots movements to policy making as part of a coherent local, national and European governance programme. At the exosystem level, all state and non-state institutions that are engaged in the programme of sustainability may be provided with a vehicle for engaging in an active discourse with a diverse range of environmental groups through an interactive medium. This can be built into a model of socio-technological innovation in the real-world exosystem level setting (i.e. local government, policy panels, etc.) through broader reaching participatory forums. This inclusion of institutional level stakeholders in the process of the negotiation of meaning also allows for the identification of areas where citizen's views may be accommodated in a more open and discursive way, and consequently more effective in supporting these institutions in implementation their mandates. For example, many policy makers in Ireland are already using many social media formats (e.g. Twitter) to engage with their constituents. Adopting a CAPS based approach is simply taking this approach to the logical next step by building interactivity into the discourse, and the capacity to capture, analyse and visualise the data.

For example, a significant benefit of this type of programme is in its capacity not only to involve social innovators in policy making around sustainability at all stages of its co-design but also to implement evaluations of the efficacy of this approach at each stage. For instance, if innovators have local experience, often crucial for the effective implementation of sustainable practices, an improved communicative mechanism has the potential to engage these, and other, local communities and social actors. These new participants may have unique perspectives on events and may suggest unique solutions. These insights/opinions/framings emerge in response to environmental risks.

When shared with different groups, these individual framings contribute to and enrich, the collective framing of the event. It then becomes possible to identify and compare what activities are evolving, and what priorities are changing, through innovation and what role technologies play, and could play, in the future.

