SI-DRIVE
Social Innovation: Driving Force of Social Change

SOCIAL INNOVATION IN ENVIRONMENT AND CLIMATE CHANGE: SUMMARY REPORT

POLICY FIELD ENVIRONMENT
D6.4 ENVIRONMENT

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CONTENTS

1 EXECUTIVE SUMMARY

Needs and challenges

The main interest of social innovations in the area of environment is reducing society's environmental impact. Detrimental environmental impact can take a multitude of forms, many of these like the deterioration of oceans and marine habitats, the stratosphere or rainforests, cannot be felt everyday by individuals on a local level. However, these areas of the environment are influenced by the everyday behavior of individuals on a local level which is often motivated by short-term profit thinking and an emphasis on individual benefits over social benefits (*tragedy of the commons*). It is the ambition of many social innovation initiatives to bring new solutions to environmental problems in providing a local context to often global environmental problems. A more sustainable economy is a major issue in social innovation in the area of environment. This is hinged to more sustainable production chains, to all aspects of the circular economy and to consumer patterns and consumer choice. This strong dependence on consumer patterns and consumer choice entail, of course, increased awareness of (un)sustainable behavior and puts emphasis on citizen engagement and inclusion more generally. Several challenges can be distinguished in the field of environmental and climate policy that are currently addressed at different levels – nation states, EU and global organisations (e.g. UN); e.g. climate change, air pollution, energy efficiency, resource efficiency and sustainable consumption & production, biodiversity, or water management and water pollution.

Global and regional differences

There are huge regional and global differences in conceptualising projects addressing environmental challenges as social innovation initiatives. One example here is the Nordic region. Here social innovations often have evolved as the result of an outrage to deal with ongoing unaddressed situations and problems – among these are also the destruction of environmental assets, mistreatment of animals, wasting of food or other resources, etc. To varying degrees this is also the case for other countries of the European Union.

However, in many countries around the world social innovation is to a lesser extent associated with environment and climate change, but is developed and implemented to solve other pressing needs. It is not that environment and climate change are not huge problems in many of them, but apparently they are not connected with the concept of social innovation.

Practice fields of social innovation in Environment and Climate Change

Exemplary practice fields of social innovation initiatives in Environment and Climate are displayed below. In parentheses the number of social innovation initiatives included in the SI DRIVE Global Mapping.

Practice field	Examples of sub practice fields	Description
Alternative and sustainable food production and distribution (19)	Reduce food waste Marketing of sustainable Agriculture	Projects reach from associations of interested people who buy organic food in a self-organized way directly from local farmers and to give everybody the opportunity to consume high quality organic food to the production of sustainable (organic) food itself
Protection and re-storing of eco-systems & biodiversity (16)	Encouraging use of local plant species and seed varieties	Aiming at the challenge of continued loss of biodiversity, awareness raising and education plays a role, also a combination of awareness raising and monitoring, the issue of biodiversity can be combined with other social goals, such as the integration of asylum seekers through joint work in a nature garden
Repairing, re-use, extending life time of products, recycling (14)		Avoid the waste of precious raw materials and the realization of low or zero waste economy, repair-cafés where people meet and exchange knowledge and help each other to repair broken products.

Sustainable (strategic) consuming, sharing economy (9)	Sustainable (strategic) consuming & new procurement practices (Carrotmob)	Contribute to the emergence of a 'sharing economy'. These social innovation projects aim to make it possible for people to share products and services with each other.
Urban Gardening (3)	Urban beekeeping	Projects which practice different approaches of gardening in urban regions such as parks within cities
Sustainable living (3)		develop radically new ways of living and working, such as ecological villages based on a sustainable and solidary economy replacing a societal model based on economic growth, often alternative ideological models as well

Policy context

In the policy field of environment and climate change relations to policy are not one-directional, see Figure 2 for an overview.

- On the one hand, there is impact from policy on social innovation. Social innovation initiatives do receive active public support, be it in the form of financing through public programmes or buy-ins through politicians (legitimization, organisational support in the collection of special forms of waste etc). Social innovation initiatives also benefit from policy framing in the field, i.e. EU policy framing that provides a legal obligation to separate waste on the level of municipalities.
- On the other hand, social innovation initiatives in environment often develop because they want to have an impact on policy, or compensate for missing policy – social innovators want to impact on policy. Here, policy change is in focus and policy is seen as the arena to achieve change. Social innovators may advocate for more far-reaching government action or get involved in debates on legislation (e.g. on waste from electrical and electronic products, WEEE).
- And a third connection to policy is that some social innovators desire explicit measures to support social innovation initiatives. More favourable fiscal and legal conditions for social innovations should also include special seed financing which should have features different from seed financing for commercial undertakings.

With regard to the relevance of different policy levels it becomes clear that the European policy level is of very high importance in the field of environmental and climate policy. Since the beginning of EU environmental policies in the 1970's, the importance has increased steadily over time, so already in 2005 it could be stated that "[…] the vast majority of national environmental policies and laws have their origins in EU law" (EEB, 2005, p.8).

Actors and resources

In Environment and Climate Change, the initiatives seemed to primarily rely on non-governmental and non-profit organisations, and more than others on private companies (together with Energy Supply and Transport and Mobility). Public bodies are underrepresented in *Environment & Climate Change* compared to the other policy fields. The strong involvement of private companies as actors in the social innovation initiatives in Environment and Climate Change also explains the prominent role of economic returns from own products and services in the funding of these social innovation initiatives.

Scaling and institutionalization

In Environment and Climate Change, increasing the target group is the most prevalent form of scaling, followed by extending the network and organizational growth.

Drivers and barriers in Environment and Climate Change

Incentives and latent demand Latent demand is a critical factor for social innovation initiatives in the area of environment. Although there often is a strong social demand (unemployment) for one service, the main service (e.g. repair, or alternative food production and distribution) is based on more assumed or latent demand. It is often perceived by the initiators of the social innovation initiatives as a tension or societal challenge (kickstarted by statistics or personal experiences). Initiators of such projects start on the basis of assumed or latent demand that may become explicit and – in case of success -translate into actual demand as soon as service offerings take concrete form. Thus social innovation initiatives have an important role as they provide real feasible alternatives to the existing ways of doing things.

Empowerment One strength of the social innovation initiatives in the environment area lies in its empowerment function. Citizens are empowered to manage their waste in a sustainable way or to mitigate their negative impact on the environment. The notion of empowerment has gained interest in several disciplines. As a general concept, it is characterized by following a strength-oriented perception in contrast to a deficit-oriented perception. Although empowerment has several dimensions, they all refer to informing about otherwise hidden features (which is crucial for informed decision-making), viable options and consequences, provide feasible alternatives.

Imitation, Competition There are aspects of weak competition in nearly all cases in the policy field, which means that at least at the beginning of the initiatives there was rarely a competitor offering a similar solution. Sometimes this changed over the longer course of the initiatives and competition arose and at least elements of the strategy or solution got imitated.

Media as a success factor Generally, networks and media are used to gain attention and attract people as suppliers, as well as customers. Hence, media may become an extremely important partner in social innovation initiatives. Media contributions about repair services often may raise awareness and demand that was latent before becomes then apparent and materializes.

Role of technology The role of technology varies greatly in the different social innovation cases, from no visible role, via the well-established enabler role to being one context factor of the problem.

Concrete policy support for social innovation Roughly recommendations for concrete policy support can be formulated on three levels:

Common visions and ambitions
Governments should contribute to common visions about desirable environmental outcomes and long-term opportunities. Governments provide guidance in incorporating clear visions and ambitions for goals (like the Paris goals, the SDGs; nation/city level goals). Here it is important that the state should view big environmental challenges as investments of the state, as it has worked quite well with climate change: invest in technology, life styles, ethics, and values. This together with an overall permissive and encouraging environment is the nutrient solution where socially innovative ideas can develop and prosper, and become social movements.

The project level of social innovation (agency)
A second level of policy recommendations refers to the stages of social innovation projects /initiatives themselves, like ideas – networking – start-up – growth or exit. It refers to the capacity of individuals and groups to act independently and to behave environmentally responsible, create ideas through learning and raised awareness for environmental and social issues, find allies, plan and carry these ideas out and survive. Here governments can provide support in a multitude of ways.

The reflexiveness of policy (structure)
In promoting alternatives to current environmentally damaging practices, governments have to be reflexive as well, meaning they have to reflect the structures they provide and that shape the opportunities of social innovators., like the overall framework, regulations and formal institutions. Policy should recognize the existence of social innovation, and policy should also see social innovation as indicators of where policies are dysfunctional because social innovation may provide feasible alternatives here.

2 THE SI DRIVE PROJECT

2.1 THEORETICAL FRAMEWORK

Social Innovation is a ubiquitous phenomenon, characterised by a high variety, diversity and plurality of concepts and understanding. Therefore the SI-DRIVE approach is going beyond pure social entrepreneurship being in the focus before. The former strong focus on social entrepreneurship excluded other key aspects and the potential of a comprehensive concept of social innovation and its relationship to social change (Howaldt, Kaletka, and Schröder 2017, p. 108).[1] SI-DRIVE elaborated (building blocks of) a theory of social innovation by integrating existing theories and research methodologies to advance understanding of Social Innovation - leading to a comprehensive new paradigm of innovation.

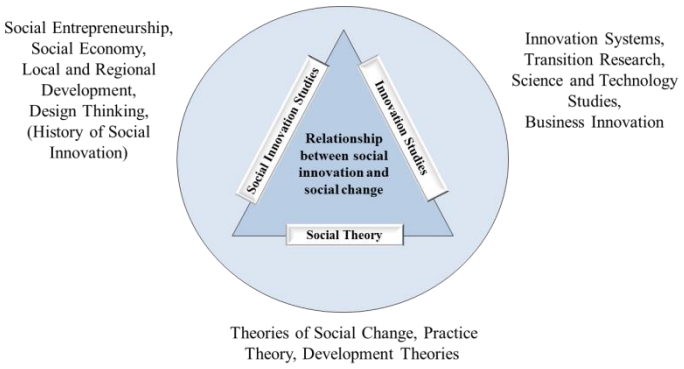


Figure 1: Building Blocks towards a Theory of Social Innovation

Starting point of the development of such a theoretical framework was a review of existing theories relevant for Social Innovation (Howaldt et al 2014): Social Theory, Innovation Studies and Social Innovation Studies form the three building blocks (including the main approaches of each block) for developing a Social Innovation Theory and the relationship of Social Innovation to social change (see figure 2). Based on this critical literature review of existing theories, Howaldt et al. (2016) developed a theoretical framework for the empirical mapping of social innovations based on mainly four pillars: (1) a comprehensive definition of social innovation and (2) practice fields combining similar initiatives, (3) five key dimensions and (4) mechanisms of social change.

The comprehensive **definition of Social Innovation** is focusing on "*new social practices* defined as a new combination or new configuration of social practices in certain areas of action or social contexts, prompted by certain actors or constellations of actors in an intentional targeted manner with the goal of better satisfying or answering needs and problems than is possible on the basis of established practices; at the end socially accepted and diffused (partly or widely) throughout society or in certain societal sub-areas, and finally established and institutionalised as social practices. …This working definition also foresees that, depending on circumstances of social change, interests, policies and power, successfully implemented social innovations may be transformed, established in a wider societal context and ultimately institutionalised as regular social practice or made routine" (Howaldt et al., 2016: 4f).

Based on this definition SI-DRIVE is differentiating between the macro level of policy fields and the meso level levels of "**practice fields**" and related "projects/initiatives" (micro level):

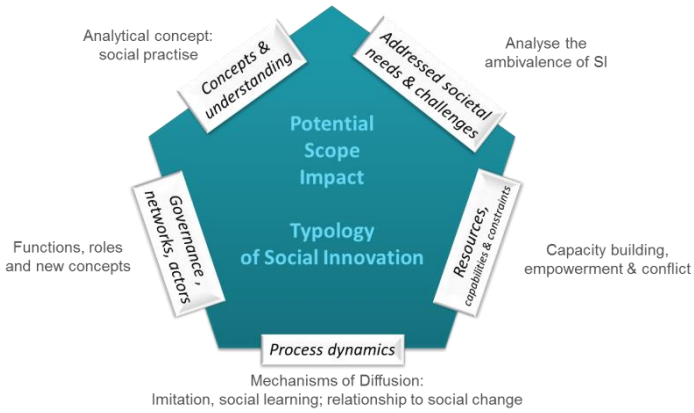
- "policy fields" are thematic areas of social innovation, often with dedicated policies governing the area. For SI DRIVE seven policy fields were researched:
    - Education and lifelong learning,
    - Employment,
    - Environment and climate change,
    - Energy supply,
    - Transport and mobility,
    - Health and social care,

[1] "What is needed is a differentiated perspective of the role of social entrepreneurs within the different phases of the social innovation process and the cross-sector collaboration with actors from the different societal sectors (private, public, universities, and civil society)." (Howaldt, Kaletka, and Schröder, 2017: 95).

- Poverty reduction
- "practice field" is a general type or "summary" of projects and expresses general characteristics common to different projects (e.g. micro-credit systems, car sharing).
- "project/initiative" is a single and concrete implementation of a solution to respond to social demands, societal challenges or systemic change (e.g. Muhammed Yunus' Grameen Bank which lends micro-credits to poor farmers for improving their economic condition, different car sharing projects or activities at the regional-local level).

Main theoretical frame for mapping and analysing social innovation cases are the operationalization of the comprehensive definition of Social Innovation through **five key dimensions**:

1. concepts and understanding (analytical concept: social practice)
2. addressed to social demands, societal challenges (and systemic changes, if feasible)
3. resources, capabilities and constraints including capacity building and empowerment and conflicts
4. governance, net-working and actors (functions, roles and sectors) for social change and development
5. different phases of the process dynamics (mainly: mechanisms of diffusion: imitation, social learning; relationship to social change).



: Key Dimensions of Social Innovations

Figure 2: Key Dimensions of Social Innovations

In a fourth perspective the process of social innovations are characterised by **mechanisms of social change** (Howaldt and Schwarz, 2016: 59f, based on Wilterdink, 2014): learning, variation, selection, conflict, competition, cooperation, tension and adaption, diffusion, planning and institutionalisation of change. To illustrate some of these mechanisms, *learning* is e.g. illustrating the mechanisms of cumulative knowledge improvement, capacity building and empowerment: Within mutual learning processes social innovators and other actors of the initiatives realise mistakes, apply new ideas and engage in processes of learning, leading to tacit and codified new knowledge (Cowan, David, and Foray, 2000). *Selection* incorporates processes of adoption, diffusion and imitation, but also processes of decline and death of initiatives. *Institutionalisation* could be a planned or unplanned or even a not intended process, in congruence or in difference with existing institutions, interfered by unforeseen events.

2.2 METHODOLOGY

SI-DRIVE is aiming at a *comprehensive and systematic analysis*, focusing on the *main societal challenges* reflected by *different policy fields* and *mapping social innovations all over the world*. The developed methodology is *combining qualitative and quantitative research* fulfilling the gaps and constraints of each methodology in a complementary and interrelated way: Beneath qualitative research (more than 80 in-depth-case studies) SI-DRIVE conducted - *for the first time* - a *quantitative mapping of more than 1,000 social innovation cases all over the world*.

The SI-DRIVE methodology[2] is constructed as an iterative research process characterised by two empirical phases based on and feeding the three central research pillars of SI-DRIVE: theory, methodology and policy. Starting with a first theoretical, methodological and policy and foresight framework the empirical phase 1 lead

[2] A detailed description can be found in Howaldt et al. 2016, chapter 3.

to a global mapping of Social Innovation: comparative analysis of 1,005 cases worldwide, seven policy field reports, global regional report, external database screening, and eight first policy and foresight workshops. These results led to the improvement of the three pillars and set the ground for the second empirical phase: the in-depth case studies in each of the seven policy fields of SI-DRIVE and the second round of policy and foresight workshops. Finally, the results of both empirical phases are summarised in each of the policy field and across, contributing to the final theoretical framework, the methodology and the policy and foresight recommendations of SI-DRIVE.

Thus, the chosen triangulation and combination of quantitative and qualitative methods has also a sequential aspect: While the quantitative approach is more appropriate for the analysis of 1,005 mapped social innovation cases, the qualitative methodology is more relevant for the 82 conducted in-depth case studies (based on the quantitative and qualitative analysis of the first empirical phase).

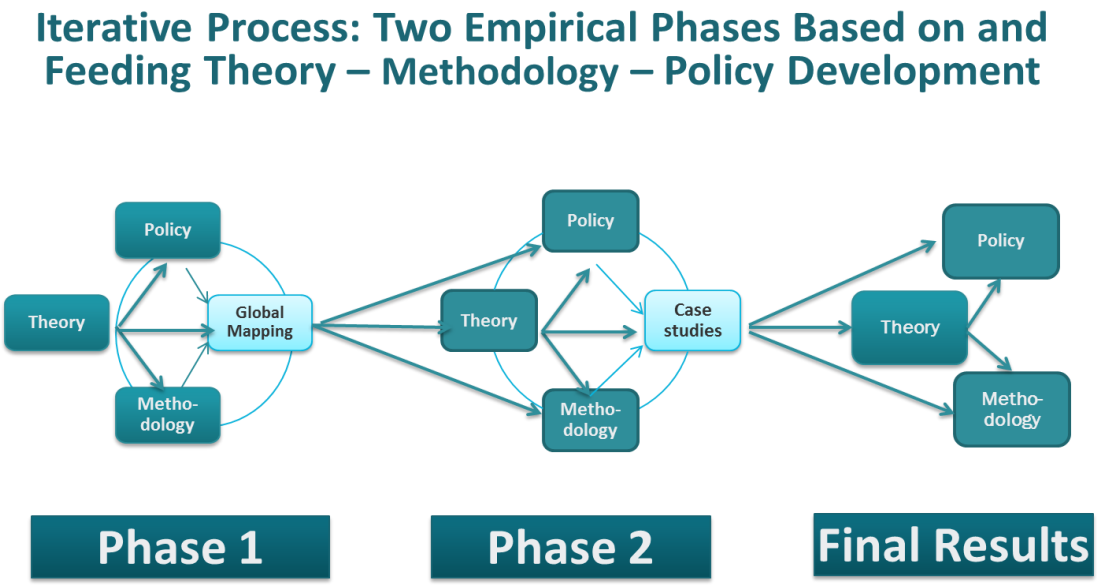


Figure 3: Continuously Updated Research Cycle

While the focus of the global mapping was on exploring the multifaceted world of Social Innovation the focus of the subsequent qualitative research was on the dynamic interrelation between social innovations, the practice field and various mechanisms of social change: Related to the five key dimensions of SI-DRIVE the case studies explored further Governance, Networks and Actors as well as Process Dynamics, mainly asking for factors of success (and failure) and considering mechanisms and degree of social change: diffusion in society, degree of institutionalisation, and importance of the practice field and initiative for everyday life and local communities.

