



Redesigning the Support System for Innovation and Entrepreneurship

Work Package 8: Paradigm shift

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Preface

The project SHIFT – Support Systems for Sustainable Entrepreneurship and Transformation – is being carried out in the timeframe 2012-2016 within the first call of the EU research network ECO-INNOVERA,¹ which enables international collaborative projects on eco-innovation that are funded by the respective national funding organisations of the participating research institutions. The goal of the project is to analyse how public, intermediary and private support systems for entrepreneurship have to be changed in order to systematically boost the development and implementation of eco-innovation, and make realistic recommendations for policy makers and important actors of the support system on how to initiate a paradigm change in their supporting schemes.

This report contains the results of Work Package 8 (WP 8) of the SHIFT project. The aim of WP 8 was to a) evaluate any discrepancies between the current support systems for entrepreneurship and innovation and the requirements of adapted systems to specifically stimulate and support sustainable entrepreneurship and eco-innovation; and b) develop a holistic model and basic strategies for redesigning the support systems adapted for sustainable entrepreneurship and eco-innovation at national and EU-levels.

In WP 8 the implications from the findings in WP 2 to 7 for the structure and content of public and intermediary support systems have been explored both for the specifics in the national contexts of Finland, Germany and Sweden, as well as overarching implications for the EU-level.

The strategies and recommendations formulated in this report are targeted at the European Commission and European policy makers (for the European level) and at specific actors of the support system on the local, regional and national level. The strategies and recommendations have been developed by the SHIFT project team by systematically evaluating the empirical results of WP 2 to 7 and by taking the theoretical and conceptual insights from WP 1 into account.

¹ www.eco-innova.eu

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1 Introduction: Aim and methodology of WP 8

WP 8 relates to the guiding research question of SHIFT:

In which regard and how do support systems for entrepreneurship have to be changed in order to effectively support the generation and implementation of eco-innovation?

There is no widespread, common understanding of the concept of support systems in the context of entrepreneurship and innovation. Based on the model of “innovation systems” and a range of related concepts in both innovation theory and entrepreneurship theory (Fichter et al., 2013, p. 24 f.) we thus broadly define “support systems” as follows:

A support system comprises all actors, institutional settings and resources that help entrepreneurs in innovating successfully. (Authors’ own definition)

The guiding research question contains several distinct components, which reveal the complexity of the object of research in the project. It emphasises the *need for change*, in a *systemic manner*, in a range of actors related to *entrepreneurship* and *eco-innovation*, as well as the exploration of the *kinds of changes* that are needed for an effective transformation of the support systems. The following concepts and their description have helped to make explicit what elements the empirical in WP 2 to 7 focussed on:

- *Support system* – embraces notions of hard, soft, formal and informal types of support from the key actors within various overlapping and independent support systems.
- *Key actors* – have been identified through the specifics of WP 2 to 7 and relate to the contextual research of the existing eco-innovation support systems in Germany, Finland and Sweden and through more extensive ‘state of the art’ literature and contextual reviews.
- *Enterprise types* – depending upon the scope of the work package, focus have been given to start-ups, young MSMEs and/or established SMEs.

The aim of WP 8 is to a) evaluate any discrepancies between the current support systems for entrepreneurship and the requirements of adapted systems for sustainable entrepreneurship; and b) develop a holistic model for redesigning support systems adapted for sustainable entrepreneurship at national and EU-levels.

Methodology / Working steps: In WP 8 the implications from the findings in WP 2 to 7 for the structure and content of public and intermediary support systems will be explored both for the specifics in the national contexts of Finland, Germany and Sweden, as well as overarching implications for the EU-level. The evaluation and integration of findings in WP 2 to 7 are based on theoretical concepts that have been developed in WP 1 and have been developed further in the course of the project. We employ a systems approach in evaluating how different actors and influence factors can be integrated into redesigned support systems.

2 Theoretical background

The evaluation and integration of findings of WP 2 to 7 are based on theoretical concepts that have been identified in WP 1 and have been developed further in the course of the project. We base WP 8 on three key concepts:

- The notion of “paradigm shift”
- Eco-Innovation embedded in a multi-level framework of transformation
- The gap concept.

2.1 Paradigm shift²

The concept of *paradigm shift* (or revolutionary science) was first defined and popularized by Thomas Kuhn in his book *The Structure of Scientific Revolutions* (1962) as a change in the basic assumptions, or paradigms, within the ruling theory of science. A paradigm is typically defined as a set of assumptions, concepts, values, and practices that constitutes a way of viewing reality for the community that shares them, especially in an intellectual discipline. Paradigm shift in turn is often defined as a fundamental change in an individual’s thinking or a society’s view of how things work in the world. Classical examples of such changes from one way of thinking to another are for example the shift from earth to sun as the centre of the solar system, and heart to brain as the seat of thinking and feeling. Since the 1960s, the term has also been used in numerous non-scientific contexts to describe a profound change in a fundamental model or perception of events, even though Kuhn himself restricted the use of the term to the hard sciences. The concept entered the business world during the high-tech boom in the 1990s, and it has been abused in the marketing speak of business. Paradigm shift can often be considered a rather meaningless buzzword in this context.