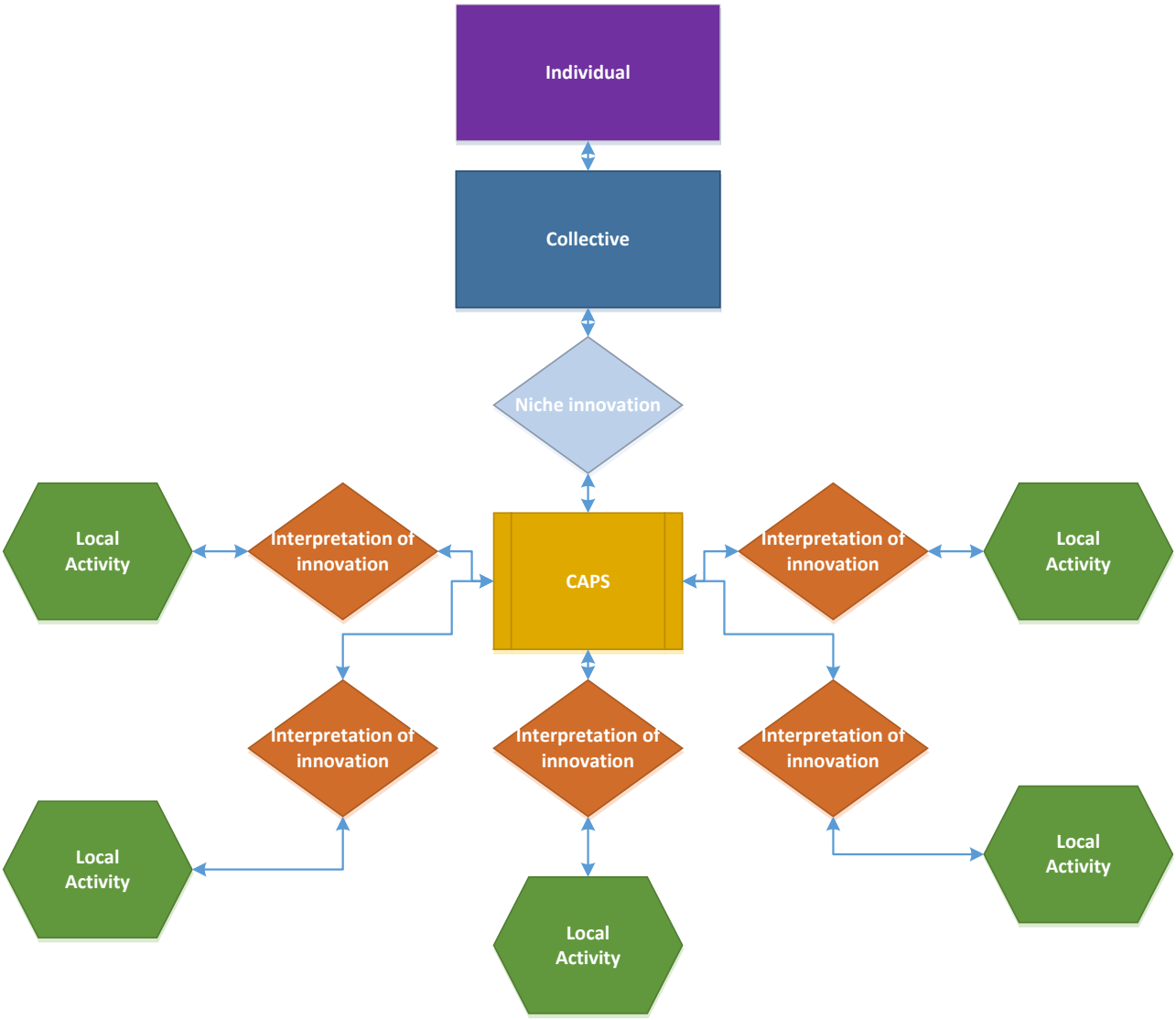


Figure 15: Example of the potential CAPS enabling socio-technological innovation spaces

For example, employing CAPS platforms we can capture the data stemming from individual collaborations in the form of qualitative data (discussions), and social network data and/or quantitative data (connections, networks, number of contributors, frequency of contributions, resonance of key issues) allowing for the examination of the process of consensus formation through a mixed-mode approach to data analysis. We can examine the most important communications procedures, interpretation of innovations in the local setting, and the format socio-technological innovations take in the local activity relative to those which best support consensus at the local and cosmopolitan levels.

Some examples include:

- collective intelligence creation/shared longitudinal data and scenario building;
- backcasting (setting goals for the future and deciding what we need to do to achieve them now);
- roadmapping (what roadmap do we need to employ to achieve these goals);
- generating and sharing data on real-world incidences;
- the employment of semantic web;
- the use of new and future internet technologies;
- the relevance of the internet of things to the implementation of effective, sustainable solutions;
- the potential for 3D scenario development, modelling and printing; and
- mobile technologies such as eHealth/connected health and their capacity to capture and manage personal information through user feedback tools.

It is possible to identify the main characteristics required for the development of systematic procedures for effective communications. For example, analysing the implementation of the Digital Agenda for Europe (DAE) through the lens of BiMEC, we can conclude that there are several characteristics required which allow for the formation of a socio-technological innovation space:

- Accessibility: current standards in IT should support the drive and development of systems which are accessible across a variety of devices, open source software, and different platforms, are free or cheaply available, and easy to use for a range of service users.
- Privacy: The Charter of Fundamental Rights supports the right to privacy of data. The privacy of their data is a central concern for European citizens (Special Eurobarometer 431). There are several ways to protect one's data and privacy, while also allowing for an open and inclusive discourse. One is added security within a programme itself. Another is by defining the ethical boundaries which govern the anonymity of participants. One outcome of these approaches is that they may improve the right to privacy and protection of personal data and simultaneously foster greater trust and willingness of citizens to express their opinions freely without fear of repercussion or repression. In this way engaging in online platforms and mechanism where knowledge is shared openly directly

allows equal access to the discourse by all participant's, and addresses democratic deficits for those who have fewer resources.