Based on the global mapping of 1,005 social innovation initiatives all over the world 82 case studies were selected from the database (with some additional cases of high recent relevance) and performed. The cases were nominated on the background of given theoretical framework, the results of the mapping and the partners' knowledge and experience. Beneath practical points like access to and willingness of the initiatives to participate a general regional variety were taken into account. The (strategical) relevance of the practice fields, the representativeness of the single case for the practice field showing its variety in terms of social demands and regions and an advanced development phase (cases that are already in the implementation, impact phase) were additional selection criteria. [3]

[3] Detailed information about the case study methodology and selection could be found in Schröder/Kuschmierz 2016, chapter 1.

2.3 ENVIRONMENT AND CLIMATE CHANGE – EMPIRICAL BACKGROUND

Within the policy field of Environment and Climate Change the partners recorded 95 cases in the database of the global mapping related to practice fields (Figure 4, Chapter 4.2). For the in-depth case studies two main practice fields and one additional case from another practice field were chosen, amounting to 10 cases in total. The chosen practice fields are the following:

1. Repairing, reusing and recycling: This is an important issue around the world, which accounts for a substantial number of mapped cases (17 cases within the mapping database)

2. Alternative and sustainable food production and distribution: This is a heterogeneous field, ranging from farming practices, via food cooperatives to activities attempting to reduce food waste. (24 cases within the mapping database).

Furthermore, in a policy field workshop in March 2017 external experts were invited in order to discuss what current/future challenges we are going to be confronted within the policy field, what (political) ambitions and goals are pursued in the policy field, the main drivers and barriers in the field, the role of social innovation and the role of policy for social innovation.

Based on this methodology this report is summarising and analysing the state-of-the art report (Budde et al. 2015), the global mapping (Howaldt et al., 2016) and the case studies (Schartinger et al., 2017) and the results of the policy field workshop 2017, conducted in the policy field Environment and Climate Change. The analysis and summary is structured by the main research questions referring to the five key dimensions of SI-DRIVE:

- What is the landscape and context of social innovation in Environment and Climate Change? (chapter 3)
- What kind of concepts and understanding are current social innovations creating new spaces to improve education and lifelong learning? (chapter 4)
- What characterizes soicla innovatzion in Environment and climate change considering its policy context? (chapter 5)
- Which resources, capabilities and constraints are driving or hindering social innovations? (chapter 6)
- What is the structure of actor-networks and governance in social innovation processes? (chapter 7)
- How are social innovations processing, from start-up over implementation to scaling and institutionalisation? (chapter 8)

The report ends with a summary of findings and recommendations for policy on Social Innovation within Environment and Climate Change.

3 THE AREA OF ENVIRONMENT AND CLIMATE CHANGE: NEEDS AND CHALLENGES

This report highlights results of the SI Drive project on social innovation in the area of Environment and Climate Change. Numerous environmental challenges stand to negatively affect the lives of billions of people around the world. Changes to the environment are naturally interconnected with developments in other policy fields, such as education, employment and poverty. Moreover, there are strong inter-linkages with the policy field energy, covered by work package 7 of the SI-Drive project, since many environmental impacts such as CO2 emissions are caused by the current fossil fuel dominated energy supply system. To avoid duplication of effort and overlaps, WP6 Environment focusses on social innovations in the field of environment and climate change, including the demand side of energy but not energy supply.

3.1 NEEDS AND CHALLENGES

The main interest of social innovations in the area of environment is reducing society's environmental impact. Detrimental environmental impact can take a multitude of forms, many of these like the deterioration of oceans and marine habitats, the stratosphere or rainforests, cannot be felt everyday by individuals on a local level. However, these areas of the environment are influenced by the everyday behavior of individuals on a local level which is often motivated by short-term profit thinking and an emphasis on individual benefits over social benefits (*tragedy of the commons*). It is the ambition of many social innovation initiatives to bring new solutions to environmental problems in providing a local context to often global environmental problems. A more sustainable economy is a major issue in social innovation in the area of environment. This is hinged to more sustainable production chains, to all aspects of the circular economy and to consumer patterns and consumer choice. This strong dependence on consumer patterns and consumer choice entail, of course, increased awareness of (un)sustainable behavior and puts emphasis on citizen engagement and inclusion more generally. Especially throwaway products and throwaway behaviour cause fast-growing amounts of waste (also food waste, which has an additional ethical dimension) and high CO2-emissions.

Several challenges can be distinguished in the field of environmental and climate policy that are currently addressed at different levels – nation states, EU and global organisations (e.g. UN).

Climate Change

Climate Change mitigation (avoiding climate change by cutting back the release of harmful emissions) is high on the European and global agenda. The reference for emission reductions is the internationally agreed target to limit the increase of the global mean temperature to 2°C compared to pre-industrial times. More recently (since 2009) the need to adapt to changing climate conditions has been taken into consideration, not as a replacement but as a supplement to mitigation activities. Even though many European member states were relatively successful in reducing their CO2 emissions in recent years, addressing climate change is very challenging due to its global dimension. In addition, it has to be taken into account that the policies implemented in Europe may lead to an increase of emissions in other countries ("carbon leakage") where no or not as strict regulations are in place (Di Maria and Van der Werf, 2008).

The emission reductions targets for 2050, at the global and EU level until 2050, cannot be achieved by incremental innovation only, but require more radical innovations On the global scale greenhouse gas emissions continue to grow. Even through some industrialised countries managed to de-carbonise their economy to some extent the decoupling of GDP growth and CO2 emissions achieved by the industrialized countries, such as the EU member states, remains weak (OECD, 2013). Much larger reductions are necessary to limit the rise in mean global temperature to 2°C.

Air pollution

In addition to greenhouse gas emissions, air pollution remains problematic in many regions and cities worldwide. Industrial production, energy provision and transport contribute to air pollution, which still leads to serious health and environmental problems. On the EU level, although many countries have made large

progress in terms of air quality (EEA, 2013, EEA, 2016) currently the human death toll of poor air quality is higher than for road traffic accidents (European Commission, 2014a). The EU has been active in the regulation of air pollutants since the early 1970s and - in cooperation with member states and the regions - achieved major improvements with regard to certain harmful substances such as sulphur dioxide, lead, nitrogren oxides, carbon monoxide or benzenes (European Commission, 2014a). Still problematic areas remain, especially particulate matters and ozone in urban areas, where the EU is not on track to reach the air quality targets set (EEA, 2014a).

Energy efficiency

Improving energy efficiency on one hand serves as a tool for climate change mitigation since decreased use of (fossil) energy leads to less CO2 emission and reduces climate change. And on the other hand, it serves economic and geo-political purposes. In the EU policy framework, in particular the 20-20-20 strategy, demanding a 20% reduction of primary energy consumption compared to 2007 using a business as usual scenario, represents a major pillar in the area of energy efficiency. Moreover, in late 2014, the European Council proposed to increase these targets further to 30% for the period up to 2030. This is in line with the EU strategy to reach an overall greenhouse gas emission reduction target of at least 80% by 2050 (EEA, 2014b).

Resource efficiency and Sustainable consumption & production

Although some progress has been achieved in recent years, there is still an urgent need to further improve the resource efficiency of European economies and societies and the decoupling of resource use from economic growth (EEA, 2013, EEA, 2015). Ultimately a shift needs to take place from the current linear resource use ("take-make-consume and dispose") towards a circular economy, which uses resources repeatedly even after the lifetime of a product is over. The realization of a circular economy reduces the need of using new resources and avoids the production of large amounts of waste. Nevertheless the transition to a circular economy requires a number of fundamental changes throughout the value chain spanning processes from product design to business and recycling models (European Commission, 2014b).

Biodiversity

The loss of biodiversity is a major concern at the global scale and throughout the European countries. Loss of biodiversity is a global phenomenon now affecting almost all kinds of ecosystems across the globe and also public health (ten Brink P. et al., 2016). Since 1992, 168 states have signed the Convention on Biological Diversity, acknowledging the importance and value of biodiversity and have committed themselves to take actions to reduce the loss of biodiversity (United Nations, 1992). In more recent years the convention was supplemented by the Cartagena and Nagoya protocol addressing concerns with regard to biosafety, liability and redress, of relevance e.g. to the movement of biotechnologically modified organisms (SCBD, 2014). Despite these global policy initiatives empirical evidence indicates that biodiversity loss at the global scale could not be limited in the past. On the contrary rates of biodiversity loss have been increasing. This has stimulated the discussion of new targets for 2020 (the so called 'Aichi targets') and negotiations concerning the establishment of the "Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Cardinale et al., 2012). The Aichi targets define five strategic goals and 20 more specific targets for the year 2020. (United Nations, 2015)

The situation with regard to the loss of biodiversity is alarming in all world regions including Europe. Currently nearly 65% of the habitats and 52% of the species listed in the European Habitats Directive are exhibiting a negative trend and/or are currently endangered (European Commission, 2011, EEA, 2013, EEA, 2015) . In particular the current fishing practices are not sustainable and 88% of fish stocks have been fished beyond their maximum sustainable yield. There are numerous indicators illustrating the dramatic loss of biodiversity. (European Commission, 2011).

Water management and water pollution

With regard to water, there are two major challenges: a) to ensure the availability of high quality water resources for nature and society and b) to minimize/reduce the impacts of droughts and floods. Both

challenges are related to climate change adaptation strategies, since the large majority of climate models are forecasting more extreme weather events like floods and droughts. Meanwhile, most EU member states still have a high percentage of rivers and lakes which are not in a good ecological or chemical conditions as defined by the European Water Directive (EEA, 2013, EEA, 2015). Other important actions to support hydrological systems and avoid or reduce the impact of floods and droughts include the restoring of natural ecosystems, such as wetlands and floodplains.

Whereas these are the most prominent policy challenges covered in recent policy strategies, position papers of EU institutions as well as NGOs, there are several other environmental challenges which are often related and/or the consequence of the environmental challenges discussed above (e.g. deforestation and the loss of biodiversity are closely related to each other).

3.2 GLOBAL AND REGIONAL DIFFERENCES

There are huge regional and global differences in conceptualising projects addressing environmental challenges as social innovation initiatives. One example here is the Nordic region. Here social innovations often have evolved as the result of an outrage to deal with ongoing unaddressed situations and problems – among these are also the destruction of environmental assets, mistreatment of animals, wasting of food or other resources, etc. For instance, Icelandic citizens took action against overfishing of North Atlantic salmon, the traditional mainstay of Icelandic society and its economy, in effect saving the species from extinction and salvaging future supplies of the associated quality food and jobs. In Denmark, children across the country embraced a scheme introduced by a single class to radically reduce food waste in schools.

For Eastern Europe, the SI Drive Global Region Report states that social innovations there are mainly connected with the activities of civil society organisations, introduced either in response to social needs or in order to address certain challenges. They mainly occur in the field of education and environment and rarely in the field of energy as well as healthcare. Many initiatives have been initiated as a response to pressing social needs that the public administration has failed to address. With regard to social needs in the field of environment, they find expression in the demand for improving the quality of the urban environment, which is achieved through implementing projects, aiming to green cities (e.g. “Green Sofia” in Bulgaria, “Urban Community Gardens” in Romania), cleaning initiatives (“Let’s clean Bulgaria in one day” in Bulgaria, “Let’s do it, Romania!” in Romania), etc. (Boelman and Heales, 2015: p61)

For New Member States like Bulgaria and Romania, EU policy has an important function in adapting legislation, which in turn incentivizes new services to meet environmental standards. Especially for Romania and Bulgaria, it seems that the national policy context in the area of environment (and sometimes employment) is driven particularly by the EU strategies in the area, thus the development of the social innovation project follows and uses the new regulations that appear through EU membership. This partially also explains differences to other countries in their relations between social innovation initiatives and the area of environment and climate change.

In Turkey, the term “social innovation” (SI) is very new and also relates to initiatives that foster the environment. It refers not to a concept but rather to a range of activities, including traditional non-profits, government initiatives, or functions of social enterprises. Turkey suffers from loss of biodiversity which have been deteriorating due to rapid industrialisation. These include endemic-species rich Mediterranean maquis, grasslands, coastal areas, wetlands, and rivers. Social innovation in the area of environment is driven by the concern for biodiversity and ecological life, sometimes led by city dwellers who want to give back. Some of the examples include the Anatolia Foundation, which focuses on ethnobotanical heritage and the Bugday (Wheat) Association, promoting ecological life by organizing seed exchanges and voluntary organic farming. (Boelman and Heales, 2015: p78)

In many countries around the world social innovation is to a lesser extent associated with environment and climate change, but is developed and implemented to solve other pressing needs. There are many challenges and unmet needs driving social innovations in the Western Balkans (Albania, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Kosovo and Serbia). However, the main causes behind a vast number of these challenges are the changes in transitioning to the market economy -including migration, economic sanctions,

rigid out-dated education systems, formation of new states and economies, and the EU integration process. (Boelman and Heales, 2015: p42ff)

As for social innovation initiatives in other countries and world regions, it is not that environment and climate change are not huge problems in many of them, but apparently they are not connected with the concept of social innovation. The concept and term of social innovation is reserved to tackle other major pressing needs coming from poverty - environment may in rare cases be addressed via food security, see below from Boelman and Heales (2015):

- In South-Asia, where poverty is a major historical reality since the late 19th century, environmental issues are not mentioned as challenges and opportunities driving social innovation.

- In Latin-America and the Caribbean, social innovation initiatives address especially vulnerable groups such as women, indigenous peoples, Afro-descendants, people with disabilities are distinguished, among others. SI focusses on those who have always faced unfavorable conditions and suffer from homelessness and low educational levels, or maternal and child mortality.

- Apparently social innovation is only rarely associated with environment in Egypt and the Arab countries. Rather with energy in the energy sector because Egypt and the Arab countries face many challenges in the transition towards renewable energy.

- China, facing the ever-increasing serious pollution from carbon emission and the pressing need for sustainable development, has initiated a strategy of low-carbon development in 2010 which since then has nominated eight cities and five provinces in China as pilot areas to develop a low-carbon economy. (QU and LIU, 2017). However, environmental initiatives in these pilot regions are apparently not seen in the light of social innovation.

4 THE SOCIAL INNOVATION LANDSCAPE OF ENVIRONMENT AND CLIMATE CHANGE

4.1 DEFINITIONS AND CONCEPTS

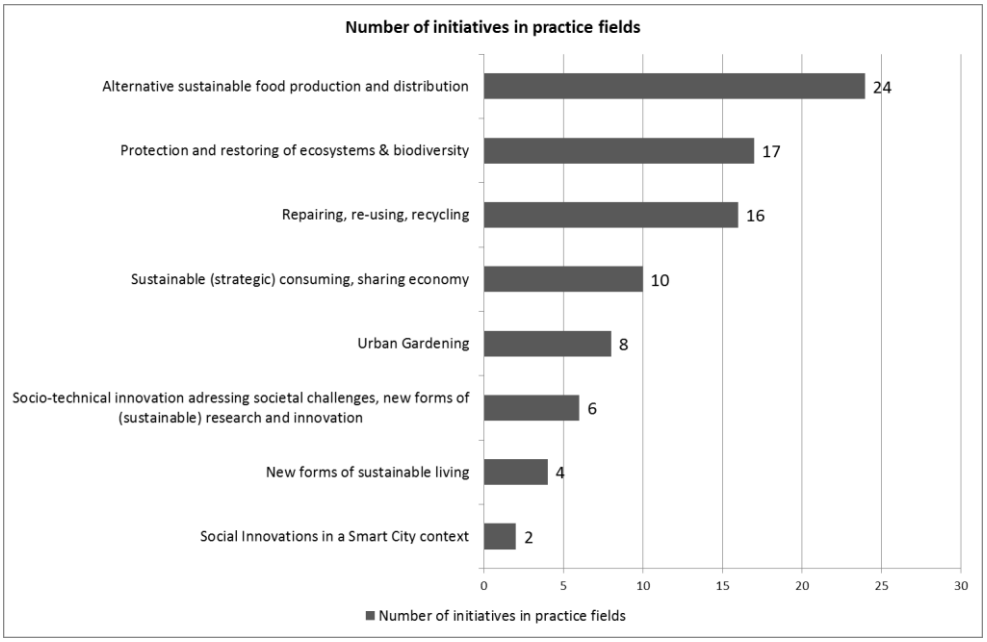
In general, the definition we used for the term "social innovation" within the SI-DRIVE poject was: "A new combination or figuration of practices in areas of social action, prompted by certain actors or constellations of actors with the goal of better coping with needs and problems than is possible by use of existing practices".

For the area of Environment and Climate Change our addition is: Social innovation in the area of environment and climate change is not considered a first order goal, but a way to increase sustainability in products/services/systems in other ways than existing ones. In environment and climate change social innovation initiatives combine environmental and nature aspects and social aspects. Nature is something that has to be especially cared for, otherwise it deteriorates with unforeseeable consequences for the earth. Social aspects come into play in the form of speading more sustainable practices, in a focus on empowerment, sharing, networking in setting up the social innovation, and integrating people with diverse backgrounds and difficult histories.

Bundles of social innovation initiatives were collected in practice fields. A "**practice field**" is seen as a general type or "summary" of projects and expresses general characteristics common to different projects (e.g. micro-credit systems, car sharing), whereas a "**project/initiative**" is understood as a single and concrete implementation of a solution to respond to social demands, societal challenges or systemic change (e.g. Muhammed Yunus's Grameen Bank which lends micro-credits to poor farmers for improving their economic condition, different car sharing projects or activities at the regional-local level) (Schroeder et al., 2014). In addition to the practice fields (**bold letters**) there are several "sub-practice fields" (*italics*) yellow. These are sub-categories of the practice fields, which may be merged in later phases of the project.

4.2 PRACTICE FIELDS OF SOCIAL INNOVATION IN ENVIRONMENT AND CLIMATE CHANGE

Figure 4: Environment and climate change: Number of SI initiatives in practice fields



Source: SI DRIVE Global Mapping. Absolute numbers, N=95, including 8 cases without practice field.