Kuhn (1962) argued that science evolves in phases. In the first, pre-paradigm phase there is no consensus on any particular theory. Instead of consensus, there are several incomplete theories. In the second phase a single mental framework becomes the dominant paradigm, and “normal science” begins. Most scientists accept the prevailing paradigm, solving their puzzles within the assumptions of the dominant paradigm. However, as time goes on, anomalies accumulate and the dominant paradigm is stretched and adjusted in an effort to resolve them. In the third phase revolutionary science begins as some scientists start exploring alternative new ideas to the old self-evident assumptions, and they start developing a new conceptual framework that would present a better way of resolving the anomalies. As the new but still incomplete framework contains gaps and anomalies, it will normally face strong resistance from the scientific community, and even other actors in the society. The revolutionaries are attacked for being theoretically incomplete, and the revolutionaries attack the dominant paradigm for the anomalies. Such a period of conflict may last for decades. Finally, when most scientists agree that the old theory should be replaced by the rival theory, a paradigm shift has occurred. Naturally, some individuals may continue to defend the old paradigm. A fundamental

² The text of this chapter is a slightly shortened version of section “Paradigm change” in Chapter 2.2.1.2 of the final report of WP 1, written by Mika Kuisma.

theme of Kuhn's argument is that the typical development pattern of a mature science is the successive transition from one paradigm to another through revolutionary process. It is often the final result of the long process that is meant when the term *paradigm shift* – the (radical) change of worldview – is used, without reference to the specificities of Kuhn's argument. Thus, following Kuhn's concept of evolution of a paradigm shift, four major phases can be distinguished:

- Phase 1: Pre-paradigm phase
- Phase 2: Dominant paradigm evolves
- Phase 3: Exploring alternative ideas
- Phase 4: Paradigm shift - Replacement of old paradigm

The term “paradigm shift” has found uses in other contexts, keeping up the fundamental idea of a major change in a certain thought pattern, e.g. a radical change in personal beliefs or system of organizations replacing the former way of thinking or organizing with a radically new way of thinking or organizing. The concept has also been developed for technology and economics in the identification of new techno-economic paradigms as changes in technological systems that influence the behaviour of the entire economy. This concept is linked to Joseph Schumpeter's idea of creative destruction. Examples include the move to mass production and the introduction of microelectronics, i.e. the introduction of the personal computer (PC) and the Internet have impacted the shifts in both personal and business environments from mechanistic industrial society to a service-based information society.

As mentioned above, the term paradigm shift has become an abused buzzword in business (marketing and management), now even with recommendations to avoid the use of it. However, the parallels of scientific paradigm shift in terms of anomalies are apparent in the basic mental model of contemporary management. Examples of such anomalies or challenges to modern management way of thinking have been many: the need for more attention to the needs of the customer, the importance of values such as trust and sustainability, and the need for more attention to the environmental and social impact of the operations etc. These anomalies may in practice mean game-changing transformations in industries that companies should not miss (e.g. Denning, 2012).

2.2 Eco-innovation in a multi-level framework of transformation

The underlying idea of the project is that eco-innovation and sustainable entrepreneurship will contribute substantially to bringing about a transformation. Transformation is taken to signify a radical change or creation of a whole new form, function or structure. It is assumed that a “great transformation” is needed in society and the economy in order for these to become (substantially more or radically) sustainable. In order to better understand and explain the role of eco-innovation in this great transformation, we apply systems theory and multi-level frameworks (MLF) within SHIFT. MLP enables the framing of the SHIFT project within a larger context of sustainability transformation. It also emphasises the concept of systemness, which implies that units of analysis do not exist in isolation; rather they are in dynamic interaction with other components of the entire system. The multi-level perspective will be used in two ways:

- (1) To position the SHIFT project in a broader context of sustainability transitions.

(2) To postulate how to analyse support systems for sustainable entrepreneurship.

One basic concept we build on is the differentiation between micro-, meso- and macro-levels of a societal system. In our understanding, eco-innovation and sustainable entrepreneurship are mainly micro-level phenomena, while support systems for the developing and implementing novel or significantly improved products and services can be located on a meso-level. We think that the contribution of eco-innovation can only be understood if the micro-level phenomena of eco-innovation and sustainable entrepreneurship are conceptualized as part of a larger transformation process of society and socio-technical systems towards sustainability. This long-term transformation process can be framed to take place on a macro-level.

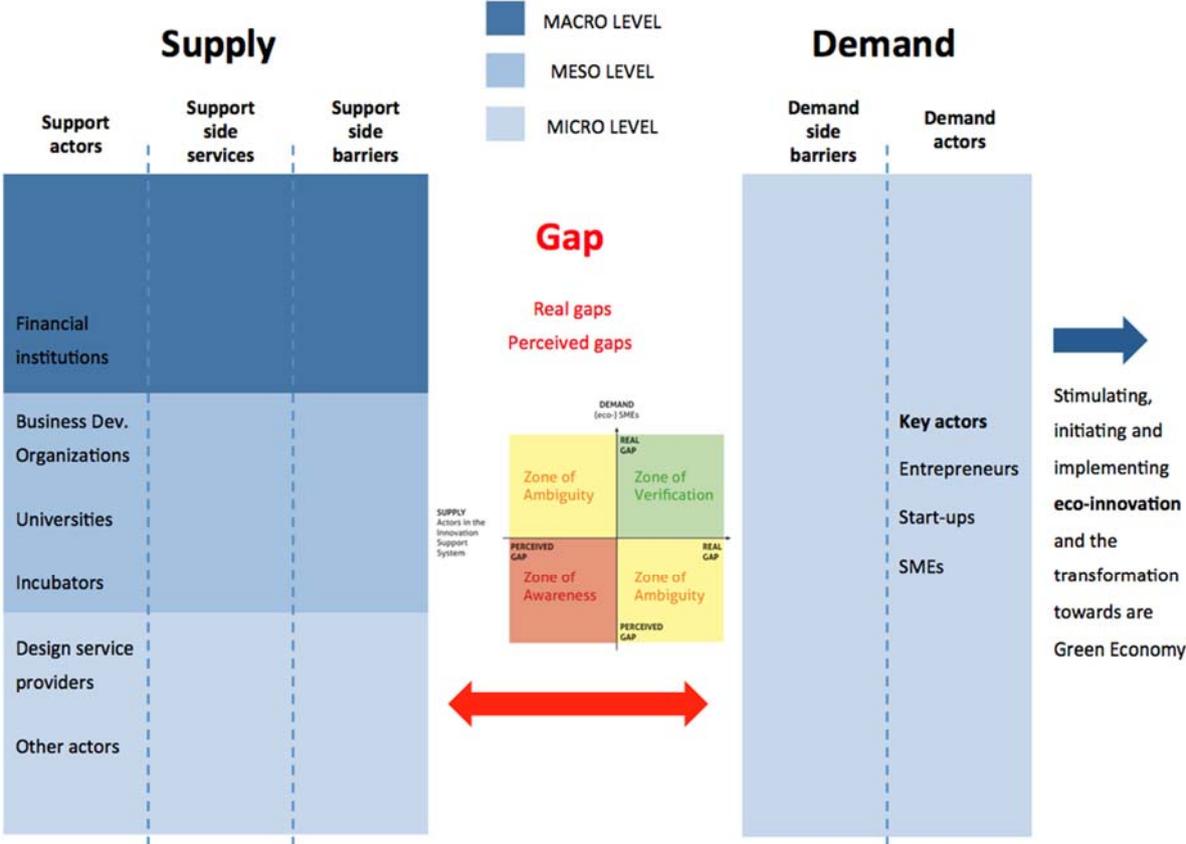
Table 1: Multi-level framework and focal areas of interests in SHIFT. Source: Authors.