- Digital literacy and competency: empowering and emancipating users in the digital age, enhancing participation and digital competence which are fundamental in the knowledge economy.
- Infrastructure: providing fast internet access to all citizens. A lack of access to broadband reduces the capacity of many to participate in these forms of innovation. Engaging in these debates by active and empowered ecological citizens can drive the agenda for the roll out of broadband and other forms of digital technologies. These may include broadband initiatives such a satellite broadband (Satellite broadband is network connectivity provided through low-earth-orbit -LEO- or geostationary satellites) or the use of mobile technologies in remote areas for the dissemination of health care advice in developing countries. The Broadband Commission for Digital Development represents an organisation working on these initiatives. They advance the debate that access to communication is a human right and that Broadband is a critical modern infrastructural resource. Further, this right spans the digital divide including regions within developed countries, less economically developed countries, and a range of cosmopolitan citizens who do not share the same access to digital technologies.
- Collective design: promoting the co-design of socio-technological innovations including all citizens at all stages of the innovative process. This inclusivity encourages not only innovation but the co-design of communications, technologies, programmes and the methodologies for their implementation. This promotes knowledge and usability of the ICT resource, tailors it to a specific setting and community, encourages creative responses to environmental risks, and promotes better standards in ICT.
- Investment: greater investment in research and development to ensure best socio-technological innovations are explored that lay out joint technology roadmaps, from research to harnessing innovation for social need.
- Policy and human rights: health and humanitarian policies support inclusivity in cosmopolitan ecological governance.

- Meta-narrative: these socio-technological innovations should be based on the progressive institutionalisation of sustainability as a meta-narrative as a fundamental underlying concept from which to build the innovation space.

This approach clearly frames the socio-technological innovation and the evolution of ecological citizenship, within an open, transparent and credible sustainability paradigm. Sustainability and health, I argue, represent the most stable socio-political and human rights based arguments from which to build these inclusive spaces, and from these spaces establish the BiMEC model as a normative construct.