Table 1: Case chosen for in depth-analysis in the policy field environment and climate change

Name	Practice field	Country	Description, Criteria
Myrorna	Repairing, reusing and recycling	Sweden	Facilitates reuse through effective collection, repair and re-sale at low cost
Workshops without frontiers (AFF)	Repairing, reusing and recycling	Romania	ICT equipment reuse and refurbishment by longterm unemployed; providing disadvantaged communities with donated devices.
Collection and recycling of hazardous waste (Balbok)	Repairing, reusing and recycling	Bulgaria	BalBok engineering together with Sofia Municipality has developed a solution for separating hazardous waste from the normal waste of households
Repair and Service Centre (RUSZ)	Repairing, reusing and recycling	Austria	RUSZ, offers repair services for electronic devices to reduce waste (WEEE), integrates formerly unemployed people.
ECOREG	Repairing, reusing and recycling	Romania	Application of Industrial Ecosystems Principles to Regional Development
North Atlantic Salmon Fund (NASF)	Alternative and sustainable food	Iceland	The NASF Campaign attempts to restore salmon stocks in the North Atlantic
Agricultural Marketing (Tarımsal Pazarlama)	Alternative and sustainable food	Turkey	Building a platform of information technologies to act as an enabling architecture for Turkey's three million farmer families
Organic Agriculture via Turkish-German Collaboration (ETO)	Alternative and sustainable food	Turkey	Education and training of Turkish farmers and other responsible parties on organic agriculture for export activities
Iss mich (Eat me)	Alternative and sustainable food	Austria	Iss mich prepares dishes from healthy veggies that did not meet retail standards due to aesthetics, integrates people without work experience
dynaklim	SI in smart city context	Germany	dynaklim wants to empower the region for an improved climate change adaptation and innovation strategy (network + roadmap process)

Source: SI Drive Mapping 2.

Practice field: Alternative sustainable food production and distribution (organic in combination with new organisation models, such as cooperatives, direct distribution to customers)

The most frequent practice field in environment and climate change (24 SI initiatives) embraces activities in alternative food production and distribution. It is a very heterogeneous practice field, where projects reach from associations of interested people who buy organic food in a self-organized way directly from local farmers and to give everybody the opportunity to consume high quality organic food (Lebensmittelkooperatived'Speis, www.speis.org/, Austria), to the production of sustainable (organic) food itself. Some social innovations address primarily organic farming (EkolojikTarim, Ecological Farming, Turkey) or develop strategies to reduce contamination of food supplies through ecologically unfriendly agricultural and food processing methods (Gıda Güvenliği. Food Safety, Turkey). Another dimension of food production, addressed by the opening of virtually packaging free supermarkets (MaßGreislerei, www.mass-greisslerei.at, Austria & Original unverpackt, http://original-unverpackt.de/, Germany) are the large amounts of packaging materials, requiring vast amounts of natural resources and generating waste.

Other social innovations include risk, task and food sharing of farmers and citizens (SolawiDortmund, http://solawi-dortmund.org/, & Kartoffelkombinatwww.kartoffelkombinat.de, both Germany). Many of these social innovations do address additional societal challenges such as employing handicapped people (WUK biopflanzen – SozialeLandwirtschaft, http://biopflanzen.wuk.at/, Austria) or organic farming cooperatives trying to keep people on the land in Anatolia in a sustainable fashion (DoğuAnadoluTarımsalÜreticilerveBesicilerBirliği, Eastern Anatolia Agricultural Producers and Breeders

Association, Turkey). Another project in Austria (Garden project Maconda, http://nachbarschaftsgartenmacondo.blogspot.co.at/p/nachbarschaftsgarten.html, Austria) provides a shared garden for refugees and citizens in Vienna to grow their own organic food, aiming to combine sustainable farming practices with helping refugees to integrate into society.

Sub-Practice Field: Marketing of Sustainable Agriculture

Related to alternative food production and distribution are activities promoting these sustainable practices in agriculture and fishery. An example for such activities is BalYolu (Honey Road, http://balyolu.com/, Turkey) a social enterprise that seeks to fund outreach and education on sustainable farming practices and agricultural marketing with ecotourism revenues. Regarding the distribution and sale, this practice field is closely related to the practice field of eco-labelling. Regarding its basic motivation, this practice field is actually often overlapping with social innovation initiatives attempting to protect and restore ecosystems and biodiversity.

Sub - Practice field: making use of food surpluses – avoiding throwing away eatable food

Another sub- practice field which seems to be established already in some countries, but still growing in many countries is avoiding the waste of food. In Germany there is a national platform for regional activities promoting food sharing (www.food-sharing.de, Germany) and so called mobile "peoples kitchen" (Volxküchen, Fläming Kitchen). Many of the new social practices in this field try to combine societal benefits, such as supplying food to people in need with environmental benefits. WelserTafel and project Le+O are examples of projects which can be found in many cities which make use of excessive food production, food with wrong packaging to supply it to people in need and to temper the worst consequences of poverty (www.issmich.at, www.essen-und-leben.at/, and www.caritas-leo.at, all three Austria). Another example is the Bulgarian Food Bank (Bulgaria) which collects and manages the distribution of donated food.

Selection of cases for in-depth study: Four cases were chosen for in-depth analysis in the practice field alternative food production and distribution (see Table 1). As social innovation projects in this field are frequently addressing several challenges – different environmental challenges and beyond, such as improving public health or addressing (food) poverty, the initiatives included here can also be seen on the threshold of various motivations and aims. NASF (Iceland) was originally in the practice field protecting and restoring ecosystems and biodiversity, but showed a lot of parallels to Tarimsal Pazalarma (Turkey). The North Atlantic Salmon Fund (NASF) and Tarimsal Pazalarma are both social enterprises. The goals of the social innovation initiatives in this practice field are to avoid practices that make farming and fishing unsustainable because they lead to the exploitation of nature in terms of degrading soil and endangering wild species (ecological goals). Furthermore, they want to improve standards of living for families in agriculture and fishing businesses, allowing them to stay on the land (socio-economic goals). Sectorally, these social innovation initiatives address producers in the primary production sector that act as basic suppliers for the food industry. The long-term question is how to make fishing and agriculture viable so that farmers and fishermen can profit from their products without eroding the basis. Tensions arise particularly because these food suppliers are traditional family businesses, which have existed for generations. Selling fish in maritime regions and agricultural production have been important economic activities for mankind from very early on. Exploiting natural resources in terms of decimating salmon stocks or deteriorating soil quality are a social and economic problem, as much as an ecological one.

Another of the selected SI initiatives – Iss mich (Austria) makes use of food waste and employs vulnerable groups of the population (i.e. young mothers). By doing so these projects address challenges related to the environment and poverty at the same time.

Practice field: protection and restoring of eco-systems & biodiversity

17 social innovation initiatives in the practice field protection and restoring of ecosystems & biodiversity have been included in Mapping 1 (see Table 1). They are primarily aiming at the challenge of continued loss of biodiversity in most countries around the globe. The ways and means how the specific projects try to ultimately contribute to sustain current levels of biodiversity are different. This can be very related to agricultural and food production practices, which is the case for the NASF (North Atlantic Salmon Fund) (see paragraph above).

In other SI initiatives here, awareness-raising plays a vital role, for instance the BIG FIVE project (http://www.lag21.de/themen-und-projekte/biodiversitaet/aktuelle-projekte.html, Germany), which educates young people about endangered species and the value of biodiversity or NatureNet (Turkey) which runs innovative awareness campaigns for protecting biodiversity. Another approach a number of social innovation projects are perusing is to combine awareness-raising with the monitoring of biodiversity, e.g. the project "Biodiversity monitoring with farmers" (http://www.biodiversitaetsmonitoring.at/index.php/en/, Austria). Going beyond awareness-raising and monitoring of biodiversity another type of projects directly contributes to the conversation or re-storing of ecosystem, such as the KristianstadsVattenrike (http://www.vattenriket.kristianstad.se/, Sweden) a biosphere serving project which aims to combine conservation of landscape and sustaining biodiversity with educational task or the TEMA foundation (TürkiyeErozyonlaMücadeleAğaçlandırmaveDoğalVarlıklarıKorumaVakfı, Turkey) which implements large scale tree planting campaigns and facilitates similar projects implemented by other organisations. Similar to other practice fields, addressing the issue of biodiversity can be combined with other social goals, such as the integration of asylum seekers.

In the *Sub - Practice Field: encouraging use of local plant species and seed varieties* a specific approach to sustaining biodiversity is to encourage the use of native species and seed varieties, for food production as it is done by AnadoluTohum (Anatolian Seed, Turkey).

Selection of cases for in-depth study: Tarimsal Pazalarma and NASF, now related to alternative and sustainable food production and distribution, have at the same time a strong motivation to save species and prevent erosion of ecosystems.

Practice field: Repairing, re-using, recycling

There are a number of activities taking place in a number of European countries and aiming at repairing, re-using and recycling of different products, 16 of these are included in the SI DRIVE Global Mapping (see Table 1). These are for instance repair-cafés where people meet and exchange knowledge and help each other to repair broken products. Generally there is a focus on electronic products, but there are examples of other things such as clothes or toys as well. In some cases social innovation projects in this practice field combine the aim to repair and re-use articles with other societal impacts, for instance in the field of employment by hiring people who have difficulties to get a job on the 'regular' job market. This practice field primarily addresses the challenge to achieve higher resource efficiency, often in combination with employment and educational aspects (e.g. providing opportunities for long-term unemployed or disabled people to repair electronics).

In the sub-practice field *Cleaning the environment* social innovation projects are included which focus on the collection of waste that was disposed of (illegally) in nature. An example is the "Let's clean Bulgaria in One Day" campaign, which localizes the most polluted areas and organizes volunteers to clean these areas together.

Selection of cases for in-depth study: The practice field of repairing, reusing and recycling products accommodates social innovation initiatives with different perspectives: Myrorna (Sweden), RUSZ (Austria), AFF (Romania), ECOREG (Romania) and the system for the collection and recycling of hazardous waste (Bulgaria). Structurally, Myrorna is an arm of the Salvation Army, an NGO, focusing on the reuse of clothing, furniture and household items. RUSZ (a social enterprise in the legal form of a limited company) and Ateliere fara frontier (AFF, a non-profit association) both have a focus on the reuse of electrical and electronic equipment (EEE). In Bulgaria, the system for the collection and recycling of hazardous waste was implemented by a public-private partnership of Sofia Municipality and Balbok Engineering, a private company.

Practice field: Sustainable (strategic) consuming, sharing economy

In the *Sub - Practice Field: facilitation of sharing economy* social innovation projects are summarized that contribute to the emergence of a 'sharing economy'. These social innovation projects aim to make it possible for people to share products and services with each other. The basic idea of a 'sharing economy' is that many assets, like books, electronic products, vehicles, etc. can be used much better, in terms of efficiency, costs, enhancing social relations or environmental impact. Similar to other practice fields, there are umbrella

organisations such as Let's SHARE (www.lets-share.de , Germany) reporting about latest trends and projects. Examples are Umsonstladen, www.umsonstladen-dortmund.de/solidaroekonomie-im-pott , Germany, www.tauschen-ohne-geld.de, Germany, Frents (www.frents.com , Germany), EsyaKütüphanesi (Library of stuff, a lending and sharing center, Turkey), SAMBIS (smart bicycle rental/sharing system in Samsun, Turkey) or Yakın Komşu (Nearest Neighbor, Turkey), Kollaborativ Ekonomi Göteborg

In the *Sub - Practice Field: Sustainable (strategic) consuming & new procurement practices* SIs aim at strategic consuming to exert pressure on suppliers to offer more sustainable products. Examples are Einkaufsgruppe NGO NPO (procurement group for NGO NPOs, Austria, http://einkaufsgruppe.com/) or Carrotmob (http://www.carrotmob.org/about, several countries, e.g. Germany, France, USA, Thailand, Australia, New Zealand) based on the idea of organising consumer pressure in forms of procurers groups or flashmobs.

Selection of cases for in-depth study: On the whole, this practice field embraces 10 SIs in Mapping 1 (see Figure 4). No SI initiatives were selected for further analysis here. The empirical analysis of Mapping 2 concentrated on cases in the most frequent practice fields.

Practice field: Urban gardening[4]

Urban gardening summarizes activities and projects which practice different approaches of gardening in urban regions such as parks within cities, 8 initiatives were included in SI DRIVE Global Mapping. In general, there can be foci from greening of the city to raising awareness for nature and environment, supporting biodiversity and/or local food production. Urban gardening can be practiced in commonly used gardens, intercultural gardens or as guerrilla gardening on spaces not (yet) dedicated to gardening. Most of the urban gardening projects do not only address the environmental dimension, but function as a platform for community building, intercultural exchange and knowledge transfer. Examples can be found in several countries, e.g. Grünstern (growing organic food in a city park, http://www.grünstern.at/, Austria) orStadtimker (http://www.stadtimker.at/, Austria) KültürelMutfak (Cultural kitchen, urban gardening, Turkey) project or ByBi (http://bybi.dk/?lang=en, Denmark) Junior City Farmers Schönbrunn project (http://cityfarmschoenbrunn.org/, Austria). Bee Urban, (http://www.beeurban.se/kontakt-2, Sweden). Orestad Urban Gardens (http://www.dac.dk/en/dac-cities/sustainable-cities/all-cases/green-city/copenhagen-urban-gardens-liven-up-oerestad/?bbredirect=true), Denmark.

This practice field can be interpreted to address the issue of biodiversity. However as stated above, the main motivations for most of the projects in this field are probably related to the lack of green spaces in cities or the desire to produce food by yourself. Other projects are focussed on enabling intercultural change by setting up urban gardening activities.

Selection of cases for in-depth study: On the whole, this practice field embraces 8 SIs in Mapping 1 (see Figure 4). No SI initiatives were selected for further analysis here. The empirical analysis of Mapping 2 concentrated on cases in the most frequent practice fields.

Practice Field: Socio-technical innovation addressing societal challenges, new forms of (sustainable) research and innovation [5]

This practice field encompasses new forms of socio-technical innovations, which address environmental challenges. The main characteristic of this practice field is that these social innovation projects try to develop and diffuse (technological) innovations organised in a different way. In doing so, they expect to come up with adequate technologies which are not emerging from the established innovation systems. Examples are typically social enterprises such as HafifTuğla (Light Brick, Turkey), which try to organise research and innovation in a more sustainable way oriented towards societal challenges. Another example is Bagaway in Turkey, led by a social entrepreneur who is venturing to develop, produce and market low-cost, eco-friendly reusable shopping bags.

[4] Even though some projects in the practice field could be related to the next practice field "protection and re-storing of eco-systems, biodiversity", it is argued that it has very specific characteristics in terms of place (the city) and aims (bringing people in the city in contact with nature) legitimizing an own practice field. In addition the number of urban gardening projects appears to be growing very fast during recent years).

[5] Remarks – issues for further discussion with regard to this practice field: This would include a large share of innovation activities benefitting from public innovation schemes, which are mission-oriented, thus addressing 'grand societal challenges'.

Relation to challenges: This practice field could address all environmental challenges, where existing technologies are causing the environmental challenges discussed above. New forms of developing and implementing new technologies could contribute to resolve issues such as climate change, energy or resource efficiency.

Selection of cases for in-depth study: On the whole, this practice field embraces 6 SIs in Mapping 1 (see Figure 4). No SI initiatives were selected for further analysis here. The empirical analysis of Mapping 2 concentrated on cases in the most frequent practice fields.

Practice field: New forms of sustainable living

This practice field comprises social innovations which aim to develop radically new ways of living and working. A main characteristic is that these innovations take a more holistic approach to sustainable living such as ecological villages based on a sustainable and solidary economy replacing a societal model based on economic growth. Thus, people frequently live and work together in these communities. In some of these projects, these communities are based on alternative ideologies comprising not only the economic model and impacts on the environment, but as well family or educational models. Examples are the communities Siebenlinden (http://www.siebenlinden.de/, Germany) and Niederkaufungen (http://www.kommune-niederkaufungen.de/, Germany), and Hyllie Project (www.hyllie.com/climate), Sweden.

New forms of sustainable living are a holistic and most probably the most radical approach to address numerous environmental challenges (climate change mitigation, energy and resource efficiency, water and air pollution) at the same time – 4 social innovation initiatives were included in the SI Drive data base in Mapping 1. Many of these initiatives are a response to dissatisfaction with the current societal system and the perceived need to develop radical solutions.

Selection of cases for in-depth study: No SI initiatives were selected for further analysis here. The empirical analysis of Mapping 2 concentrated on cases in the most frequent practice fields.

Practice Field: Social innovations in a Smart City context

The term social innovation is increasingly appearing in policy documents in relation with the development of "smart cities". The main characteristic of these social innovations is that they are developed and implemented in a smart city policy context. Examples of such activities can be found in Austria, Germany, the Nordic countries and GCC countries, Masdar City being the most prominent example.

5 SOCIAL INNOVATION IN ENVIRONMENT AND THE POLICY CONTEXT

5.1 POLICY CONTEXT

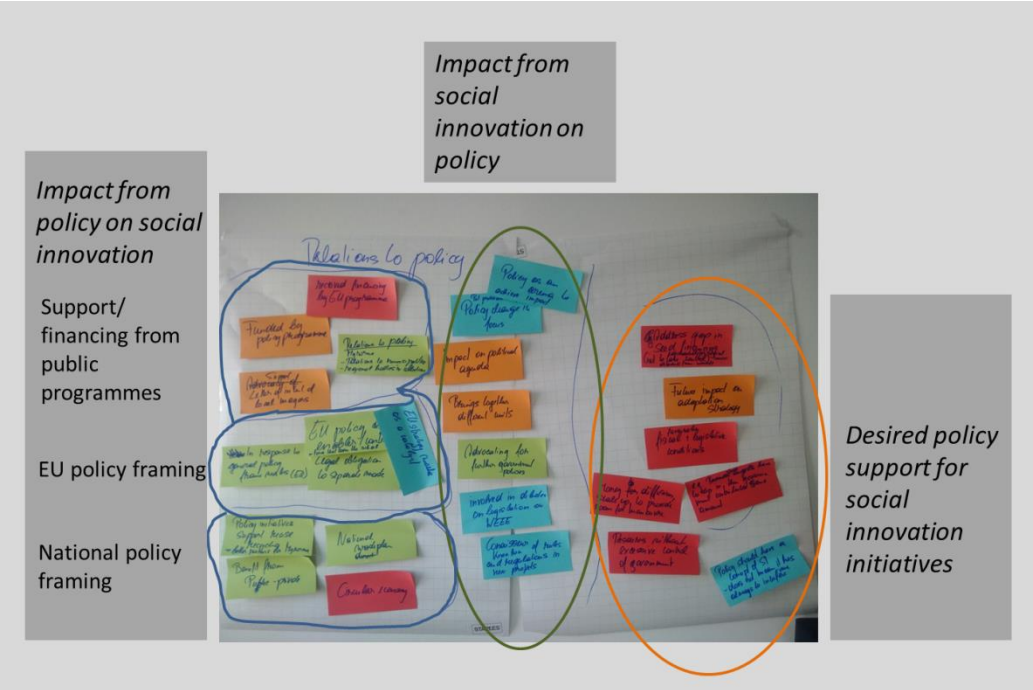
In the policy field of environment and climate change relations to policy are not one-directional, see Figure 5 for an overview.