Level	Focal area of interest
Macro-level	Long-term transformation of society and socio-technical systems
Meso-level	Support systems for innovation and entrepreneurship
Micro-level	Eco-innovation and sustainable entrepreneurship

2.3 Demand, supply and the gap

Based on an overview and analysis of the state of the art in several relevant academic fields in WP 1 (cf. Fichter et al., 2013) a gap concept was developed for exploring potential mismatches between the existing support system for innovation and entrepreneurship and the innovators that are intended to be supported to innovate successfully. The gap concept developed in WP 1 was applied in the empirical investigations of WP 2 to 7. Based on insights from WP 2 to 7 and discussions within the SHIFT team in the course of the project the following figure was developed for answering the guiding research question in which regard and how support systems for entrepreneurship have to be changed in order to effectively support the generation and implementation of eco-innovation.

Figure 1: The SHIFT gap concept for exploring the (mis-)match between the support system and innovators



Source: Authors.

Figure 1 depicts three major aspects of a business support system, the demand side (innovators like entrepreneurs, start-ups and innovative small and medium sized enterprises (SMEs)), the supply side (organisations that support businesses with specific support services) and a gap that might exist between these two. Whether a gap exists, depends on a possible mismatch between the supply and demand sides in business support activities (Gibb, 1992; Klofsten & Mikaelsson, 1996). The support that is given does often not correspond to the real needs within businesses in general, or small firms in particular. Gibb (1992) argues that there are several barriers associated with business support, for example a scepticism from the small business manager regarding the value of support, inability to pay to take part in support, lack of time and the preference to be engaged in activities that seem to give a more direct return on investments rather than indirect activities such as business support activities. Kanda et al. (2015) in their study of public support for cleantech MSMEs highlight some challenges on the demand side, such as unawareness of such support programmes among some MSMEs, and also the difficulty in accessing such programmes stemming from amongst others the confusingly large number of initiatives and organisations.

The gap in itself as depicted in Figure 1 is characterised by the “real”³ and perceived⁴ needs of the demand side. The gap should thus be explored for a better correlation between the supply and demand sides. This could be done through reactive approaches where solutions are sought to perceived or “real” needs of the demand side and/or through proactive approaches such as scenarios of changes in the landscape and regimes within which the demand side operates. In any such approach, the generic needs for boosting innovation should be differentiated from needs specific to eco-innovation to make targeted recommendations for filling the gap.

The zones of awareness, ambiguity and verification⁵

The viewpoints of the innovation support system (supply side) and (eco-)SMEs (demand side) are both important in establishing perceived or real gaps in supply and demand side. However, the boundaries between real and perceived are fuzzy, as is demonstrated by the example study SHIFT cited in WP1 (Klofsten & Mikaelsson, 1996). The views of entrepreneurs from 62 technology based firms in the vicinity of Linköping, Sweden, of the demand and supply sides of support systems for small business firms were analysed to determine if a gap exists and, if it does, how the system could be made more effective. Respondents of the survey answered questions on a 5-point Likert scale. This scale is itself a rating system based upon intensity of feelings (memories, viewpoints, interpretations) about the correct answer to the question, and is therefore subjective. Furthermore as the study pointed out, most of the respondents were CEOs or a member of staff which do not necessarily represent the entrepreneurs’ individual or collective view. This paper confirms there are supply/demand gaps, but illustrates the difficulty in denoting whether a gap is ‘real’ or ‘perceived’.

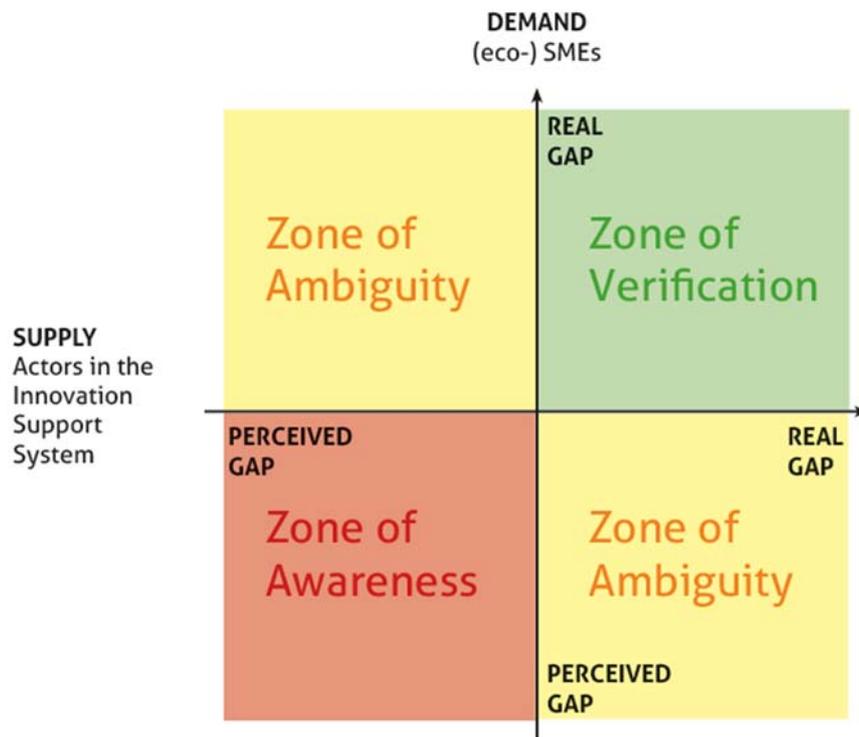
This leads to consider a new way of looking at how ‘gap analysis’ is presented. We propose that there are three gap ‘zones’ – ‘the zone of awareness’, zone of ambiguity’ and ‘zone of objectivity’ where the opinions and facts from the supply side actors interact with those of the demand side actors (eco-SMEs) in a four way matrix (cf. Figure 2).