7.4. Sustainability, health and the BiMEC model as a normative construct

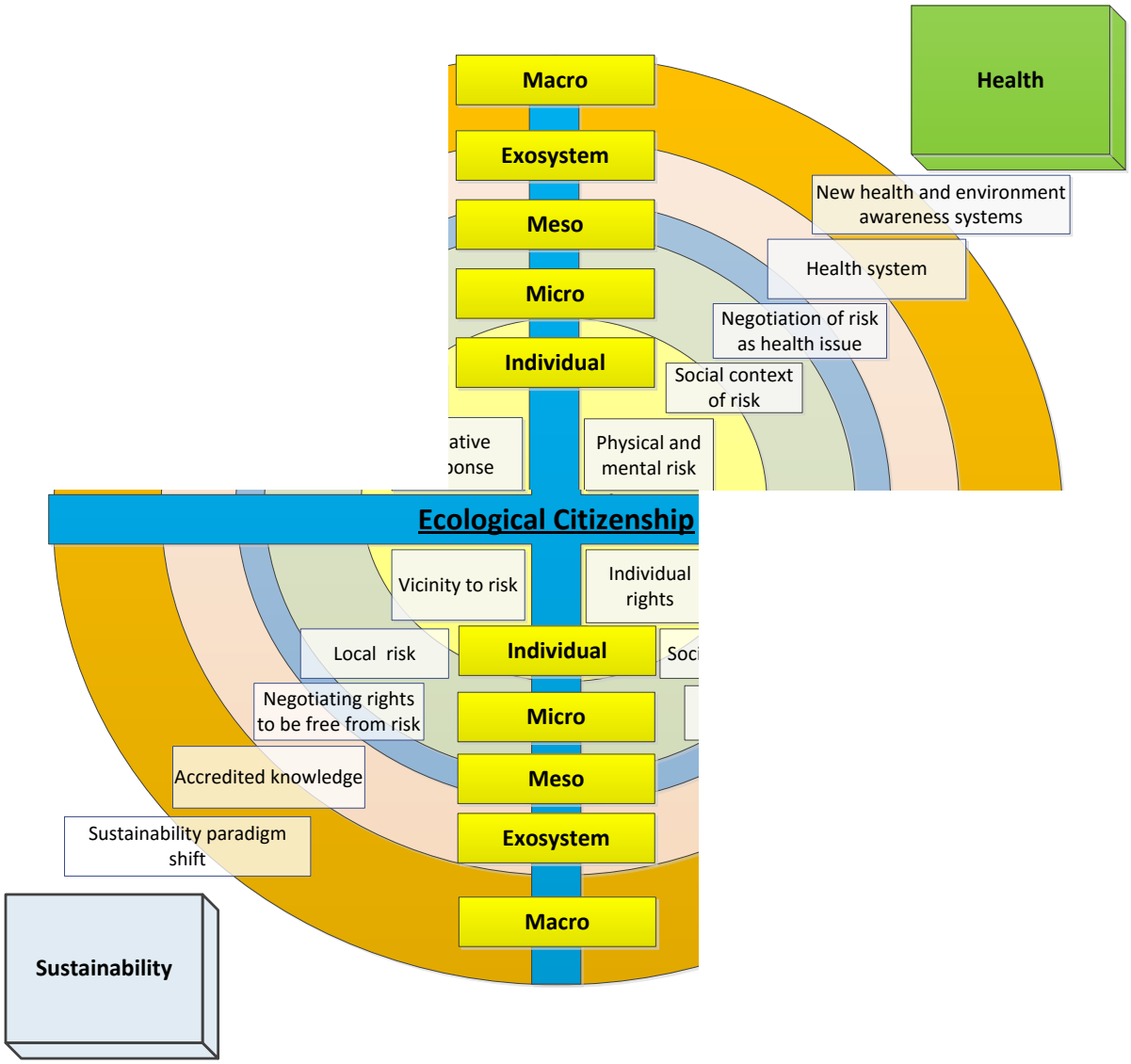


Figure 16: BiMEC model health and sustainability quadrants

There is a disconnect between the use of the health theme in the official language at the institutional level and the implementation of policy and its employment in the framing of sustainability among niche social innovators. Linking human health and wellbeing and environmental health at all societal levels is a key outcome of this research and an area that could be the focus of future work. This work should continue to employ health as the fundamental catalyst establishing the BiMEC model as the basis of a socio-legal argument in support of the recognition of sustainability as a human right.

This, I argue, could be the foundation of innovation spaces which include communications systems that enable the sharing of information, and implementation of innovative solutions to environmental risks at different local levels simultaneously. This enables innovators to participate in the development of cosmopolitan collectives which support innovations and promote sustainable practices.

Further, discourses through these innovations spaces focused on the improvement of governance practices serve to normalise and institutionalise the model of ecological citizenship. Once this becomes a normative societal construct, it emerges that this supports the institutionalisation of sustainability at local, national and cosmopolitan levels.

7.5. The biopsychosocial model of ecological citizenship (BiMEC): its contribution to social science and potential research directions

The sustainability paradigm is based on the premise that events occur at specific times and in specific societal contexts which include: the current disposition of individuals; contemporary social and civil society movements and institutions; and societal trends/macro frames/meta-narratives such as sustainability and climate change. These factors influence the resonance of events to individuals and inform their responses to them which emerge as collective responsibility. The model presented here defines this emergent responsibility and situates it in the context of a multi-stakeholder narrative including ICT innovators, social innovators/activists, environmental scientists, the lay public, policy advisors and other social bodies/actors.