On the one hand, there is **impact from policy on social innovation.** Social innovation initiatives do receive active public support, be it in the form of financing through public programmes or buy-ins through politicians (legitimization, organisational support in the collection of special forms of waste etc). Social innovation initiatives also benefit from policy framing in the field, i.e. EU policy framing that provides a legal obligation to separate waste on the level of municipalities. In new Member States like Bulgaria and Romania, cases of social innovation exemplified the positive impacts of EU policy frameworks that became effective through accession to the European Union. Also policy frameworks on the national level often have a positive impact on the growth of social innovation initiatives (national waste plans). And also the public discourse on certain topics, led by public actors, often enhances the awareness and acceptance of social innovations, as it is the case for public discourse on food waste or the circular economy.

On the other hand, social innovation initiatives in environment often develop because they want to have an impact on policy, or compensate for missing policy – **social innovators want to impact on policy**. Here, policy change is in focus and policy is seen as the arena to achieve change. Social innovators may advocate for more far-reaching government action or get involved in debates on legislation (e.g. on waste from electrical and electronic products, WEEE).

And a third connection to policy is that some **social innovators desire explicit measures to support** social innovation initiatives. More favourable fiscal and legal conditions for social innovations should also include special seed financing which should have features different from seed financing for commercial undertakings.

Figure 5: Social innovation in environment and climate change: relations to policy



Source: SI Drive WP Environment Policy Field Workshop, March 2017

EU and national policy framings

With regard to the relevance of different policy levels it becomes clear that the European policy level is of very high importance in the field of environmental and climate policy. (see also chapter on Needs and challenges). Since the beginning of EU environmental policies in the 1970's, the importance has increased steadily over time, so already in 2005 it could be stated that "[…] the vast majority of national environmental policies and laws have their origins in EU law" (EEB, 2005, p.8). The primary role of the EU and its institutions in this policy field is to set targets or define standards and provide a strategic framework, whereas the member states have to define how these targets will be achieved by the use of different means. This often requires the drafting of national action plans or roadmaps which are developed at the national and/or regional level.

This holds not only true for environmental challenges which inherently have a European or global dimension such as climate change, but also for more regional and local issues, such as local air pollution in urban areas. The large majority of environmental policies are agreed at the EU level, setting the framework for policies at the domestic level. Frequently targets are set at the European level, which have to be reached at the national level through the implementation of measures at the member state, regional or local level. If member states do not implement EU legislation or repeatedly fail to achieve targets, and respectively cannot demonstrate that they take appropriate measures, they ultimately face fines for non-compliance. This happens seldom however, since non-compliance to targets usually leads to a negotiation phase, in which member states can demonstrate that they will implement appropriate measures or explain specific reasons making implementation and compliance more difficult than anticipated.

In general, environmental standards throughout Europe have been tightened under the influence of European environmental policies (Farmer, 2012). Moreover, the European policy level provides an opportunity for member states to influence environmental policies in other EU member states. This is of particular relevance, since many environmental challenges cannot be addressed within the borders of a nation state, but have to be addressed on a higher level, such as the European or even global level. Another role EU environmental policy has been playing is to strengthen the position of national environmental ministries in relation to other ministries within the member states, when EU policies require a member state to comply to certain environmental standards (Farmer, 2012). In addition member states have the opportunity to exchange experiences and learn from the experiences of other member states implementing certain environmental policies (Farmer, 2012).

This description paints a rather positive picture of the multi-level governance in the field of environmental and climate policy. However it should be mentioned that the coordination of different policies on the local, regional, national, European and global level remains a challenge and often leads to less than optimal results with regard to the protection of the environment. In addition the coordination between different policy fields proves to be difficult. A review of energy and climate policies in the European Union, conducted by the IEA, draws the conclusion that there "has been a lack of integration of climate and energy policies at the EU level and between EU level and national energy policy decisions" (IEA, 2014, p.5).[6]

There are numerous conflicts and struggles with regard to environmental and climate policy at the European level. There is a large variety of actors trying to represent certain interests and influence European environmental policy. Due to the strategic role of the European policy level in setting goals and defining standards, and the different institutions represented in the policy process, many stakeholders try to seek influence through a variety of institutional paths to make sure their interests are taken into account (Farmer, 2012).

Conflicts and struggles do not only arise along the "usual" interests, such as economy vs. environment, but as well between member states or member states and the EU institutions. Frequently it can be observed that EU wide targets are widely accepted, however struggles arise when deciding how much member states have to contribute to the achievement of the overall EU target.

[6] for a more elaborated discussion on coordination issues and conflicts between policy fields, see section 2.5

Another conflict and coordination problem arises from the perspective of different policy fields, with ostensibly consistent targets, but with different rationalities and time horizons. Even within the policy field of climate policy, conflicts arise, for instance with regard to short term vs. longer term orientations. From the perspective of climate policy, GHG emission reductions have to be realised as soon as possible to have any hope of reaching the 2°C goal, however due to path dependencies, short term measures may even reinforce in principle unsustainable paths.[7] Thus, principle conflicts between environmental, climate policy and innovation policy emerge, even though both policy fields try to address climate change, though with different rationalities and time horizons (Budde, 2013).

Another observation regarding the horizontal coordination of policies is that economic growth and job creation are currently very high on the agenda of European politicians and policy makers, whereas environmental and climate concerns are in danger of losing in importance on the European policy agenda (IEA, 2014).

Nevertheless, experiences from recent energy and climate policy approaches demonstrate that the coordination of policies is challenging, with regard to the integration of climate and energy policies at the EU level and national policies (Skjærseth, 2013, Budde, 2013)Thus, future policies, in particular the upcoming 2030 Climate and Energy Policy Framework, are confronted with the difficult task of taking into account and balancing the goals and interests of environmental and climate policy vis-à-vis competitiveness, while not neglecting the environmental challenges ahead in times of economic crisis in many European countries.

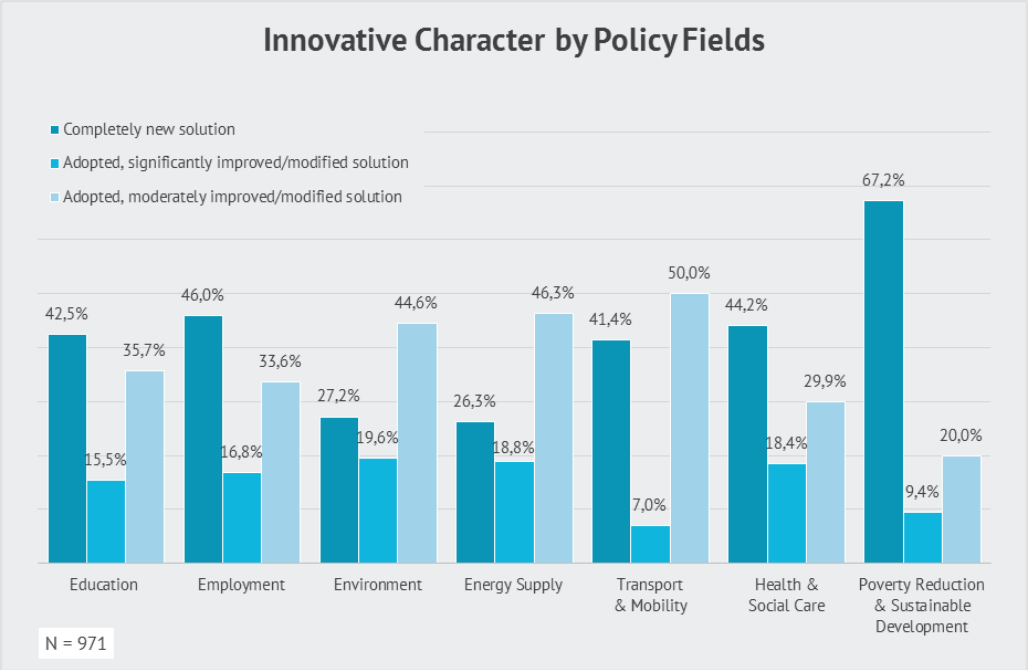
5.2 SOCIAL INNOVATION INITIATIVES IN ENVIRONMENT

This chapter highlights some of the characteristics of social innovation in environment and climate change, compared to social innovations in other policy fields.

Figure 6 indicates that in the area of Environment and Climate Change the majority of the social innovation initiatives are adopted or moderately improved. In contrast, more brand new solutions are developed in Poverty Reduction (two out of three initiatives) and Education, Employment, Health and Social Care (about half of these initiatives). The same as in Environment and Climate Change seems to apply in the two other sustainability oriented policy fields, i.e. Transport and Mobility and Energy Supply (in each field approx. 50% of the initiatives).

[7] An example would be priority setting with regard to vehicles: Whereas some stakeholders argue that we need immediate emissions reductions, which could be achieved through strict regulations and research on combustion engines on the shorter term, other actors argue that only radically innovations such as electric vehicles will enable emission reductions at the scale needed to reach the 2°C target.

Figure 6: Innovative character of the social innovation initiative



Source: SI DRIVE Global Mapping

Technology

Technological developments offer a significant opportunity for social innovation, facilitating individuals, groups and institutions to solve societal problems or address needs and wants. Looking to the energy sector, for example, advancements in the development of energy technology (for example photovoltaic technology) have facilitated social innovations such as energy cooperatives. Depending on the time frame (technological development enabling social innovation need not be recent) this may become visible in the SI DRIVE Global Mapping or not. Interestingly, Energy and Transport and Mobility are among the policy fields with the least motivation of introducing an inspiring new idea or technological solution. New technologies lead most often to social innovations in the fields of Poverty reduction (36,7 per cent) and Health and Social Care (31,3 per cent). Education, Employment, and Environment (all three around 28 per cent) are in the middle range (see Table 2).

From SI Drive Mapping 2, it became obvious that the opportunity of taking advantage of new technologies in social innovation initiatives in Environment and Climate Change ranged from completely technology-dependent solutions to no technology involved at all.

Technology did work as an enabler. Tarimsal Pazalarma (TR) is the application of a technology in order to provide new services and information to farmers which had not been provided to these communities before and a program to educate farmers on new technologies to use in their fields.

However, not in all social innovation initiatives does technology play a role. For e.g. Myrorna, technology was not essential. However, now Myrorna is becoming open to and interested in using modern ICT tools for improved services and reaching out. Technology can play an important role in some initiatives in the practice field of repairing, reusing recycling, but not in the classic sense. First, in the perspective of this practice field, technology is something that can break, in which case the original utility of the product is reduced or zero. Hence, the diffusion of repair services means remedy to broken technology. Whatever technology diffuses, it can break as well, in which case it needs repair. Technology is not an enabler, but it is weak and may be defunct. A second role within the practice related to technology, is that of informing an interested public about in-built technological weaknesses of devices and about easy-to-repair product designs.

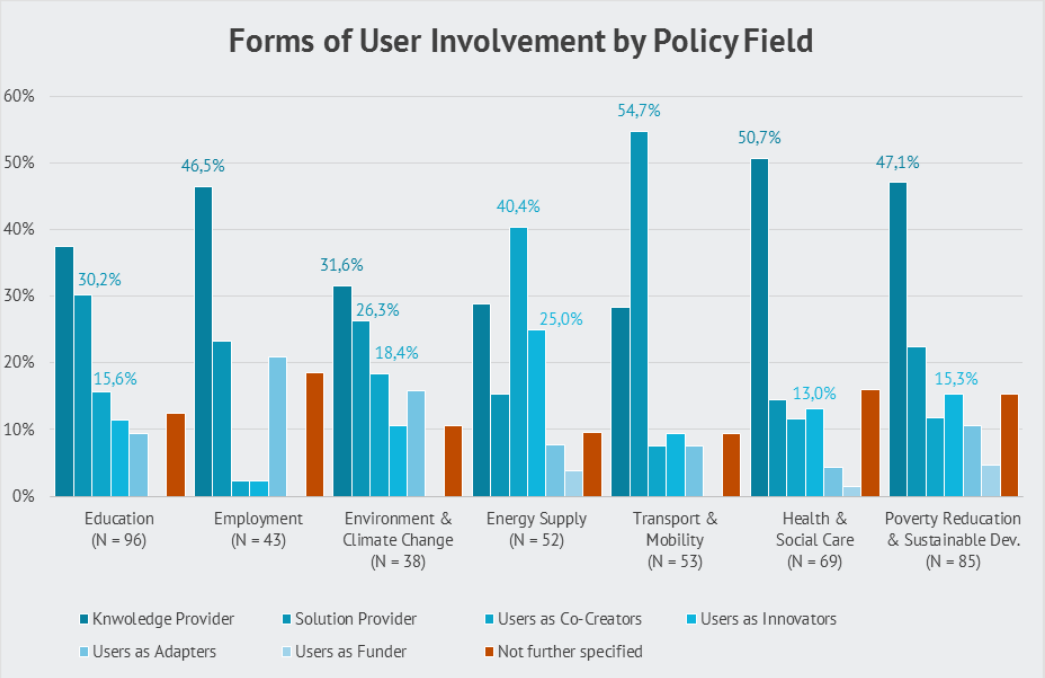
Table 2: Motivation and Triggers for Social Innovation – Comparison Between Policy Fields

	Education		Employment		Environ-ment		Energy Supply		Transport & Mobility		Health & Social Care		Poverty Reduction	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
The need to respond to a local social demand	128	61,8	83	61,0	36	37,9	44	56,4	70	55,6	97	66,0	136	75,6
The need to respond to societal challenges	134	64,7	78	57,4	64	67,4	52	66,7	58	46,0	85	57,8	129	71,7
A social movement (large grouping focusing on specific issues)	22	10,6	18	13,2	23	24,2	12	15,4	8	6,3	24	16,3	39	21,7
A policy incentive (strategies, programs)	33	15,9	20	14,7	15	15,8	22	28,2	28	22,2	27	18,4	25	13,9
An inspiring new idea or invention	58	28,0	39	28,7	27	28,4	17	21,8	20	15,9	46	31,3	66	36,7
Possibility of taking advantage of new technologies for tackling social problems	57	27,5	25	18,4	16	16,8	21	26,9	34	27,0	26	17,7	43	23,9
Other	15	7,2	7	5,1	9	9,5	3	3,8	7	5,6	10	6,8	9	5,0

Source: SI DRIVE Global Mapping, multiple responses possible.

User involvement in the area of Environment and Climate Change is in around 70 per cent of the mapped initiatives. It is not as high as in Energy Supply (78 per cent) and Poverty Reduction (74 per cent), and far above Employment (52 per cent) and Education (58 per cent) (Source: SI DRIVE Global Mapping, not depicted here). The most prominent form of user involvement in Environment and Climate Change in the mapped social innovation initiatives seems to be that of a knowledge provider, followed by solution provider and the role of users as co-creators of the innovative solution. Apparently, in Environment and Climate Change users do not appear to fund social innovation initiatives, which is in contrast to e.g. Energy Supply (see Figure 7).

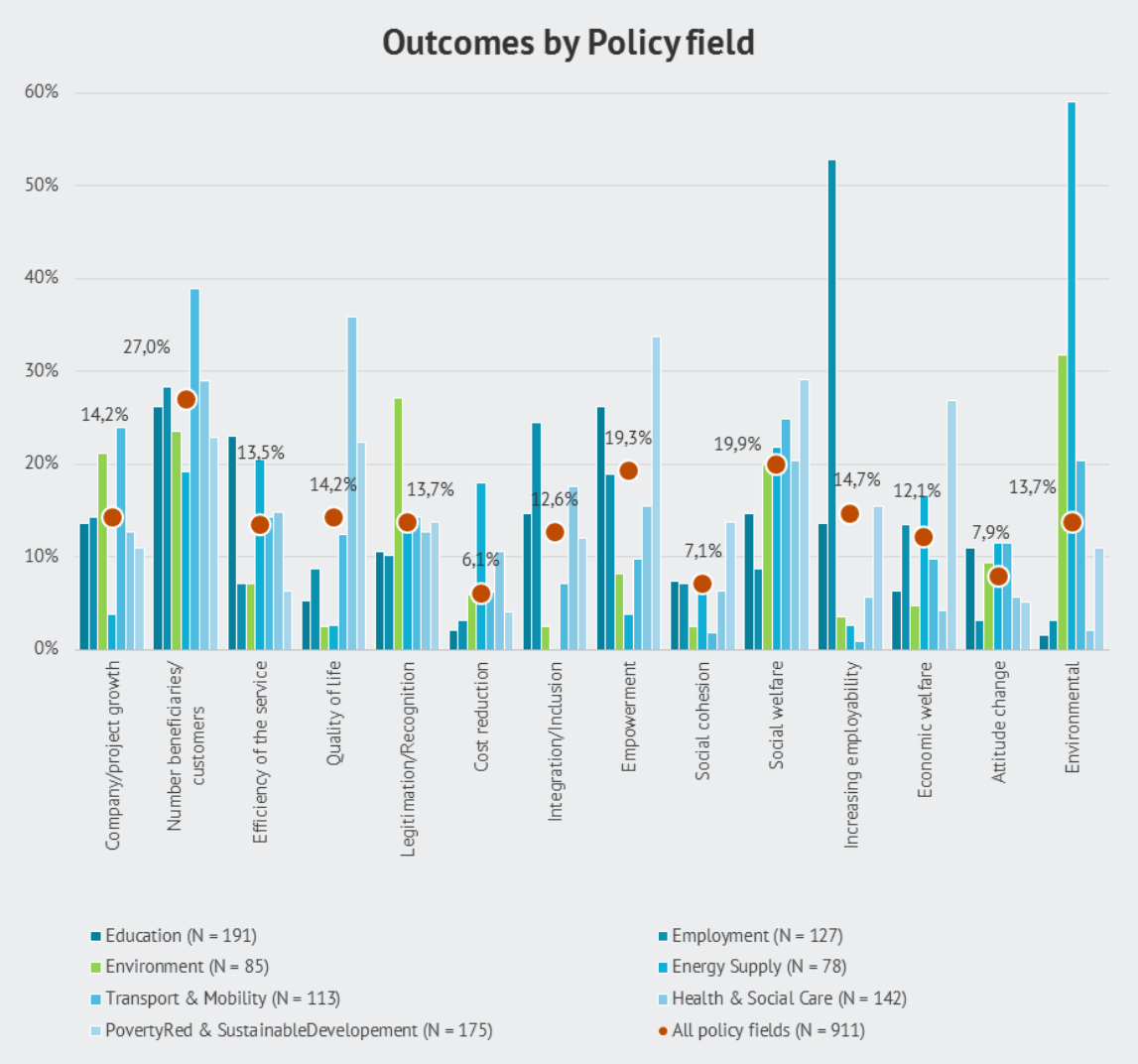
Figure 7: Forms of User Involvement



Source: SI DRIVE Global Mapping

Figure 8 displays outcomes of social innovation initiatives per policy field. It is not surprising that a positive environmental outcome is ranked first in social innovation initiatives in the area of Environment and Climate Change. At first sight it seems surprising that it can be topped here by another policy field, but a closer look reveals that it is Energy Supply which shows an even higher percentage of environmental outcomes – together with Transport and Mobility these are the policy fields that have the strongest focus on sustainability issues. The figure also displays that a major outcome of social innovation initiatives in the area of Environment and Climate Change is legitimation and recognition. As social innovation initiatives in the field often focus on establishing new environmental behavior which may also cause additional costs to users, and they often plea for different legislation, for government action where there is none, etc, it seems obvious that legitimation and recognition are both essential and seen as a major success.