³ Standard English definitions of ‘real’: being or occurring in fact or actuality; having verifiable existence; true or actual, not imaginary, alleged or ideal.’ Source: thefreedictionary.com, accessed 04.05.2015

⁴ Standard English definitions of ‘Perceived“: to become aware of (something) directly through any of the senses; to achieve understanding of, apprehend; to regard or consider, deem.’ Source: American Heritage® Dictionary of the English Language, Fifth Edition. Copyright © 2011 by Houghton Mifflin Harcourt Publishing Company. Published by Houghton Mifflin Harcourt Publishing Company. All rights reserved. Source: thefreedictionary.com, accessed 04.05.2015

⁵ This section was provided by the Finish SHIFT team and taken from their working paper: Alastair Fuad-Luke, Mika Kuisma, Anja-Lisa Hirscher and Malin Bäckman, NODUS, Aalto ARTS: Defining ‘real’ and ‘perceived’ gaps in Supply and Demand sides of an innovation support system: A discussion document for the SHIFT consortium, 01.06.2015.

Figure 2: A four-way matrix showing differences in 'perceived' and 'real' gaps by supply and demand side actors.



Source: Alastair Fuad-Luke, Mika Kuisma, Anja-Lisa Hirscher and Malin Bäckman, NODUS, Aalto ARTS: Defining 'real' and 'perceived' gaps in Supply and Demand sides of an innovation support system: A discussion document for the SHIFT consortium, 01.06.2015.

Perceived gap – zone of awareness

If the supply and demand side actors both perceive a gap then they are both aware of the 'problem' and are likely to agree on an action or solution to remedy it – this is the zone of awareness. If both actors have incorrectly perceived the problem then it is possible that the solution will fail and vice versa.

Real gap – zone of verification

If the supply and demand side actors both understand there is a real gap, measured in an agreed empirical or verifiable way, then again, the 'problem' is defined and easier to recommend solutions that have some chance of success – this is the zone of verification.

Ambiguous gap – zone of ambiguity

However, if there is a mixture of perceived and real gaps from either actor then we fall in the zone of ambiguity and it is likely that the 'problem' is ill defined or mis-understood, so it is less easy to correct and, indeed, the likelihood of creating the wrong solution exists. If a support actor has objective evidence of a (real) gap but the demand side actor perceives something different, then the support

actor has to educate and raise awareness about the real gap and understand why the demand side actor sees it differently. And, vice versa.

So, for the SHIFT project it might be advantageous to:

- treat common perceived gaps by supply and demand actors (i.e. where they both agree) as a means to define areas for further inquiry, verification and cautionary recommendations.
- treat common real gaps by supply and demand actors (i.e. where they both agree) as defining a problem area to which we can suggest solutions and strong recommendations.
- treat the zone of ambiguity with caution and suggest further areas of inquiry.
- draw our solo-disciplinary approaches into an integrated inter-disciplinary framework with some cross cutting common themes or functions around which common perceived or real gaps exist.

Even when we agree on the gaps (real and perceived) if many support actors are involved getting agreement on which solutions or changes to prioritise might be difficult. Since support systems are complex with many actors and none having overall control of the system, the problems they perceive and generate can be defined as 'wicked problems' (Rittel & Webber, 1973). These are usually intractable unless modes of inquiry pursue changes in the society, governance and their underlying assumptions with transdisciplinary imagination (Brown, Harris, & Russell, 2010).

3 Redesigning support systems for innovation and entrepreneurship towards a paradigm change

As elaborated in Chapter 2.1, a paradigm is typically defined as a set of assumptions, concepts, values, and practices that constitutes a way of viewing reality for the community that shares them. Paradigm shift in turn is often defined as a fundamental change in an individual's thinking or a society's view of how things work in the world. Applying Kuhn's concept of the evolution of a paradigm to the guiding research question of SHIFT and pulling together insights from WP 2 to 7 allows for describing several phases within a paradigm change in support systems for innovation and entrepreneurship as depicted in Table 2.

Table 2: Paradigm change as a result of changing key assumptions, values and practices in regard to support systems for innovation and entrepreneurship

Phase	Key assumptions and values	Practices
Phase 1: Pre-paradigm phase	Innovation happens based on single entrepreneurial activity, no need is seen for specifically supporting innovation by public authorities or private actors	Innovation and entrepreneurship is being implemented without specific public or private support activities
Phase 2: Dominant paradigm evolves	Innovation is considered to be a key driver for the wealth of nations, public support is considered to be important to boost innovation	Innovation and entrepreneurship support systems evolve with a clear focus on generating economic benefits
Phase 3: Exploring alternative ideas	Sustainability is considered to be important; innovation and entrepreneurship are considered key forces in solving societal problems /challenges	Practices are being explored for generating and boosting eco-innovation, potential mismatch between support systems and innovators is identified, redesign of support systems
Phase 4: Paradigm shift - Replacement of old paradigm	There is consensus that eco-innovation and sustainable entrepreneurship are key forces for securing and increasing the well-being of mankind	Innovation and entrepreneurship support systems are designed to generate multi-purpose benefits (economically, ecologically, socially).