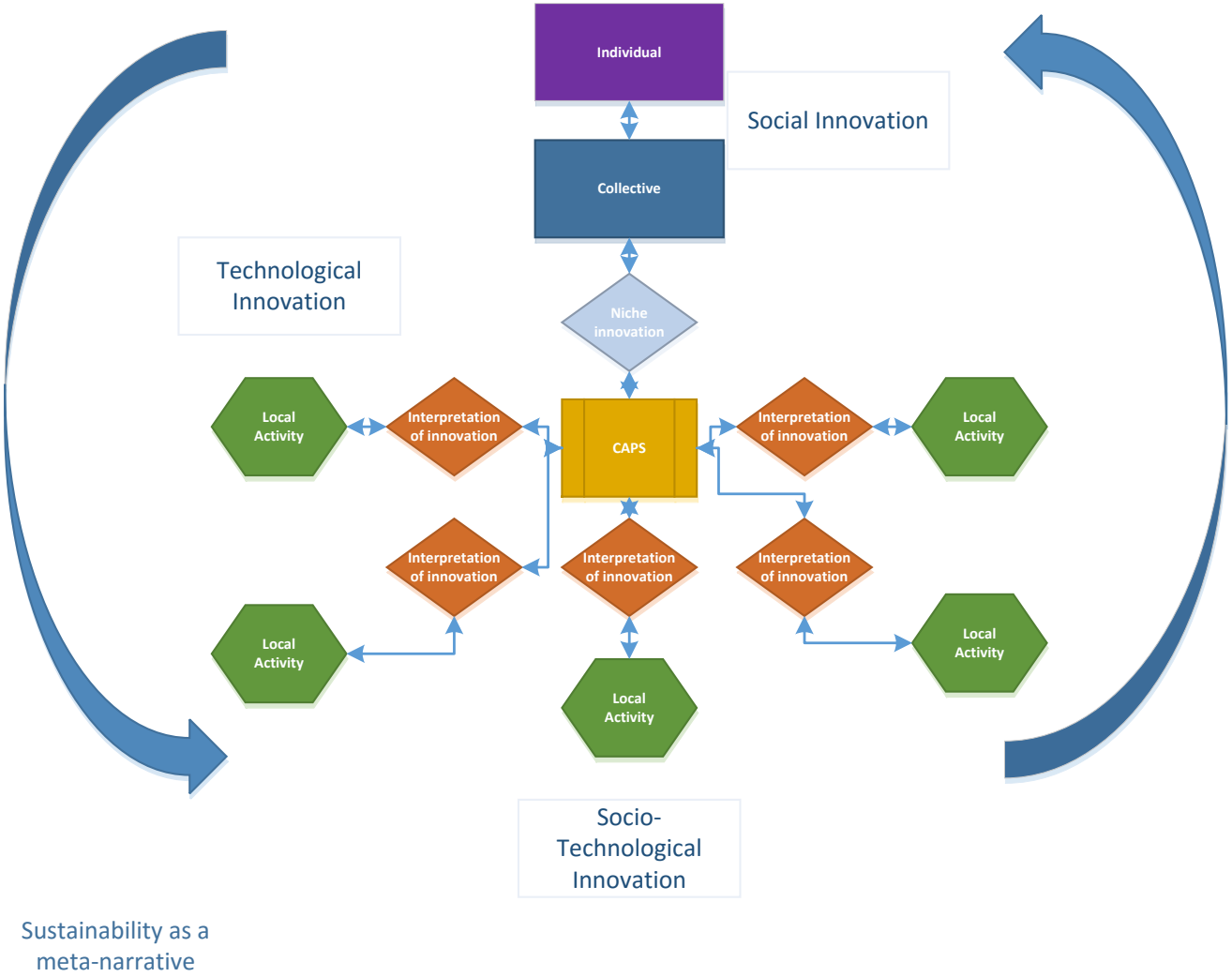


Figure 17: Sustainability: from metanarrative to paradigm shift

I argue that BiMEC can support a vibrant and inclusive form of open governance based on equity and mechanisms which empower citizens by providing them with increased capacity to mitigate the risks of climate change. This improves their adaptive capacity based on the four key themes of the model: improved access to better health; increase capacity to enact their human rights to be free from environmental risk; improved capacity to engage in innovative solutions to address these risks; and the ability to engage with (and define) a more sustainable lifestyle. This allows for the identification and examination of critical societal risk issues through a cross-section of society. It allows for the measurement of the effect of the