Figure 8: Outcomes by Policy Field



Source: SI DRIVE Global Mapping.

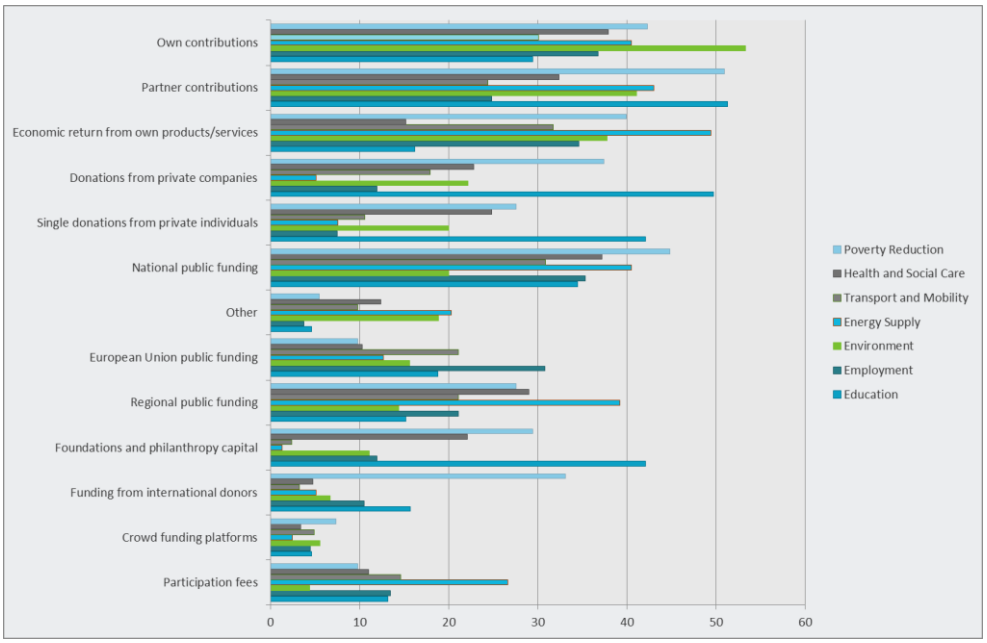
6 RESOURCES, CAPABILITIES AND CONSTRAINTS

6.1 RESOURCES

Within the initiatives collected for SI DRIVE Global Mapping Environment and Climate Change showed particularities with respect to types of actors involved (see Figure 15). The initiatives seemed to primarily rely on non-governmental and non-profit organisations, and together with Energy Supply and Transport and Mobility more than others on private companies. With a proportion of around 25 per cent public bodies are underrepresented in *Environment & Climate Change* compared to the other policy fields. Likewise, the role of foundations appears to be marginal well below the shares of all other policy fields except for Transport & Mobility where it is equally low (3 per cent).

This strong involvement of private companies as actors in the social innovation initiatives in Environment and Climate Change also explains the prominent role of economic returns from own products and services in the funding of these SIs (see Figure 9). Only Energy Supply displays a higher proportion of financing through economic returns from own products and services. In general, internal funding through own contributions are most relevant for environmental initiatives (53%), followed by partner contributions.

Figure 9: Funding of Social Innovation Initiatives Across Policy Fields



Source: SI DRIVE Global Mapping

6.2 DRIVERS

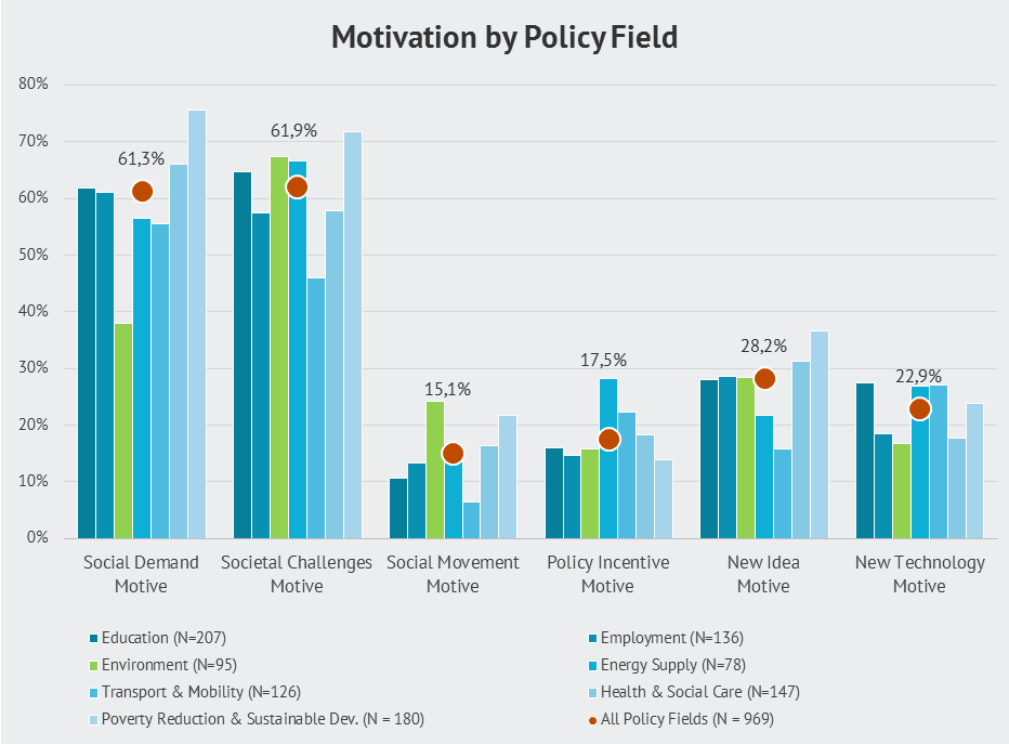
The societal challenge perspective motivates most social innovation initiatives in Environment and Climate Change (see Figure 10), more than any other policy field except for Poverty Reduction. It reflects the view that preserving nature seems often to be against other interests, against interests of incumbent industries and players, against interests of economic growth. Instead, the social demand perspective is least prevalent in Environment and Climate Change compared to all other policy fields. Indeed, the social perspective is integrated in many initiatives through seeking re-employment for vulnerable groups in labour-intensive activities of social innovations operating on the market, but it is more often not a first order goal. The realization of win-win-situations lies in the heart of many social innovation initiatives in the field. What may be useless to some people, may be of high value and use to others. To organize e.g. the change of ownership that

grants a second life-cycle to goods that would otherwise have been thrown away (**environmental impacts**) at the same time provides job opportunities for the less advantaged and supports the re-integration of longterm unemployed (**social impacts**).

Latent demand is a critical factor for this kind of social innovation initiatives. Although there often is a strong social demand (unemployment) for one service, the latter (e.g. repair services) is of a more assumed or latent nature. Although it is perceived by the initiators of the social innovation initiatives as a tension or societal challenge (often kickstarted by statistics on amounts of waste), little is known at the time of foundation about how the new offerings will be taken up by users. Although the sustainability aspects are more and more in the focus of discussions and offerings, many social innovation projects promoting sustainability aspects operate on an agenda which is beyond concrete and local demands. Initiators of such projects start on the basis of assumed or latent demand that may become explicit and – in case of success -translate into actual demand as soon as service offerings take concrete form. Thus, social innovation initiatives have an important role as they provide real feasible alternatives to the existing ways of doing things.

It seems important in this respect that SI in Environment and Climate Change, more often than in any other policy field, social innovation initiatives see themselves as part of a (bottom-up) social movement, as **activists**, i.e. as part of collective action by a larger group of interested (Oliver and Marwell, 1992). (see Figure 10) From SI Drive Mapping 2, we know that charismatic leadership may be a critical factor in successful initiatives, in combination with insights and talents by the individual entrepreneurs and innovators, as well as their closest supporters.

Figure 10: Motivation per Policy Field



Source: SI DRIVE Global Mapping

Inducing a **sense of ownership** seems to be a strategy of success in some of the mapped initiatives (see SI Drive Mapping 2, Schartinger et al, 2017). Initiators often understand from the very inception that if people who cause environmental problems themselves did not feel a sense of ownership of the projects or of their participation in it and did not wish to pursue it for their own benefit the initiatives could not succeed. As part of their strategies, SIs engage people to assume a direct role in working out new solutions and new ways to

addressing the problems at hand and their solution is a continuous process. Further, the ambitions of the organization keep growing, with much more still needed and also strived for, at international level.

Legislation and regulation can be favourable framework conditions making initiatives spread. Laws of waste disposal, national waste plans had a positive impact on the development of initiatives and o the practice field of repairing, reusing and recycling in general, by setting standards for good behaviors, increasing awareness, help build a community of professionals.

Media and communication Generally, networks and media are used to gain attention and attract people as suppliers, as well as customers. Media contributions about repair services often may raise awareness and demand, before this latent, becomes then apparent and materializes. Furthermore, craftsmen exist to carry out necessary repair services; however, they are often small businesses in backyards, not visible to the public. To organize them in a network and make them visible through media contacts and marketing activities supports the diffusion of repair services and reuse of second-life products. (Schartinger et al., 2017)

More generally, **information is crucial** in Environment and Climate Change, especially **for the social acceptance of environmentally friendly behavior**. Open knowledge and information via social media, about environmental problems their roots in human behavior and changes in life styles and daily actions are key for many social innovation initiatives. The Third Sector plays a major role here in providing independent information about environmental problems that are caused by individual behaviours, but are not felt where they are caused.

And direct financing schemes for social innovation initiatives could of course support them and be a factor of success. Campaigns at the municipal level, calling for inputs financing start-ups in environmental entrepreneurship can help to solve (local) problems. Taxation favouring and thus incentivizing social entrepreneurship, financing opportunities for innovative projects. SI accompanying research and innovation, in turn, is the means to spread information about the success of initiatives. Via citizen science, information about environmental developments (biodiversity) and the state of the SI initiatives could be integrated.

6.3 BARRIERS

Although the main barriers for social innovation initiatives in the area of Environment and Climate Change is **lack of funds** (see Figure 11), this seems to be of a minor problem compared to other policy fields. Already the second major barrier to social innovation in the field is **knowledge gaps**. This is the other side of the coin, reflecting the above observation that information is crucial for the success of initiatives. Information about environmental problems their roots in human behavior and changes in life styles and daily actions are key for many social innovation initiatives, as many detrimental effects on nature cannot be felt immediately, so private considerations of individual benefits prevail. Consequently, **lack of media attention** for social innovation initiatives initiatives can also be a barrier.

Other barriers can be grouped as the following:

Policy barriers

- Reluctance of policy responsibles, flat attitude, apathy of policy makers/actors in public admin
- Vested policy interests as a huge barrier
- Conflict of interests/power relations
- From policy decision makers perspective: difficult to integrate many SI, what to support, what do they produce?

Instead, rather cynically, lack of policy can be driver for social innovation because it forces people outside policy to take action.

Distribution of power as a barrier

- opposition from entrenched interests
- Economic interest of firms or individuals against environment
- Polarization in public discurse: “Either environment or social/economic interests.”
- New practices do not receive financial support and dry out

Personal barriers

- Change is annoying, frightening, horrible, hence bottom-up resistance.
- Acceleration culture leads to accelerated consumption and other unsustainable behavior.

- Social pressure to conform/achieve

Can be counteracted by DIY (Do It Yourself), 3D printers, Maker communities

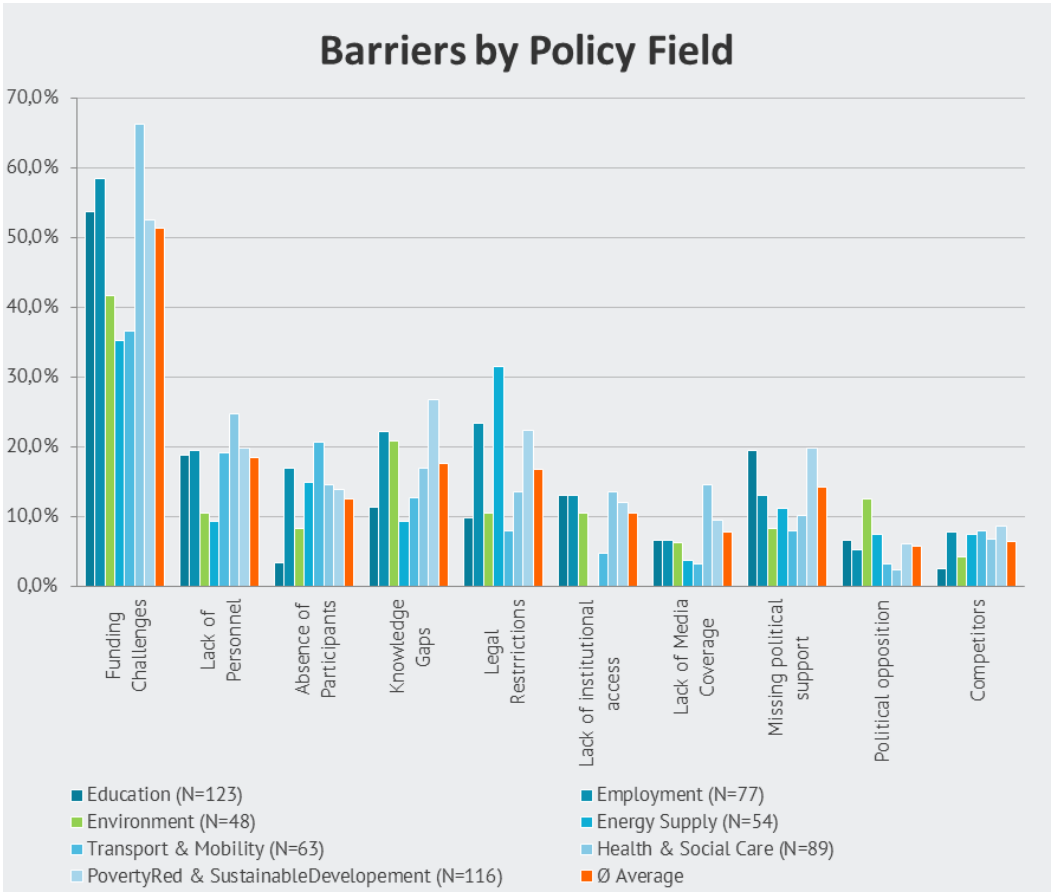
Lack of awareness/misinformation

- Lack of awareness of people/community of environmental issues
- Information society: ubiquitous computing, big data, viral diffusion of information in Social Media has good and bad effects
- SI and labour market, mind the female gap : There are three types of fast growing jobs (ICT, health, green jobs), two of these ignore women.

Organisational barriers

- If there is a rigid market evolution of SI into enterprises, then there are often no social gains. If SI goes too much in the direction of a market (too close to UBER, Amazon), then it is no SI anymore.
- State planning on SI may affect their innovativeness negatively. If SI comes too close to public planning, it gets too limited, too structured, too many indicators they have to fulfil.
- Hence, in order to remain a SI, they have to build an own ecosystem.

Figure 11: Barriers by Policy Field



Source: SI DRIVE Global Mapping

7 GOVERNANCE, NETWORKS AND ACTORS

7.1 GOVERNANCE

Mega context: Large international organisations and NGOs

In the area of Environment and Climate Change large international organisations like the United Nations and international NGOs (WWF, Greenpeace etc) provide information and a differentiated frame of reference that gives additional legitimacy to many social innovation initiatives. Very often in the presentation of a social innovation initiative, in its motivation and roots reference is made to goals, statistics or infographics published by organisations which are knowledgeable and have reputation. These organisations have an important role in the governance of the area in that they spread information on the deterioration of nature which cannot be felt in the everyday lives of most people (e.g. extinction of salmon). In the following a few examples:

The UN Sustainable Development Goals (SDGs) [8] were developed at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world.

Figure 12: UN Sustainable Development Goals

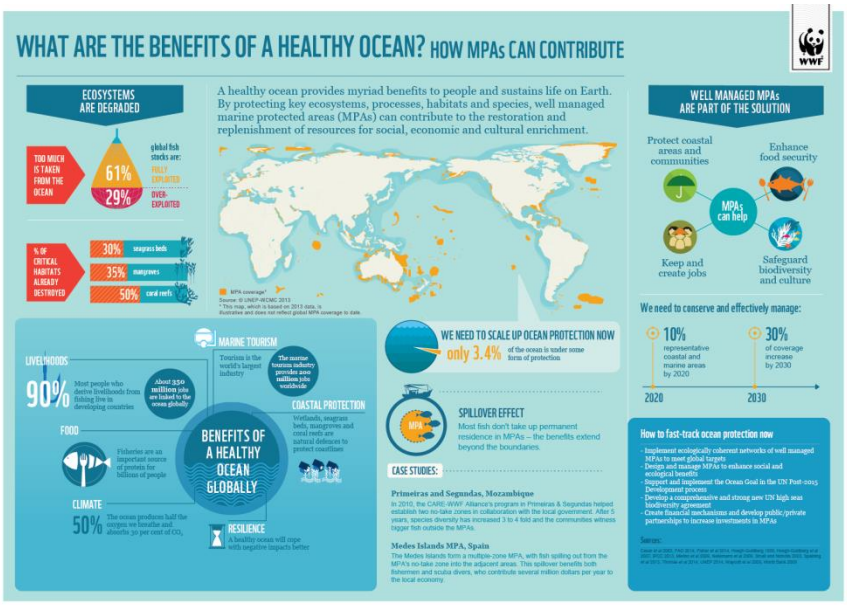
Source: http://www.undp.org/content/undp/en/home/sustainable-development-goals/background.html, last accessed May 31st, 2017

Thereby the SDGs replace the Millennium Development Goals (MDGs) formulated in the year 2000. The SDGs coincided with the agreement reached in 2015 at the COP21 Paris Climate Conference (often referred to as the *Paris goals*). Together with the Sendai Framework for Disaster Risk Reduction, which was signed in Japan in March 2015, these agreements provide a set of common standards and achievable targets to reduce carbon emissions, manage the risks of climate change and natural disasters, and to build back better after a crisis. http://www.undp.org/content/undp/en/home/sustainable-development-goals/background.html, last accessed May 31st, 2017

[8] http://www.undp.org/content/undp/en/home/sustainable-development-goals/background.html

Another example is the **WWF**, who informs about endangered species and provides a list of priority species, but in general is concerned with forests, oceans, wildlife, food, climate & energy, and freshwater.[9] This also provides a framing and context for initiatives in the fields.