Recent studies as well as findings in WP 2 to 7 make clear that all three countries that we have investigated (Finland, Germany and Sweden) have very sophisticated support systems for innovation and entrepreneurship (Cornell University, INSEAD, & WIPO, 2015). These support systems have largely been developed during the past two to three decades. WP 2 to 7 also point out that in all three coun-

tries sustainability is considered to be important by the respective governments and that there is a growing consensus in the population and business that production and consumption patterns should be designed to be sustainable. Findings also illustrate that most actors of the support system for innovation and entrepreneurship are interested in sustainability issues (for various reasons) and that good practice examples of support for eco-innovation and sustainable entrepreneurship already exist. But the results of WP 2 to 7 also make clear these activities are for the most part still an exception and a niche phenomenon. In general it can be stated that sustainability is hardly implemented in the support system for innovation and entrepreneurship and is not yet established as a standard in business development processes and the respective support activities. Most parts of the innovation and entrepreneurship support systems still have a clear focus on generating economic benefits and are not yet intended and designed to generate multi-purpose benefits (economically, ecologically, socially).

Against this background it can be concluded that Finland, Germany and Sweden are still in Phase 3 of the evolution of paradigms and that a mainstreaming of integrating sustainability systematically and holistically in the support system for innovation and entrepreneurship has not yet occurred in practice. A change of the old paradigm of supporting business development and innovation activities solely for economic reasons has not yet been taken place. A paradigm shift has not yet occurred.

4 Strategies for redesigning support systems to effectively support eco-innovation

4.1 Seven basic strategies for redesigning support systems

As elaborated in the last chapter, even countries like Finland, Germany and Sweden who are leaders in eco-innovation support (EIO, 2013), still are in Phase 3 of the evolution of paradigm change. No mainstreaming of integrating sustainability systematically and holistically in the support system for innovation and entrepreneurship has yet occurred in practice. Based on this central result of the SHIFT project and the detailed findings of WP 2 to 7, seven basic strategies can be developed for the redesign of support systems to effectively support eco-innovation:

- (1) Put eco-innovators at the centre of support efforts: Select specifically eco-innovators for support activities and/or design support activities that fit the specific needs of eco-innovators.
- (2) Easy entry and sign posting for eco-innovators: Create easily accessible entry points to the support system for eco-innovators and provide clear guidance to available support offerings.
- (3) Encourage experimentation: Specific support for eco-innovators is emerging, but is a fairly new phenomenon. Pilot exercises and good practice examples are already available, but experience with support systems specifically designed to stimulate and help eco-innovators is still limited. Well-established “standards” or dominant designs do not exist yet. Therefore experimentation with innovative support activities and designs should be encouraged.
- (4) Dynamic tailoring of support activities: Eco-innovators are not a homogeneous group, but comprise different types of entrepreneurs who act in very different sectors, markets and regulatory and societal environments. Therefore support activities for eco-innovators have to be tailored dynamically to the specific needs of specific groups and contexts.
- (5) Mainstreaming sustainability in the support system: Sustainability aspects and requirements are not just an issue for the specific group of sustainable entrepreneurs that are highly mission-driven or active in specific green markets. Sustainability nowadays is relevant for all entrepreneurs no matter in which field of technology, sector or market they are active or intend to be active. Therefore sustainability has to be integrated broadly in the support system. It helps all entrepreneurs to embrace additional opportunities and advantages from taking sustainability into account and in avoiding risks and failure from not considering success relevant aspects of sustainability.
- (6) Specialisation: Mainstreaming sustainability should be combined or supplemented by support activities that are specifically targeted at and designed for sustainable entrepreneurs and eco-innovators. To fit the specific needs of eco-innovators and to establish entrepreneurial communities and eco-systems requires specialisation in the support system.
- (7) Assessment and monitoring of effectiveness: Support activities are not an end in itself, but should contribute to specific goals. Up till now support systems for innovation and entrepreneurship have been focussing exclusively on economic goals. With regard to sustainability it

requires a paradigm change. Support systems should be designed to generate multi-purpose benefits (economically, ecologically, socially). This requires assessment and monitoring tools that help to benchmark existing support systems, measure impacts and outcomes of support activities and provide data and information for policy makers and decision makers of the support system.

For implementing these seven basic strategies for redesigning support systems for innovation and entrepreneurship we have elaborated recommendations for European policy as well as for different actors of the support system. These will be presented in the following Chapters.

4.2 Strategies and recommendations for European policy

Based on findings, recommendations for action and good practice examples from WP 2 to 7 (cf. Table 3) and extensive discussion in the SHIFT project team recommendations for European policy for redesigning the support system for innovation and entrepreneurship can be developed. The recommendations are targeted at European policy makers and address specifically the Directorate-General (DG) for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW, Dir F — Innovation and Advanced Manufacturing, Unit 2. Clusters, Social Economy and Entrepreneurship), the Directorate-General (DG) for Environment (Dir A — Green Economy, Unit A.1. - Eco-Innovation & Circular Economy) and the Directorate-General (DG) for Research and Innovation (DG RTD, Dir I — Climate Action and Resource Efficiency, Unit Eco-Innovation) of the European Commission.