implementation of the risk mitigation strategies via local action groups across multiple sites simultaneously through the collation and analysis of the cumulative effect of their combined efforts on improving the adaptive capacity of the individual ecological citizens. It allows for the documentation of the changes that the implementation of the model has on each societal level. This situates the sustainability discourse at the core of cosmopolitan citizenship/human rights and health discourses, and as a contemporary 21st-century paradigm.

7.6. Summary

Development, based on the exponential global population growth and increases in quality of life which consequently require the extraction and exploitation of more and more resources, is unsustainable. Human beings must move away from the concept of sustainable development and towards sustainability. If there is a way to achieve sustainability, health as a basic human right is a core component of the solution.

ICT's, and the access to information they provide, open boundaries to diverse representations of events and the potential for a variety of interpretations of these events. This, in turn, opens up the potential for the inclusion of many new discourses. These discourses around global issues, such as sustainability and climate change, occur across the cosmopolitan public sphere. They contain global risk, rights, responsibility and sustainability debates. These constellations (Habermas, 2001) have local, national and cosmopolitan contexts through which they challenge individuals to become more innovative and to reconstruct, redefine, and reinterpret what is taken for granted.

Promoting socio-economic and socio-political practices based on sustainable socio-technological innovations promotes equal access to fundamental resources. Through the exploration of this way of thinking, and being, it may become possible to move beyond a position where economics acts as the primary driver of sustainability and innovative decision-making processes, and we avoid the traps of localisation of solutions. I argue that to situate fundamental concepts of health and wellbeing of all human beings at the centre of the debate mitigates this by emphasising the requirement of upholding all citizen's rights through collective responsibility.

Within the BiMEC model, individuals may become engaged in discourses through communities of interest such as grassroots movements and NGO networks. CAPS programmes may be used as vehicles for these groups to communicate their messages to a larger audience. In this way, grassroots discourses have a voice in directing knowledge paradigms (e.g. the sustainability paradigm) as they emerge through new information sharing systems (e.g. a local representative, or interested stakeholder, can be designated to act on behalf of a collective in the online forums by the group). I argue that it is this model can act as an empirical-theoretical tool which enables the social scientist to identify the following:

- a means by which awareness of environmental risks can be improved;
- effective methods by which to encourage more individuals to become involved in these debates; and
- methods by which these participants may be inspired to become actively involved in programmes which address local environmental risks.

The BiMEC model presented here supports the effective integration of human rights, health, innovation, and national and international sustainability discourses. This acts as a means for social and technological innovators to form collectives via a series of real and virtual innovation spaces. It is through these hubs that we can increase public participation in rights-based discourses, support the formation of a culture of collective responsibility, and promote better policies and treaties and their implementation. This, then, improves the adaptive capacity of ecological citizens, and equity in society.

In summary, ecological citizenship is emerging at the policy level, supported by scientific evidence, and is being driven by social innovators. It acts as a socio-legal manifestation of the sustainability meta-narrative that is continuously being constituted, contested, reproduced, and transformed as part of the ongoing construction of social reality (Berger and Luckman, 1996). This dynamism ensures its continuous relevance to changes in societal structures, communications, human rights, institutions, and environmental challenges. It establishes sustainability as an emerging contemporary cosmopolitan paradigm in the 21st century.

8. Chapter 8: Conclusion

Can sustainability be realised in a world of finite resources and a population which is increasing exponentially? Can social and technological innovations enable human beings to escape the physical laws of entropy? I would argue no; a finite system driven by endless growth is unsustainable. However, I argue that communications technologies set in socio-political and socio-legal frames based on the human right to health can at least open sustainability debates to include all social actors and ecological citizens. This provides all citizens with a voice in the discourses around our fundamental right to survive.