Figure 13: Infographic by WWF



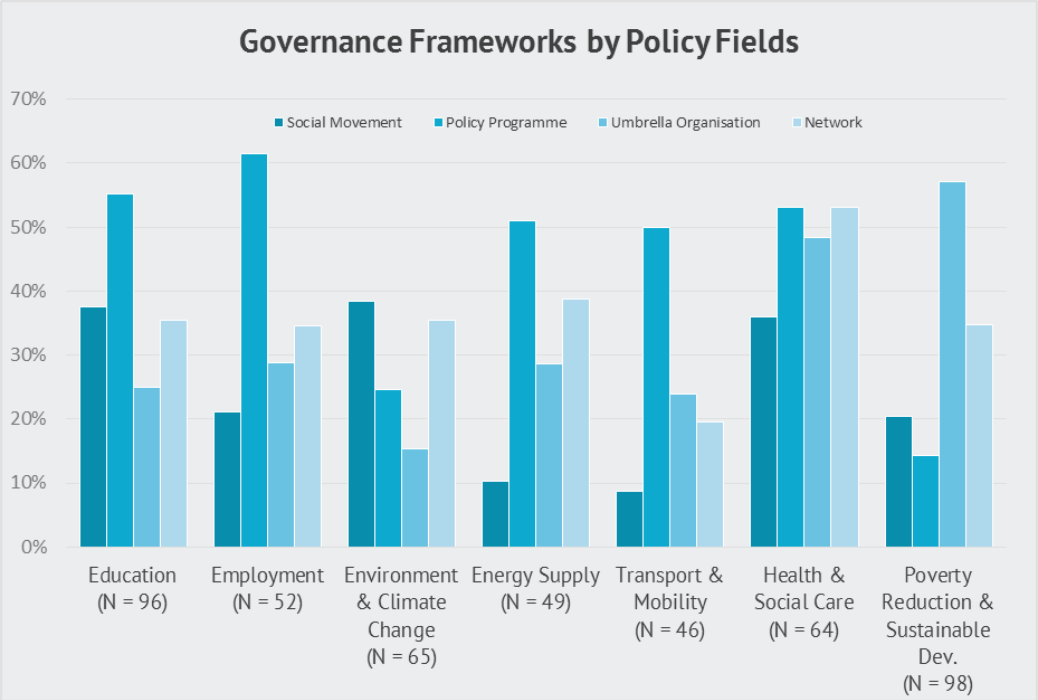
Source: http://wwf.panda.org/what_we_do/how_we_work/our_global_goals/oceans/ , last accessed May, 31st, 2017

Earth Overshoot Day is an initiative of Global Footprint Network, an international research organization that is changing the way the world measures and manages its natural resources. The date of Earth Overshoot Day is the day every year on which humanity's resource consumption for the year exceeds Earth's capacity to regenerate those resources that year, it is the day when humanity enters deficit spending for the running year. It is calculated with data from Global Footprint Network's National Footprint Accounts [10] Earth Overshoot Day is a campaign supported by many other nonprofit organizations.

This mega context is the more important as - already discussed in the chapter on Policy context - social innovation initiatives in Environment and Climate Change often develop because **social innovators want to impact on policy. Thus these large international organisations provide information and legitimacy to initiatives in the area of Environment and Climate Change.** Social innovation initiatives often want to have an impact on policy, or compensate for missing policy –. Here, policy change is in focus which is also reflected in the different governance frameworks for the policy fields (see Figure 14). In Environment and Climate Change, more often than in any other policy field, social innovation initiatives are part of a social movement, i.e. try to mobilise collective action by a larger group of interested (Oliver and Marwell, 1992). The notion of a social movement is stronger in the area of environment than that of an umbrella organization. Indeed, social innovation initiatives do rather feel part and try to activate networks, which is the second strongest governance framework. Social innovation initiatives are indistinct about policy programmes, probably because their relations are so multi-faceted: some SI initiatives do receive funding from policy programmes, some came to existence to criticize current policies or compensate for missing policies.

[9] http://wwf.panda.org/what_we_do/how_we_work/our_global_goals/oceans/
[10] http://www.overshootday.org/

Figure 14: Governance frameworks of SI in environment and climate change, compared to other policy fields

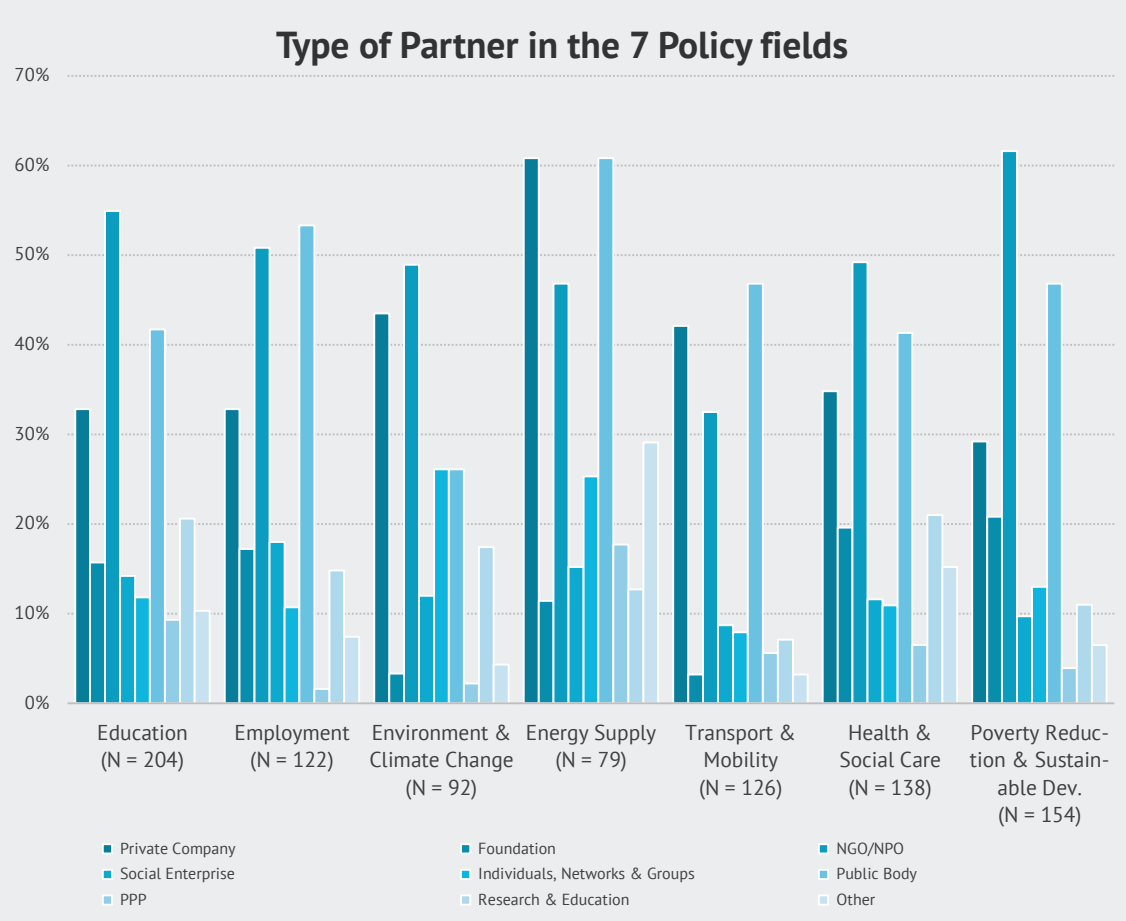


Source: SI DRIVE Global Mapping

7.2 NETWORKS AND ACTORS

Within the initiatives collected for SI Drive Mapping 1 Environment and Climate Change showed particularities with respect to types of actors involved (see Figure 15). The initiatives seemed to primarily rely on non-governmental and non-profit organisations, and together with Energy Supply and Transport and Mobility more than others on private companies. With a proportion of around 25 per cent public bodies are underrepresented in *Environment & Climate Change* compared to the other policy fields. Likewise, the role of foundations appears to be marginal well below the shares of all other policy fields except for Transport & Mobility where it is equally low (3 per cent).

Figure 15: Type of Partner per Policy Field



Source: SI DRIVE Global Mapping

Functions and roles of actors and networks in case studies

In terms of functions of roles and networks the following cases in the practice field of repairing, reusing and recycling may serve as examples that illustrate the field: The histories of the cases Myrorna (SE), RUSZ (AT), AFF (RO) and the Bulgarian system for the collection and recycling of hazardous waste largely differ (BG). One case (Myrorna) is over one hundred years old and was initiated by private persons for charity reasons and then taken over by the Salvation Army, which had started different social welfare projects for men, with activity refurbishment of furniture, shoemaking etc. Different types of alliances helped the strategic positioning of Myrorna: First, in hiring qualified managers, "allies" were integrated in the organization to professionalize it and make it more efficient. Myrorna in this sense shifted gradually towards building a professional and competitive organization. From the 1980s, the organization went through strategy and managerial changes which took this shift the whole way and separated from the Salvation Army. Second, Myrorna cooperates with municipalities for collecting donated goods. Collection is primarily conducted through clothing boxes,

recycling centers and in stores in many cities in Sweden. Third, Myrorna cooperates with large firms in the fashion industry in order to increase reuse and recycling in cooperation. The goal is to work broadly with the fashion industry to increase the reuse, make it easier to provide and increase awareness. Cooperation partners are carefully selected along values shared between Myrorna and the individual partner.

Through its history, RUSZ ran through different phases in seeking partnerships for its purposes. At the beginning, in the foundation phase in the 1990ies, public partners were important (Vienna municipality, Vienna waste management, Public Employment Organization AMS, etc). Once having become operational, networks of private partners have gained importance. Different networks of repair service firms have been founded on the local (Vienna Repair Network), national (REPAnet)and EU-level (RREUSE) to integrate and make accessible the services of a variety of repair service providers. Furthermore, media has always been considered as a partner, and RUSZ engages in around 300 media contacts per year to raise awareness and stay in people's minds. Today, partnerships with public actors have once again become important, in order to promote standards for durable and easy to repair goods, and counteract the issue of technological obsolescence.

Ateliere fara frontier(AFF) as a model has been transferred from France. For this reason, cooperation with the French parent and French firms located in Romania has been important from the beginning. Furthermore, the specific innovative solutions could not have been promoted without the support of two types of actors/partners: those providing used ICT equipment and those offering jobs for low qualified persons prepared by AFF for work integration. In its Annual Report 2014, AFF distinguishes between strategic and financial partners, who support with financial means and operational partners, who support with direct activities (e.g. employers, trainers) or material donations. AFF also partners with Ecotic who represents more than 500 electric and electronic equipment (EEE) producers and importers and is Romania's first scheme of producers and importers of EEE, set up in 2006. AFF with 7 other NGOs in Romania have established a national network RiseRomania – a Romanian network of social integration enterprises by economic activity.

And, like RUSZ, AFF is part of the European network of recycling and reuse organizations (RREUSE). Moreover, it is also part of the European network of social integration enterprises (ENSIE).

The system for the collection and recycling of hazardous waste in Bulgaria is based upon one crucial axis – the public private partnership between the Sofia Municipality and BalBok Engineering, a private Company in the field of waste management. The initiative for developing the system for the collection and recycling of hazardous waste has come from the Sofia Municipality. Municipalities are natural partners in the system of waste collection and recycling as national legislation on waste management requires municipalities to separately collect hazardous waste. After investigating firms in the field of waste management, the Sofia Municipality has chosen BalBok Engineering based on its expertise in the field. In 2011 the model of the system for the collection and recycling of hazardous waste was developed, and in 2012 it was completed and implemented through a pilot project between BalBok and Sofia Municipality.

For the practice field of *Sustainable primary production for food production and distribution* the founders from the North-Atlantic Salmon Fund (NASF) (IC) and Tarimsal Pazalarma (TR) represent a new breed of environmental change agents who utilize business skills and negotiation tactics to engage stakeholders and effectively protect precious natural resources. Both provide solutions where everyone stands to gain economically from collaboration; to create a win-win situation.

NASF engages, governments, works with nets men, and the land owners to conserve Salmon stocks. NASF chose partners/ experts based on the specific regions and expertise available, as needed for finding solutions for the conservation of the salmon ecosystem and make sure that the salmon stocks are sustainable. Buyouts are not just payoffs. Vigfusson tries to help the fishermen convert to a more sustainable activity. Therefore, he supports them to realize new economic incentives for ongoing conservation. (see also https://www.ashoka.org/en/fellow/orri-vigfusson, last accessed December 1st, 2016)

For Tarimsal Pazalarma, partnerships were crucial to enable the truly innovative aspect of the social innovation initiative, namely the creation of an entire IT-related "ecosystem" in which www.tarimsalpazarlama.com is able to thrive. Agricultural businesses were not interested in buying web ads because they had no websites to redirect to. Agricultural Marketing has created websites for them as part of a sponsorship package. Agricultural

businesses cannot profit from e-commerce because farmers cannot buy online. Agricultural Marketing has partnered with Şekerbank to provide farmers with the means to make online transactions. Farmers aren't interested in websites because they lack home internet connections. Agricultural Marketing partners with Vodafone to deliver their information services via text message. The project Agricultural Marketing has had to devote relatively little time to the creation of a website where farmers could get valuable information and vastly more to creating a system in which farmers are able to access this information and where both firms and farmers receive enough value from the site to be willing to support it financially.

Orri Vigfússon from NASF and Tülin Akın from Tarimsal Pazalarma have both been appointed Ashoka fellows, in 2004 and 2012 respectively.

8 PROCESS DYNAMICS

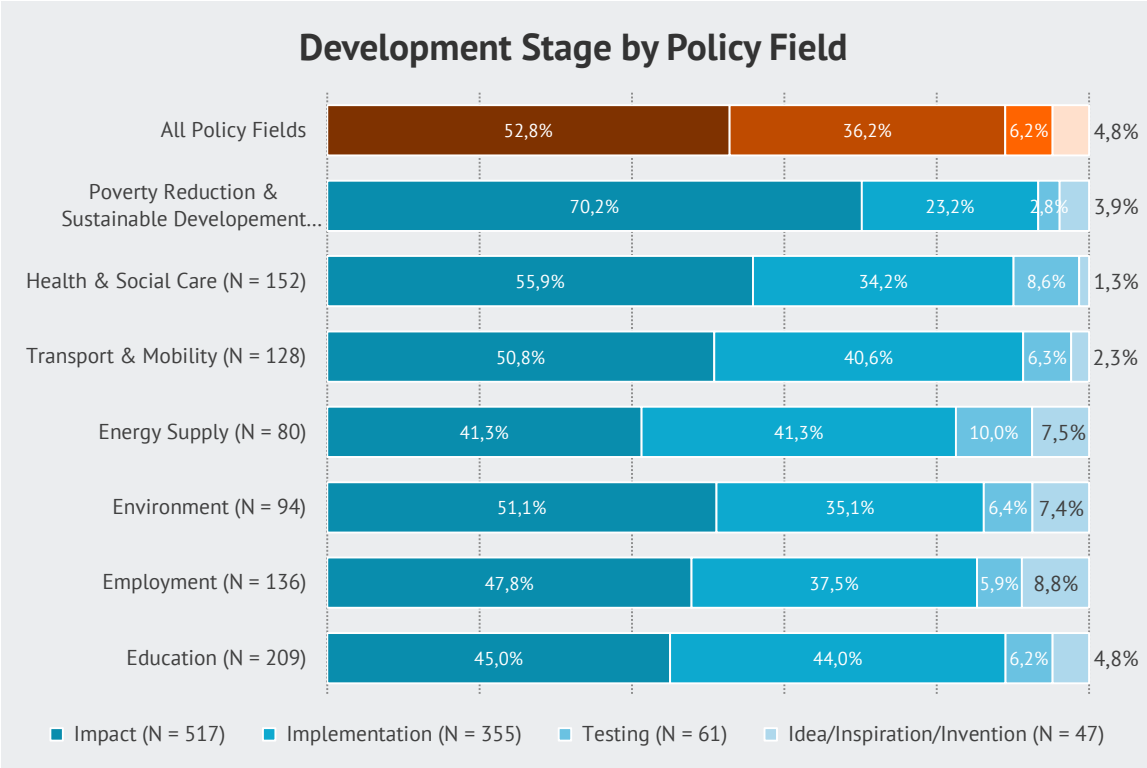
8.1 START AND DEVELOPMENT

Table 3: Initiatives' Starting Year by Policy Field

	2011 - 2015	2006 - 2010	2001 - 2000	before 2000
Education (N = 198)	38,9%	32,8%	18,2%	10,1%
Employment (N = 129)	48,8%	28,7%	12,4%	10,1%
Environment (N = 93)	46,2%	34,4%	7,5%	11,9%
Energy Supply (N = 77)	58,4%	16,9%	6,5%	18,2%
Transport & Mobility (N = 101)	47,5%	31,7%	10,9%	10,0%
Health & Social Care (N = 146)	36,3%	30,1%	20,5%	13,2%
Poverty Reduction & Sustainable Development (N = 161)	31,1%	31,7%	15,5%	21,6%

Source: SI DRIVE Global Mapping.

Figure 16: Stage of Development per Policy Field



Source: SI DRIVE Global Mapping

The majority of cases in SI Drive on the whole and in the area of Environment and Climate Change is rather young (see Table 3: Initiatives' Starting Year by Policy Field). 80 per cent of the cases are under 10 years of age.

This has of course implications for studying institutionalization and mechanisms of social change which both need a long-term perspective. However, as can be derived from Figure 16: Stage of Development per Policy Field, many cases despite being young, are in a stage beyond implementation and achieve impact.

8.2 SCALING AND INSTITUTIONALISATION

As can be seen from Figure 17: Scaling of Social Innovation Initiatives, Environment and Climate Change does not show any particularities compared to other policy fields. Increasing the target group is the most prevalent form of scaling, followed by extending the network and organizational growth.