Table 3: Basic strategies, key messages and recommendations for DG GROW, DG Environment and DG RTD

Basic strategy for redesigning support systems	Key messages with regard to the strategy	Specific recommendations for actions for DG GROW, DG Environment and DG RTD
<p>1 Put eco-innovators at the centre of support efforts: Select specifically eco-innovators for support activities and/or design support activities that fit the specific needs of eco-innovators.</p>	<p>Develop a mixture of support functions to prioritise eco-innovators and green start-ups over ordinary enterprises.</p> <p>Pick promising eco-innovators i.e. the eco-enterprises and green start-ups showing sustainable entrepreneurship potential and/or positive early results and have or are interested in embedding sustainability future-proofing.</p>	<p>The European Commission should create a project or programme to develop the criteria and the methodology to identify and pick promising green start-ups and young eco-enterprises on the basis of their 'sustainability future proofing' potential. This needs to involve actors with relevant expertise in assessing the 'effectiveness' of technologies, services and products and their ability to help with future resource efficiency, the circular economy and social sustainability. If green start-ups and eco-SMEs pass the sustainability future proofing test they should be 'fast-tracked' through the support system.</p> <p>DG GROW and DG Environment should facilitate a project to bring together the best European eco-design/sustainable design centres of expertise/excellence and the more sustainability aware design centre representatives from EU member states to develop a 'design ecosystem', a template that can be used across Europe, where the eco-innovators' are integrated as the primary beneficiaries of the support system and specific and generic support services are built around them. LADEC/the city of Lahti's design ecosystem in Finland or Climate KIC's Green Garage in Berlin and its climate innovation ecosystem would be a starting point of discussion.</p>
<p>2 Easy entry and sign posting</p>	<p>Create a 'one-stop shop'</p>	<p>DG GROW and DG Environment should co-ordinate with</p>

<p>for eco-innovators: Create easily accessible entry points to the support system for eco-innovators and provide clear guidance to available support offerings</p>	<p>which eco-preneurs/eco-innovators feel is orientated towards them and their needs. This might include e.g. offering micro-funding for specific activities.</p>	<p>each other and bring together organisations central to the creation of a European Directory of Design Services. In this Directory SMEs can easily assess what kind of design service is offered, how it adds value and whether the DSP has experience working with (eco-)SMEs.</p> <p>The European Commission should support the development of European as well as national (language specific) “One-stop shops” for green start-ups and young eco-enterprises. This could comprise e.g. Internet portals like the first national platform for green start-ups in Germany (www.start-green.net) or e.g. business plan competitions specifically focussed on eco-innovation and the Green Economy.</p>
<p>3 Encourage experimentation: Specific support for eco-innovators is emerging, but is a fairly new phenomenon. Pilot exercises and good practice examples are already available, but experience with support systems specifically designed to stimulate and help eco-innovators is still limited. Well-established “standards” or dominant designs do not exist yet. Therefore experimentation with innovative support activities and designs should be encouraged.</p>	<p>Create and stimulate fresh ways of exchanging knowledge, of networking or getting access to resources, people and systems.</p> <p>Bringing different actors together in new ways e.g. matchmaking events between SMEs, design service providers, finance service providers, incubators or university entrepreneurship centres.</p>	<p>The European Commission should initiate a funding programme for developing and evaluating innovative support activities for eco-innovators and green start-ups. Benefits, costs, impacts and transferability of pioneering support activities should be evaluated systematically and best practice should be identified.</p> <p>DG GROW and DG Environment should consider providing funding for a Programme to encourage eco-SMEs and design service providers (DSPs) to submit applications <i>together</i> for micro-funding for joint SME-DSP eco-innovation proposals. This ensures both entities look for mutual benefit from the proposal. Matchmaking events could be co-ordinated through the Enterprise Europe Network (ENN).</p> <p>National and EU prizes for best eco-innovation solutions and for green and sustainable entrepreneurship should be stimulated and supported by the European Commission. Examples for already existing prizes are the European Sustainable Entrepreneurship Award or the national StartGreen Award in Germany.</p>
<p>4 Dynamic tailoring of support activities: Eco-innovators are not a homogeneous group, but comprise different types of entrepreneurs who act in very different sectors, markets and regulatory and societal environments. Therefore support activities for eco-innovators have to be tailored dynamically to the specific needs of specific groups and contexts.</p>	<p>Develop an audit tool to help start-ups and SMEs identify their current and latent dynamic needs.</p> <p>Experts look at start-ups and SMEs needs and give their opinions as to which support services might best meet each SME’s needs e.g. coaching, training, mentoring, professional service, financing etc.</p> <p>Funding is provided for audit and for ‘tailored services’.</p>	<p>DG GROW and DG Environment should consider providing funding for a specific project for developing an audit tool for eco-SMEs and eco-start-ups so they can articulate their immediate and longer-term needs. The ‘Design Acupuncture’ game (see WP5 SHIFT report) could be further developed to ‘locate’ the best design services to meet those needs. The game can also be prototyped for other services e.g. financial services.</p> <p>Incubators supported from the EU level should be encouraged to implement sustainability strategies while taking into account the characteristics of the new ventures in its surroundings. The aim should be to create a variety of business development activities such as e.g. coaching, mentoring, or networking that is tailored to the local/regional needs and conditions and builds on regional strengths.</p>
<p>5 Mainstreaming sustainability in the support system: Sustainability aspects and requirements are not just an issue for the specific group of sustainable entrepreneurs that are highly mission-driven or active in specific green markets. Sustainability nowadays is relevant for all</p>	<p>Make sure that environmental and sustainability issues are systematically integrated in guidelines and templates for business plans and business model canvas</p> <p>Integrate sustainability and entrepreneurship criteria in</p>	<p>The European Commission should support the development, dissemination and replication of methodologies, guidelines, tools and templates for mainstreaming environmental and sustainability issues (challenges, opportunities, added value, risks etc.) into business planning and business modelling. This can build on existing approaches like the Sustainable Business Planer from Austria, the Handbook for Business Planning of the Berlin Brandenburg Business Plan Competition or the Sustainable Business Canvas.</p>