The effective development and implementation of socio-technological innovation spaces require the engagement of communities of interest in discourses around risk to the use of, and access to, resources. It involves them in the co-design of the space and includes them in its implementation. This maximises the potential of the engagement of innovators as ecological citizens. Further, if these resource issues are common to citizens from different localities, this will allow for the identification of common global environmental risks, relevant narratives, and the barriers to sustainable practices. It will also identify the availability of resources across different regions and begin to set realistic and sustainable standards for collective responsibility measured by the adaptive capacity of the individuals and collectives involved. New technologies (e.g. CAPS) and new skills (through new education programmes, innovation practices) support this.

The realisation of the model of ecological citizenship, in this context, is based on series of incremental processes which serve to build a culture of collective environmental responsibility. A series of events and discourses which construct identities that emerge as forms of ecological citizenship constitute the sustainability paradigm. The cosmopolitan public sphere (Heater, 2002; Hutchings, 1999; Linklater, 1999; Archibugi, 2000; Habermas, 2001) is saturated with vertical and horizontal communications which position these ecological citizens as drivers of innovations supporting social justice and global governance. What is important is the capacity to engage and retain active participants in sustainability discourses through these effective and inclusive communication mechanisms.

The BiMEC model supports universal access to human rights and the formation of collectives engaged in resolving the challenges of sustainability. These collectives are formed through open and inclusive discourses. As consensus is reached through the participative processes and the facilitation of structured sustainability discourses involving multiple stakeholders, the possibility of the rejection of the proposed innovation decreases by maximising the resonance of the innovation, increasing the potential for its implementation across multiple sites through collective action, and reducing the influence of antagonists.

The model includes: clear indicators of adaptive capacity upon which socio-technological innovations should be based; the parameters for sustainable socio-economic transformation through innovation; an emphasis on the importance of the expansion of social communication; the fundamental inclusion of biological and psychological health as issues of social justice; and the formation and implementation of new policies and treaties based on adaptive capacity.

I suggest, therefore, that it is possible to use the BiMEC model to identify the adaptive capacities of ecological citizens based on their access to specific resources. Based on this analysis, the model will then allow for the identification of democratic deficits which prevent individuals in accessing these resources and identify mitigation strategies which reduce these barriers to the participative co-design of socio-technological innovations. Further, it is possible to argue that these adaptive capacities are measures of the potential individuals have in becoming ecological citizens through the following: how they can engage in risk discourses; how they can access their human rights to health; and, how they can participate in collective responses to these risks.

This thesis argues that the Biopsychosocial Model of Ecological Citizenship (BiMEC) supports the effective integration of policies and human rights across thematic areas of health, innovation and sustainability. It does so by offering the opportunity to connect the local grassroots civil society actors and initiatives with cosmopolitan digital discourses via structured and open discourse. This enhances the capacity for governance based ecological citizens to promote sustainability as the contemporary cosmopolitan meta-narrative for the 21st century. This model itself is dynamic and adaptable to changes over time. The adaptability of the model, and its potential for the enhancement of the capacity for the individual to adapt

to climate change risks, supports ongoing usability of the model and its continuous relevance to changes in societal structures and institutions, communications, human rights, and environmental risks. In short, it increases the potential for the sustainability of the model of sustainability.

The impact of this research will include the provision of a methodological tool and model which will increase inclusivity in public participation and decision making around issues of environmental concern. This can drive further research in national and international contexts examining the resilience of health as a fundamental measure of adaptive capacity, and adaptive capacity as a fundamental measure of ecological citizenship. It can also inform the development of new forms of collective awareness platforms and socio-technological innovation spaces which support the developments of strategies and policies which promote citizenship engagement, increasingly equitable models of governance, and the promotion of the sustainability paradigm as a driver of social and political decision making into the 21st century.

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