For the case study research in Mapping 2, it was a criterion for selection that the cases for in-depth analysis be mature and well implemented. **Even within one practice field, forms of scaling and institutionalization differ widely**. Myrorna from Sweden is a very mature case, 125 years old. Founded by private ladies in Stockholm for reasons of altruism, and then taken over by a charity. Over the long time span it has achieved diffusion of its various services and institutionalization in that it is Sweden's largest retail chain of second-hand goods today. Starting from Stockholm it has established a country-wide system of collection and sorting points from where all donated goods are further distributed and processed. Myrorna achieved **institutionalization because it applied to Swedish values of helping the disadvantaged and protecting the environment. It made re-use attractive and socially acceptable**. Social innovation in this field is closely associated with social change as to whether people allow for their goods to be re-used, as well as to whether people accept to use second-hand goods. Furthermore, Myrorna achieved institutionalization in that it participates in a **voluntary certification system "Nordic Textile reuse and recycling commitment**".

In Austria RUSZ, in contrast, has been founded in the 1990ies, in response to new labor market policies under the title of "Experimental Labor Market Policy", to help long-term unemployed people return to the labor market. In general, circular economy as a topic is important in many social enterprises founded as a result of these new labour market policies. The RUSZ founder came out of the public sphere, he had previously been active in organizations close to the Vienna municipality. RUSZ achieved institutionalization

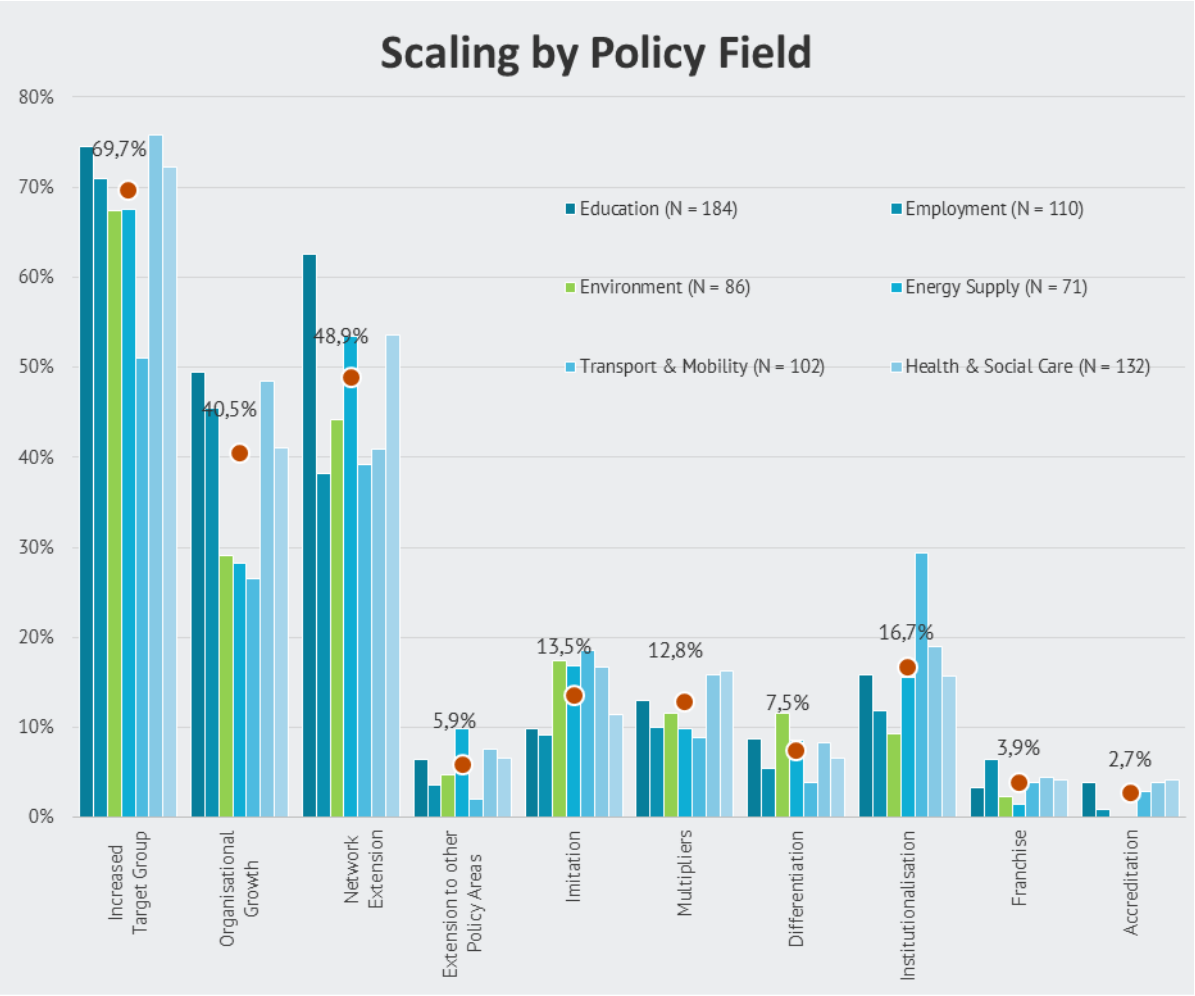
- in the form of **further firm foundations**,
- in the form of newly established **networks of repair service firms**, locally (Vienna Repair Network), nationally (REPAnet) and EU-wide (RREUSE), and
- in the form of **promoting standards for durable and easy-to-repair goods**. Such a standard has been implemented in Austria already, it attracts a lot of attention and is currently being discussed on the EU-level.

In Romania, “Ateliere fara frontier” (AFF) was first created in 2008, initially based on the French model of the Ateliers Sans Frontieres Association. The social and professional counseling methodology and the instruments have been adapted over the years to the Romanian context and stakeholder specificities. It is a Romanian non-profit association, a social enterprise that creates jobs for disadvantaged people in workshops of social economy, with the purpose of preparing these people for full social and professional reintegration on the regular labour market. AFF expanded its impacts over time in developing additional features and services: the “ASSOCLIC National program of IT donations” which engages in the donation of computers for schools to support them in their educational purposes. AFF also initiated a further project “Remesh” - which means “socialware”, a special category of fashion products resulting from the upcycling of advertising meshes and billboard banners. **AFF achieved institutionalization via its reach**: in the year 2014, 7744 Remesh products were sold, 1890 computers were donated to 495 schools and associations, 99100 beneficiaries addressed through solidarity projects. AFF also tries to raise awareness and establish recycling and reuse in the culture and values of the Romanian society. In 2014, the **RRR White Book was published** by AFF and 6 other environmental organizations. (Annual Report 2014). Furthermore, AFF contributes to the discussion on social enterprises in Romania.

In Bulgaria, the system for the collection and recycling of hazardous waste was implemented in 2012 by a public-private partnership, i.e. the Sofia Municipality and BalBok Engineering, a private company in the field of waste management. This alliance that lay the ground for the initiative was established by the Sofia Municipality, which – upon Bulgaria’s accession to the European Union in 2007 – was obliged to introduce

new standards, procedures and fulfill requirements related to waste production and treatment. The system for the collection and recycling of hazardous waste in Bulgaria intends **to achieve institutionalization via a change of daily practices of people**. Actually, the separation of waste is not very popular among population in Bulgaria. According to different sources, systems of separate waste collection are not working smoothly and people are still not used to separately dispose their waste. At the same time there is already a stable percentage of citizens with "green" thinking who are aware of the possible ways to protect the environment and also have the desire to be informed. **Other municipalities in Bulgaria (Plovdiv, Shumen, Sliven, Veliko Turnovo, Radomir, Sredets, Levski and Bansko) have implemented the system for the collection and recycling of hazardous waste on their territories.**

Figure 17: Scaling of Social Innovation Initiatives



Source: SI DRIVE Global Mapping

8.3 MECHANISMS OF SOCIAL CHANGE

Learning

In many countries, learning takes place on a collective and cultural level, social awareness, environmental awareness, appreciation for recycling and reuse. In Environment and Climate Change, social innovation initiatives often realize that success requires working on people's attitudes, achieving efficient collection and distribution of 2nd hand goods, and adding value to the products.

For different social initiatives to develop, necessary insights were that people are actually unwilling to dispose of goods because of minor damages (devices) or different shape (vegetables). Culture and values of preserving nature, avoiding waste and prolonging the use of goods exist, but shrivel without the necessary supply of services. Media contributions about repair services or food waste and alternatives immediately raise awareness and demand, before this latent, becomes apparent. A further insight is that craftsmen exist to carry out necessary repair services, however they are often small businesses in backyards, not visible to the public.

Knowledge about waste in all forms, on the basis of reliable statistics, is a major source of learning and a frame for legitimacy of action at the same time. E.g. In 2014, people worldwide discarded all but a small fraction of an estimated 41.8 million metric tonnes (megatonnes – Mt) of electrical and electronic products — mostly end-of-life kitchen, laundry and bathroom equipment like microwave ovens, washing machines and dishwashers. And the volume of e-waste is expected to rise by 21% to 50 million Mt in 2018. The e-waste generated in 2014 contained an estimated 16,500 kilotons of iron, 1,900 kilotons of copper, 300 tonnes of gold (equal to 11% of the world's total 2013 gold production), as well as silver, aluminum, palladium plastic and other resources with a combined estimated value of US$52 billion (48 billion Euro). Toxins in that e-waste, meanwhile, include 2.2 Mt of lead glass — more than six times the weight of the Empire State Building — 0.3 Mt of batteries, as well as mercury, cadmium, chromium and 4,400 tonnes of ozone-depleting chlorofluorocarbon (CFCs). (Taken from: United Nations Report (Baldé et al., 2015))

Progress in scientific evidence and scientific concepts shape the knowledge of social innovators, even when academics are not partners in the social innovation initiatives. The problem of diminishing fish stocks has been well documented by scientific evidence, with new revelations on the seriousness of the situation made public around the time that North Atlantic Salmon Fund started.[11] Elinor Ostrom published her seminal book titled Governing the Commons: The Evolution of Institutions for Collective Action in 1990. Conceptually, fish stocks are considered a "common pool resource", which attributes special requirements for the definition of property rights to find a solution which does not lead to the extinction of species. Common pool resources have the characteristic that limiting the harvest in one country only would have little effect on salmon preservation on the whole because other countries keep catching salmon. Countries that had banned the catch of salmon did not see their river stocks recovering, while those that kept fishing reaped the benefits.

Variation

In Environment and Climate Change, the variation is often to offer a new solution, new services and thereby combining ecological and social goals. There are of course more initiatives existing that follow the two different goals separately, either ecological or social, like work integration. However, the combination is of course an additional quality and variation.

In the area of repairing, reusing and recycling but also in food waste, the variation to the existing most widespread practices is to offer *reverse logistics services*. These are services which comprise the acquisition of used products or misshaped vegetables (=supply), subsequent reprocessing and upcycling and finally remarketing of reprocessed products (Lechner & Reimann, 2015). This is combined with the re-employment of disadvantaged job seekers so they can develop vocational experience, capabilities and know-how in the employment relationship (The WISE project, 2009). On a more general level, the variation is to offer manifold of such upcycling services, to avoid waste of any kind through minor damages or different shape which can easily be compensated.

For primary producers like farmers and fishermen, and members of rural communities in general, it is necessary to make big changes in the way that they think about their profession, technology, education and their community in order to be able or willing to adopt the new business models, tools or techniques. These can be thought of as complementary innovations required of primary producers. In social innovation initiatives analysed in Mapping 2 they have come around to the understanding of their rural business model as something fluid, potentially subject to progress rather than only mired in tradition. They began to see technology and education as things also important, not exclusively for urban communities. And they began to see the impacts of personal farming and fishing practices on the greater community.

[11] https://www.ashoka.org/en/fellow/orri-vigfusson , last accessed Dec 1st, 2016

Over time more awareness and realization has embodied the general public, which has started to play a major role in supporting the conservation of our natural environment and, as part of this, the conservation of species. This helped shape new practices where on the basis of sound information a brokerage of benefits becomes feasible.

Selection

In general, many efforts to counter the preservation of nature and the extinction of species were defeated by the vested interests that benefits from destroying the resources. The reasons have been the absence of political support or outright political resistance, and failure to awaken the attention of the masses.

On a more concrete level, selection takes place because many ecologically sound practices (like repair services, but also the reprocessing of non-standard fruits) are labour-intensive, and hence for reasons of taxation, often not able to survive on a completely private basis. As labour is taxed high, labour –intensive services like repair services appear expensive and hence have difficulties to survive on a purely private basis. In practice, the form of a social economic enterprise enables businesses to be eligible for public support of labour cost.

Conflict

Conflict is at the core of many challenges in Environment and Climate Change, including the conflict between short-term exploitation and long-term sustainable usage and benefits. This translates into continuous conflict between those who wish to continue to exploit nature for short-term benefits against those who work for realizing the long-term benefits.

In a general sense, lower prices and/or declining natural resources put pressure on farmers and fishermen to increase activities and output in order to pay their bills and support their families. When the stocks of a declining species or commodity diminish, prices tend to rise inducing even greater effort to keep quantities up. In the North Atlantic, there was a gradually worsening situation of this sort. Fishermen engaged in even more heavy fishing of salmon to compensate for dwindling capture in order to make a living, which accelerated the decline of Salmon in Icelandic waters as well as in the ocean generally. Pressures induced them to follow ill-advised practices for short-term benefit with long-term environmental and financial cost, such as over-fishing, over-reliance on chemical fertilizer and on irrigation. In agriculture, a major reason for low prices has been the excessive power of middlemen in setting agricultural product prices, due to farmers' lack of information regarding prices. Providing farmers with accurate, up-to-date information regarding who is selling what, where and for how much can improve their bargaining position with middlemen and mitigate some of the pressure to pursue ill-advised practices.

A basic conflict inflicting upon the practice field of repairing and reuse is contempt for re-use and social stigma which impedes associated developments. In Sweden, Myrorna helped in reducing the boundaries between social classes in this context.

Another conflict lies in the conditions for financing, in case of seeking public support to reduce the burden of high labour cost in labour-intensive services. As labour is taxed and hence expensive, the remedy within the practice field of repairing, re-use or extending the life time of products is often to seek eligibility for a Work Integration Social Enterprise (WISE) support scheme. Here, labour cost are subsidized because the target is to place long-term unemployed, difficult-to-place people into unsubsidized employment after a transit phase at the WISE. However, conflicts seem likely as WISEs have primarily goals of social stabilization and inclusion, whereas operative businesses have goals of providing high-quality services which often require skilled personnel. Hence, they are "picky" in terms of personnel acquisition.

Tensions and adaptations

Systemic tensions are relevant in several forms in Environment and Climate Change, e.g. problems with poverty and inclusion and users who do not take advantage of the full lifetime of a product. The term re-use refers to products being granted a "second life" by other consumers.

The view of donors reveals additional tensions in the system: Donors can be seen as affluent, they can provide products. SI can provide convenient services to these affluent people who are willing, or have become aware of, the possibility to donate used clothes and other accessories through a socially acceptable network of collection points and pick-up from homes. Other SIs view donors rather as needy themselves, at the mercy of large producers and retailers who provide as part of their assortments weak and defunct products, which – without adequate standards and labels – cannot be distinguished from high-quality goods by the customers.

Purposeful obsolescence is a hot topic for of the social innovators in the area. "Purposeful obsolescence exists whenever manufacturers produce goods with a shorter physical life than the industry is capable of producing under existing technological and cost conditions; or whenever manufacturers or sellers induce the public to replace goods which still retain substantial physical usefulness." (Gregory 1947, cited in Hübner (2013)). For Slade (2006) planned obsolescence is defined an "assortment of techniques used to artificially limit the durability of a manufactured good in order to stimulate repetitive consumption" (Anderson, 2007). Conceptually, a basic ingredient to planned obsolescence is asymmetric information (Akerlof, 1970). At first, only manufacturers know about differences in quality of features unobservable to the buyers of goods. Reliable repair services prolong the cycle by introducing repair services that postpone the date of withdrawal, the cycle now being buying-using-repairing-withdrawing-buying. Repair service technicians are also the most likely to be able to detect (purposefully) in-built technical weaknesses.

Cooperation

Cooperation and the search for strategic allies is the essence of social innovation initiatives. A large part of their innovation biographies is about their finding partners and the crucial influence of these partners.

Additionally, social innovators take part in wider networks. For repair services, networks on various levels (local, national, EU) have been implemented (local, national) and joined (EU) in order to become more visible, exchange knowledge and information, and provide mutual support among like-minded organizations. (Vienna repair network, REPAnet Austria, RREUSE).

In Romania, AFF is transferred from the (international) French organization Ateliers sans Frontieres. The parent organization offers the methodology for work integration of disadvantaged individuals, but the waste collection activities are matters of local opportunity. However, it is now also part of various European level networks (RREUSE, ENSIE).

In the sustainable agriculture practice field, both social innovators are part of the Ashoka network.

Box 1: RREUSE

RREUSE represents social enterprises active in reuse, repair and recycling. They want the EU and national governments to move from promoting just recycling and waste management to putting secondhand first. Approximately 77,000 employees and over 60,000 volunteers and trainees work within 30 member networks across 17 EU countries and one in the USA. The main activities of our members include collection, sorting and redistribution of used textiles and clothing, collection, repair and reuse of electrical and electronic waste (WEEE), furniture and other bulky waste, home and community composting projects, charity and second hand shops, collection and recycling of paper, cardboard, wood, plastics, paints, metals, books and toys, awareness raising campaigns, international projects, exchange of best practice and business support.

Source: Taken from RREUSE (2016).

Competition

In the practice field of repairing, re-use and extending the life-time of products, competition is weak among repair service providers. Actually, firm entries are often welcome in case they provide independent and reliable repair services. Protection of intellectual property hardly occurs. Although names of organizations are trademarked, knowledge and practices are rather spread among the like-minded. However, competition is fierce with producers of new goods and retailers. They are seen as the real competitors because due to

differential taxation of labour and energy, new appliances may be supplied at low prices that hinder (labour-intensive) repair services systematically.

For sustainable agriculture, competition in primary production globally (fishing, as well as agriculture) is a framework condition, as it has made it progressively more difficult for small family businesses operating traditionally to maintain their business and way of life. Agribusiness as well as commercial fishing is only marginally profitable.

Concerning the level of single initiatives, there was no real competition. E.g. Tarimsal Pazalarma, competition with other projects has not played a role as no one else had been doing anything similar during the developmental years of Agricultural Marketing.