<p>entrepreneurs no matter in which field of technology, sector or market they are active or intend to be active. Therefore sustainability has to be integrated broadly in the support system. It helps all entrepreneurs to embrace additional opportunities and advantages from taking sustainability into account and in avoiding risks and failure from not considering success relevant aspects of sustainability.</p>	<p>the support actor organisation (incubators, business development organizations etc.) through Key Performance Indicators (KPIs).</p>	<p>The European Commission should initiate a project or funding programme for the development of metrics and key performance indicators (KPIs) for assessing the integration of sustainability and entrepreneurship criteria in support organizations like incubators, business development organizations, innovation and start-up funding programs etc.</p> <p>DG GROW and DG Environment should focus on policy ‘language’ and appoint an officer to ensure that all future EC APs and calls under the Horizon 2020, Innovation Union, COSME, and other relevant initiatives, embed the words ‘design’, ‘ecodesign’ and ‘sustainable design’.</p>
<p>6 Specialisation: Mainstreaming sustainability should be combined or supplemented by support activities that are specifically targeted at and designed for sustainable entrepreneurs and eco-innovators. To fit the specific needs of eco-innovators and to establish entrepreneurial communities and eco-systems requires specialisation in the support system.</p>	<p>Create a platform or portal for green start-ups providing information, resources and networking specifically targeted at green businesses and sustainable entrepreneurs</p>	<p>The European Commission should support the development, dissemination and replication of European as well as national (language specific) platforms and Internet portals specifically targeted at green start-ups and young eco-enterprises. (see also Strategy 2).</p> <p>The European Commission should support a European-level network of “sustainable early-stage investors”. As sustainability-oriented and Cleantech-oriented investors invest relatively low sums of risk capital in early-stage companies, these should be brought together at the European level in order to leverage their impact. This process would increase visibility of best practice for other investors as well as create a clear access point for sustainable and green start-ups. While project-based initiatives exist both at the EU level (e.g. INNEON and national level (GreenUpInvest), a more permanent structure would be beneficial.</p> <p>Intermediaries (see WP4 SHIFT report), interagents and unusual collaboration (see WP7 SHIFT report) offer an interesting and potentially impactful way of hybridising and tailoring support to SMEs for particular eco-innovation sectors. DG GROW should liaise with DG Environment to determine which sectors in the Circular economy might benefit most from hybridisation of eco-innovation support services.</p>
<p>7 Assessment and monitoring of effectiveness: Support activities are not an end in itself, but should contribute to specific goals. Up till now support systems for innovation and entrepreneurship have been focussed exclusively on economic goals. With regard to sustainability it requires a paradigm change. Support systems should be designed to generate multi-purpose benefits (economically, ecologically, socially). This requires assessment and monitoring tools that help to benchmark existing support systems, measure impacts and outcomes of support activities</p>	<p>Benchmark the existing support system showing how it integrates sustainability and supports entrepreneurs/eco-innovators.</p> <p>Measure impacts of services on SMEs and the consequent impacts SMEs have on EU/EC sustainability targets.</p> <p>Assess the support system from three perspectives – the supply actor, the start-up/SME demand-side actor and an independent assessor.</p>	<p>The European Commission should support the development and establishment of national and European wide monitoring systems for sustainable entrepreneurship and eco-innovation. A project should be funded that explores how the existing Eco-innovation Observatory can be supplemented with specific indicators and metrics on green start-ups. Existing experiences from the existing Green Economy Start-up Monitor should be used.</p> <p>DG Environment should liaise with DG GROW to fund a project to create a new set of benchmarks for the primary functions of eco-innovation support systems in the EU, bringing data from the Eco-Innovation Observatory initiative 2011-2014 and setting new benchmarks which explicitly explain how specific support services add value to the eco-SMEs and eco-start-ups. The SHIFT consortium could suggest organisations to constitute a Steering Group for this benchmarking project.</p> <p>We suggest that the following indicators are important when evaluating support of incubators: (a) demand for</p>

<p>and provide data and information for policy makers and decision makers of the support system.</p>		<p>becoming a tenant in an incubator; (b) how many ventures that complete an incubator process (i.e. the venture including the entrepreneur/team find it worthwhile to proceed with their development regardless of viability of initial idea); (c) integration of incubator activities within the larger support system (e.g. through collaboration, co-financing, networking activities). Such indicators show how well the incubators are anchored in their local/regional environment.</p>
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4.3 Strategies and recommendations for universities

Universities are key players in the support system for entrepreneurship and innovation. They are important with regard to entrepreneurship education, venturing schemes and venture funds as well as with regard to technology transfer and university spin-offs. Universities also have been charged with key roles in promoting and implementing sustainable development and can play a pivotal role in promoting sustainable entrepreneurship and eco-innovation.

While the state of the art in university entrepreneurship research offers a variety of classifications of relevant aspects and topics, none of these fit exactly the purpose of a basic framework for investigating the role of universities in supporting sustainable entrepreneurship and eco-innovation. Therefore we have developed a basic framework of university entrepreneurship that subdivides the university as the unit of analysis into five key elements. In addition to (1) research and (2) education, which has developed historically, universities have embraced a third central function over the last few decades: to make solution- and action-orientated contributions to relevant societal challenges and problem areas. This “third role” comprises knowledge transfer, patent commercialization, joint research and implementation projects and cluster initiatives with companies and other societal actors as well as academic spin-offs and can be labelled as (3) “transfer and cooperation”. This three key functions of a university are influenced and governed by its (4) institutional framing (strategy, structure, culture) and is supported by various cross-cutting practical university structures and activities like research funding offices, innovation and entrepreneurship centers, start-up coaching, transfer offices etc., which we label as (5) “support”. Building on the interactive school of innovation theory and the process model of open innovation we use an open innovation approach to describe and analyse interaction between the university and external key actors. We put, for the first time, universities in the center of an open innovation model and differentiate outside-in approaches, cooperation approaches and inside-out approaches in the interaction between universities and external entrepreneurs, start-ups and SMEs.