Role of technology

The role of technology vary enormously between projects, being of no importance in some cases and of essential importance in others. In Tarimsal Pazalarma, technology has an enabling function. Tarimsal Pazalarma is, in essence, both a technological solution and an information platform educating about other technological solutions to social and environmental problems in rural communities. The technology itself is necessary if not sufficient component of the overall project, without these prior innovations or inventions Agricultural Marketing could not exist. A part of the importance of Agricultural Marketing has been to bring these technologies and literacy about these technologies to underserved communities. The project has not been on the global leading edge of technological innovation. However, at certain points during the project significant changes have occurred triggered by adoption of new technologies by Agricultural Marketing in order to disseminate these technologies to rural communities. A nearly complete ecosystem necessary for diffusion of technological solutions in agriculture has been created through this initiative, down to discounted phones and computers. The diffusion of platform access and membership and the diffusion of agricultural best practices that are taught to more farmers and more communities is a critical aspect of the initiative.

Technology can play an important role in some initiatives in repair services, but not in the classic sense. First, in the perspective of the practice field reuse, repair and an extending the life cycle of products, technology is something that can break, in which case the original utility of the product is reduced or zero. Hence, the diffusion of repair services means remedy to broken technology. Whatever technology diffuses, it can break as well, in which case it needs repair. Technology is not an enabler, but it is weak and may be defunct.

A second role within the practice related to technology, is that of informing an interested public about in-built technological weaknesses of devices and about easy-to-repair product designs. This is important know-how that is inherent to repair service providers. Consumers can only tell when something is broken, they normally do not have the expertise to realize if it is designed to be broken sooner than necessary.

A third role of technology, which was mentioned by the Romanian AFF case in particular, is that advancements in technology have an impact on the necessary skills and competences in dismantling and recycling methods. This may be challenging in terms of human resources.

However, not in all social innovation initiatives in the practice field does technology play a role. For e.g. Myrorna, technology was not essential. However, now Myrorna is becoming open to and interested in using modern ICT tools for improved services and reaching out.

The system for the collection and recycling of hazardous waste – although being completely new for Bulgaria - did not require technological innovation, but a new architecture to implement the service and make it widely available for the Sofia population. So it did not require technological innovation but system innovation.

Planning and institutionalization of change

Nationally, different directives and laws had an influence on the practice field in the various countries. (see also chapters Needs and challenges and Policy context).

Especially for New Member States, it seems that the national policy context in the area of environment (and sometimes employment) is driven mainly by the EU strategies in the area, thus the development of the social innovation project follows and uses the new regulations that appear. This attributes a crucial function to EU policy and legislation in the area of environment for these more recent Member States because is an important driver for changes in legislation in new Member States which in turn motivates social innovation initiatives.

With growing experience, different social innovations have increasingly put focus on how to awaken and galvanise public support, through innovative practices in communication and shaping community support. NASF specifically could take advantage of the firmly embedded concern for salmon and the long-term sustainability of the fishing industry in Iceland. Once the national base had been consolidated, NASF had the credibility and muscles to grow internationally as well. Along the way, NASF is working hard to bring about international policy support and regulation, but this task has proven very hard and success is still far off. In other words, institutionalization within public policy has not yet been the answer, due to too weak and too weakly engaged governments, but social innovation riding on public awareness and despair thus far remain the answer.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSIONS

The future role of social innovation
The future of social innovation is very much seen as a bridge between society and government, where governments are in a (governance) crisis and prone to populism. They may provide feasible alternatives to incumbent practices in matching hidden supply and demand (e.g. repair, recycling, food waste etc.) and hence become instruments for "nudging" that undermine environmentally detrimental practices. In the future social innovation is seen to have an even stronger role in enabling positive changes in behavior and often they have an explicitly local role (cultivating local values and responding to local symptoms of nature problems). However, there is also a fear expressed by many experts or social innovators that the increase of social innovation is connected to a withdrawal of governments' responsibilities (austerity policies).

What is surprising?
Latent demand ("When I started, I didn't assume it would work.")

Latent demand is a critical factor for social innovation initiatives in the area of environment. Although there often is a strong social demand (unemployment) for one service, the main service (e.g. repair, or alternative food production and distribution) is based on more assumed or latent demand. It is often perceived by the initiators of the social innovation initiatives as a tension or societal challenge (kickstarted by statistics or personal experiences). Although the sustainability aspects are more and more in the focus of discussions and offerings, many social innovation projects promoting sustainability aspects operate on an agenda which is beyond concrete and local demands. Initiators of such projects start on the basis of assumed or latent demand that may become explicit and – in case of success -translate into actual demand as soon as service offerings take concrete form. Thus social innovation initiatives have an important role as they provide real feasible alternatives to the existing ways of doing things.

Media as a success factor

Generally, networks and media are used to gain attention and attract people as suppliers, as well as customers. Hence, media may become an extremely important partner in social innovation initiatives. Media contributions about repair services often may raise awareness and demand that was latent before becomes then apparent and materializes. (Dis) Empowerment through media has to be seen critically as well (fake news).

Empowerment

Another strength of the social innovation initiatives in the environment area lies in its empowerment function. Citizens are empowered to manage their waste in a sustainable way or to mitigate their negative impact on the environment. The notion of empowerment has gained interest in several disciplines. As a general concept, it is characterized by following a strength-oriented perception in contrast to a deficit-oriented perception. In social work, empowerment presumes active, collaborative roles for client–partners, instead of viewing clients as weak, passive and ineffectual (DuBois and Krogsrud Miley 2005). Although empowerment has several dimensions, they all refer to informing about otherwise hidden features (which is crucial for informed decision-making), viable options and consequences, provide feasible alternatives.

Who is the competitor?

Who is seen as a competitor? Rarely other social innovators are seen as competitors because solutions are missing and hence competition among social innovators is weak. Instead, competitors are incumbent practices, i.e. practices and routines promoted by incumbent organisations. There are aspects of weak competition in nearly all cases in the policy field, which means that at least at the beginning of the initiatives there was rarely a competitor offering a similar solution. Sometimes this changed over the longer course of the initiatives and competition arose and at least elements of the strategy or solution got imitated.

In the practice field of repairing, re-use and extending the life-time of products, competition is weak among repair service providers. Actually, firm entries are often welcome in case they provide independent and reliable repair services. Protection of intellectual property hardly occurs. Although names of organizations are trademarked, knowledge and practices are rather spread among the like-minded. However, competition is fierce with producers of new goods and retailers. They are seen as the real competitors because due to differential taxation of labour and energy, new appliances may be supplied at low prices that hinder (labour-intensive) repair services systematically.

What does bottom-up mean?

Many examples of initiatives have been prompted by genuine concerns with social needs, although the initiative did not necessarily come about due to bottom-up initiatives from those who were directly affected. Furthermore, bottom-up does not necessarily mean coming from a local community, it means "national" in various cases, depending on the organization of the initiator. If the initiator is a nation-wide NGO, implementation may start nationally.

9.2 RELATIONS TO POLICY AND RECOMMENDATIONS FOR POLICY

General policy conclusions
Different streams of literature have social change in its wide sense as a topic. System change rather refers to the institutional structure and components of a system (actors/organisations). Social change rather addresses change in groups of society, social practices, rules of behaviour, communication, values etc. Transformative change rather focusses on our models of production and consumption on the whole. All of these sorts of change are interwoven, boundaries are fuzzy.

With the rhetoric and use of "grand challenges" as a term and rationale for policy intervention (see also Benneworth et al., 2015) "social innovation" (SI) as a term became increasingly popular. This led to focus on a new mission-led approach to innovation policy in areas that threaten social order (demography, security, poverty, climate etc). Policies for social innovation have to be seen in the new framing of addressing grand challenges which means that policies and practices have to be of a different kind than those we know from previous framings (market failure, system failure, see Schot and Steinmueller, 2016). Policies in the framing of Grand Challenges should rather be seen as open-ended missions, concerning the socio-economic system as a whole, often requiring system transformation.

As optimization of existing systems will not be a sufficient answer to Grand Challenges (OECD, 2015), there will not be a one-fits-all-social innovations policy approach, rather systemic and tentative policy mixes will lead the way. And major steps point to the right directions: Horizon 2020 as a programme with dedicated funding directed towards Grand Challenges, embracing the notion of Responsible Research and Innovation (RRI), the 2015 Lund declaration which explicitly prioritises training of researchers skilled to address Grand Challenges, as well as the Paris climate change agreement with the goal of reaching zero net carbon emissions in the second half of the century and the United Nations (UN) Sustainable Development Goals (SDGs) formulated in 2015.

The variety of 80 in-depth case studies in the SI Drive project exemplify the manifold novel ways of assembling and re-assembling heterogeneous pieces of insights (including traditional innovation), finding strategic allies and develop constellations that address a Grand Challenge. In the end, addressing Grand Challenges is about social and systemic changes, and choices what entrance points to allow and give priority. Hence, Grand Challenges policies have to cope with contestation, non-linearity and bifurcations in developments. (Kuhlmann and Rip, 2014) This does imply that linear and singular measures and practices of STI policy will not suffice to address Grand Challenges and set priorities accordingly – as argued above, this includes social innovation policy. For Schot and Steinmueller (2016), transformative innovation policy must comprise adaptability, reversibility, learning, and anticipating a greater variety of options without turning too easily in favour or in opposition of specific options. In the end, such a policy incorporates the perspective on the narrow boundaries set by incumbents. Geels (2014) argues that for system change it may be necessary to devise means of directly disrupting incumbent systems due to their monopolization of resources and domination of visions of what is possible and what is desirable, and their active resistance to system change. The CRESSI project addresses

these issues under the heading of power relations of actors, the TRANSIT project sees empowerment and disempowerment has two sides of a coin.

However this is in severe contradiction to current pressures on public actors and facilitators of public programmes who justify expenses by traditional cost-benefit-analyses and the results of randomized controlled trials. It leads to a sequence of pilots (pilotitis). (see Spru briefing note (2016))

SI impact on policy and policy impact on SI
Social innovations in Environment and Climate Change tend to address both, **structural (=root) causes** of environmental problems **and agency**, i.e. the capacity of individuals to make their own free choices in order to contribute to a better environment.

Structure entails that formal institutions (as the overall constitution, policy frameworks, regulations), as well as informal institutions of all types, ways of thinking and behavior have causal powers. These tend to be the (root) causes of social needs and environmental challenges. And they typically reflect the power of incumbents embedded in structures and institutions associated with environmentally detrimental routines and ways of acting in society.

Agency refers to the capacity of individuals and groups to act independently and to behave environmentally responsible, through learning and raised awareness for environmental and social issues, and through networking and exchange, etc. These tend to address the symptoms of social needs and environmental challenges.

The **structural view** becomes obvious when social innovations in Environment and Climate Change aim at having an influence on policy frameworks and agendas, backed by information from large international organisations and NGOs (see chapter on Governance) because many (global) environmental problems cannot be "felt" by individuals in a direct way. Here, social innovations may put pressures on governments to meet the Paris goals or the SDGs. Social innovation initiatives may introduce niches in the existing structure and thus may increase plurality and diversity of options, a space for alternatives.

- **The absent role of policy: Social innovation addressing a policy vacuum** It is in the nature of quite many social initiatives that benefits accrue to society as a whole rather than to individuals (Phills, Deiglmeier, and Miller 2008; The Economist Intelligence Unit 2016). This is also the definition of a type of market failure which motivates government intervention in theory. So where benefits accrue to society as a whole rather than to individuals, social innovation may interfere with traditional operations that governments and public policy might be expected to address. This is a worry that has been expressed on the individual level in many interviews with social innovators. The pessimistic view of the relation between promoting social innovation with public policy is that public actors, under constant financial pressures (austerity) as they are, use the label and concepts of social innovation to not take responsibility for tasks that – in essence – are public tasks. Thus, some social innovation initiatives in Environment and Climate Change addressed and caused policy change; they did not arise thanks to any policy. So on the one hand, social innovation is not to compensate for government failure. On the other hand, social innovation initiatives may be seen as seismographs indicating necessary changes and possible solutions where governments may not be aware of any. In the "seismograph view" open data and research on the social innovation initiatives are key. Data on the need for and impact of social innovation initiatives should be encouraged and collected rigorously in order to shape the policy and institutional frameworks on the different levels, from local to national and international.

- **Social innovation as outcome of general policy frameworks** In general, governments establish formal rules and (dis)incentives through their legislative, executive, judicial powers and bureaucratic functions, as well as through the distribution of powers and functions across all levels of government. In this role, social innovation initiatives may be the result of deliberate policy shifts that do not explicity address social innovation, but rather implement directives, laws, e.g. set tighter emissions limits or enforce acts to measure the occurrence of harmful environmental and health effects. Nationally, different directives and laws had an influence on the practice fields in the various

countries. The above examples show that in New Member States, EU policy has an important function in adapting legislation, which in turn incentivizes new services to meet environmental standards. It seems that the national policy context in the area of environment (and sometimes employment) is driven particularly by the EU strategies in the area, thus the development of the social innovation project follows and uses the new regulations that appear through EU membership. This attributes a crucial function to EU policy and legislation in the area of environment for these more recent Member States. More generally, different types of policies, such as policies related to environment, conservation of endangered species, and economics, influence the room for social innovation. Policies are needed to increase awareness, underpin orderly measurement of environmental and social impacts in all countries, and to push a combination of regulations/standards that set the limits for the market as well as economic incentives to help pull further improvement. Policy has also an important informing function and hence an important role to play in highlighting the costs of consumerism and support higher acceptance for re-use.

- **Unintended policy: social innovation compensating for "side effects" of policy frameworks** As a general framework, the high taxation of labour income (compared to e.g. capital income) leads to limiting labour as an input factor in the production of goods and services. This has detrimental effects on waste statistics because this systematically disadvantages labour-intensive activities like repair services and, with the limited option of repair, leads to growing amounts of discarded items, with waste of electrical and electronic equipment (WEEE) growing particularly fast. In order to respond to this, many repair service firms have to make extra efforts in order to be viable, e.g. take the form of a WISE, a work integration social enterprise. In a WISE, labour is subsidized because the WISE reintegrates people with difficult employment histories into the regular job market. However, these conditions for financing can also be a source of tensions and conflicts. Here, labour cost are subsidized because the target is to place long-term unemployed, difficult-to-place people into unsubsidized employment after a transit phase at the WISE. Conflicts seem likely as WISEs have primarily goals of social stabilization and inclusion, whereas operative businesses have goals of providing high-quality services which often require skilled personnel. Hence, they are "picky" in terms of personnel acquisition. A straightforward solution to these untended effects of policy would be a tax reform that reduces the tax burden on labour and thus has positive effects on labour-intensive services.

The agency view becomes most obvious where governments want to support social innovators in increasing the capacity of individuals and groups to act independently and to behave environmentally responsible.

- **The mediating role of policy: social innovation and soft governance** Some social innovation initiatives in Environment and Climate Change are the explicit result of the mediating role of public actors and public programmes. Ultimately, the effects of climate change and increasing amounts of waste will be felt by individuals and organizations of the respective regions. Still, although individuals, firms and other organizations should feel affected, they are often not likely to become active themselves. Many future projections like the global average annual temperature raise by 2°C until 2050 are too abstract. General statistics on amounts of waste and its effects have no immediate impact on firms abilities to carry out their routines today. So change in a larger scale on the basis of self-organization are of reduced likelihood. Public programmes try to compensate exactly for this inertia in mediating and organising processes of exchange. With different mechanisms of soft governance, individual processes of change shall be activated that would have been less likely to unfold without the public programmes/projects.

  Although the mediating role is definitely an important role of policy in social innovation, one has to be aware that straightforward and measurable impacts from this kind of policy intervention are not likely. Due to the high number of network partners involved, the project coordinators are often not able to keep an overview who has actually implemented strategic decisions based upon the insights during the formal projects and in what way. After the funding periods, projects and networks newly established dry down. Later network activities and especially the implementation of the strategy have to be realized without these financial resources. Furthermore, firms tend to react to act according to short-term horizons and daily necessities.

- **Concrete policy support for social innovation** Roughly recommendations for concrete policy support can be formulated on three levels:

  1. Common visions and ambitions
  Governments should contribute to common visions about desirable environmental outcomes and long-term opportunities. Governments provide guidance in incorporating clear visions and ambitions for goals (like the Paris goals, the SDGs; nation/city level goals). Here it is important that the state should view big environmental challenges as investments of the state, as it has worked quite well with climate change: invest in technology, life styles, ethics, and values. This together with an overall permissive and encouraging environment is the nutrient solution where socially innovative ideas can develop and prosper, and become social movements.

  2. The project level of social innovation (agency)
  A second level of policy recommendations refers to the stages of social innovation projects /initiatives themselves, like ideas – networking – start-up – growth or exit. It refers to the capacity of individuals and groups to act independently and to behave environmentally responsible, create ideas through learning and raised awareness for environmental and social issues, find allies, plan and carry these ideas out and survive. Here governments can provide support in a multitude of ways:

  Supporting the development of **ideas** in providing space/room for local initiatives to meet and offer their services, provide room for experimentation, fund the "crazy" ideas, collect and communicate environmental issues of concern in a local area, organise brokerage-like events for finding solutions.

  Networking for ideas can be supported in providing public means for coordination of networks with environmental focus, promote social-environmental research and education from school/high school level, and for all sorts of community groups, integrating an early module on social innovation in teachers' education, more generally integrating social innovation in educational systems.

  The early **start-up** phase of social innovators needs special attention considering the high exit rate of young firms in general. Social start-up support in terms of seed funding mechanisms (grants) for social innovations, dedicated incubators and assistance small-step growth seem promising instruments. Support which refunds a proportion of expenditures upon application after the expenditures have been issued by the newly founded firm is not helpful in many cases because the social innovators risk being illiquid as an application of funding takes time and the success of an application is uncertain. So instead, they decide for small-step growth, which means slowly growing via turnover, increasing employment, investment which induces further growth. This kind of strategy is often not eligible for funding.

  Further on, **growth** can be supported and **exits** avoided with favourable tax treatment for social enterprises, and special regulations for social enterprises may smoothen hindrances particular to these types of entrepreneurs; furthermore creating financial incentives to complement SI initiatives, and (easy) permits/ certification. Also socal innovation should be made visible – especially local social innovation initiatives, otherwise unknown and forgotten initiatives (e.g. with prizes). Prizes for social innovations help to increase the visibility of desirable initiatives and may serve as models for other regions/areas.

  3. The reflexiveness of policy (structure)
  In promoting alternatives to current environmentally damaging practices, governments have to be reflexive as well, meaning they have to reflect the structures they provide and that shape the opportunities of social innovators., like the overall framework, regulations and formal institutions. Policy should recognize the existence of social innovation, and policy should also see social innovation as indicators of where policies are dysfunctional because social innovation may provide feasible alternatives here. An ecotax reform that renders labour less expensive and material more expensive allows structural change in the provision of goods and services which induces self-organisation processes for the environmentally better. This calls for systemic and tentative policy mixes that cut across sections, departmental structures in governments and across funding silos.

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