Our research results reveal that up till now the concept of the entrepreneurial university and the concept of the sustainable university are largely disconnected. This is true for university policy as well as for the practical implementation in higher education institutions. In our research we focussed on three European countries (Finland, Germany, Sweden). Only a very limited number of universities in Finland, Germany and Sweden have yet implemented support activities that explicitly connect entrepreneurship and innovation support with sustainability issues and aims. Given the fact that these three countries are leading in regard to high performing innovation systems and especially in regard to supporting eco-innovation it can be concluded that – on a European and international scale - university support systems for promoting sustainable entrepreneurship and eco-innovation are still in its infancy and can be considered to be a “niche phenomenon”.

In our research on good practice we investigated five countries (Finland, Germany, Sweden, UK and USA). We could identify 42 good practice examples in these countries and have analysed and documented these examples (cf. Geier and Fichter 2015). Good practice examples can be identified in all five fields of university support (institutional framing, research, education, transfer and cooperation and support. We have produced a SHIFT good practice collection of university support for sustainable entrepreneurship with nine good practice cases from Europe and U.S.A. These can be obtained at www.shift-project.eu/publications. Selected good practice examples are also given in Table 4.

The following recommendations are targeted at decision makers at universities as well as at policy makers in charge of university policy, entrepreneurship policy, innovation policy and environmental policy. The recommendations are based on our empirical research (expert interviews, good practice research, in-depth case studies) and are linked with basic strategies for redesigning support systems for eco-innovation and sustainable entrepreneurship.

Table 4: Recommendations and good practice examples for universities

Basic strategy for redesigning support systems	Selected recommendations for actions	Selected good practice example
1 Put eco-innovators at the centre of support efforts	Check whether a specific university has the potential to focus on sustainability and eco-innovation as a core area of its research and transfer activities. If so, this allows for addressing eco-innovators and eco-entrepreneurs specifically and establish centers that focus on eco-innovation/greentech and try to introduce chairs / tenure positions for eco-innovation / sustainable entrepreneurship. Develop a specific community of eco-innovators at and around the university.	Hamburg University of Technology (TUHH): Competency area "Green Technologies"; InnovationsCampus Green Technologies; Startup Consultant Green Technologies; Startup Prize Sustainability
2 Easy entry and sign posting for eco-innovators	Make students, post-docs, professors potentially interested in eco-innovation and green start-ups aware of existing online-platforms specifically designed for eco-innovators like www.start-green.net	The German Internet Portal for green start-ups and eco-innovators: http://www.start-green.net
3 Encourage experimentation	The SHIFT good practice collection shows that there are already proactive approaches and that there is quite a bit of experimentation going on with sustainable entrepreneurship support at universities. Have a look at the good practice collection, let yourself get inspired by the different approaches and select approaches that seem to fit your university.	Cf. SHIFT good practice collection of university support for sustainable entrepreneurship with nine good practice cases from Europe and U.S.A: (cf. SHIFT good practice collection)
4 Dynamic tailoring of support activities	(1) Provide sustainability specific know-how and support at entrepreneurship centers and transfer offices of universities and connect and integrate it systematically with general start-up support activities; (2) Develop specific support activities for eco-innovators and green start-ups (3) Provide access to sustainability experts and networking support for green entrepreneurs.	(1) Technical University of Hamburg, Germany: InnovationsCampus Green Technologies; Start-up Consultant Green Technologies (cf. SHIFT good practice collection) and (2) Santa Clara University: GSBI Accelerator for social entrepreneurs from developing countries preparing to scale and GSBI Online for social entrepreneurs validating their model programmes (cf. SHIFT good practice collection).
5 Mainstreaming sustainability in the support	(1) University policy: Recognize the need for connecting the concept of the entrepreneurial university and the concept of the sustainable university! Make both	(1) Lappeenranta University of Technology (LUT), Finland: Strategy 2020 is based on sustainability; entrepreneurship is strongly

system	concepts and their integration an evaluation criteria for universities. (2) Develop an award for the “Sustainable entrepreneurial university”! (3) Entrepreneurship policy: Change government funding programs for start-up support at universities! Make “Sustainability” an obligatory requirement in start-up funding programs (e.g. for funding proposals, for business plans etc.), (4) Make sustainability a key criterion in evaluation schemes of entrepreneurial universities (e.g. in Germany the “Gründungsradar” (Start-up radar of universities).	related; (2) Leuphana University Lüneburg, Germany: Leuphana University’s semester starts with a kick-off week for all first semester students. Working together as a team, they get involved in broadly conceived projects developing solutions that make our society a place worth living in; (3) Chalmers University of Technology, Gothenburg, Sweden Chalmers Challenge Lab: an initiative where Master’s students across engineering disciplines take on big societal challenges with industry clusters, government and academia as part of their master’s thesis work. The aim of the Challenge Lab is to provide students with perspectives, methods and tools that are useful in taking on and leading challenge-driven sustainability transitions. (cf. SHIFT good practice collection).
6 Specialisation	(1) Establish sustainability and entrepreneurship as a core values and as basic principles of the university strategy; (2) integrate them in the Key Performance Indicators (KPIs) and the scorecard of the university (3) Establish centers that focus on eco-innovation/greentech; (4) Introduce chairs / tenure positions for eco-innovation / sustainable entrepreneurship. (5) Offer specialized teaching and support programs for eco-innovators and green start-ups.	(1) Chalmers University of Technology, Gothenburg, Sweden, is Climate-KIC’s first network partner in Sweden. Climate KIC offers specialized support for climate innovators. (2) Bren School of Environmental Science & Management – University of California, Santa Barbara: Module in “Eco-Entrepreneurship (Eco-E)”: Eco-E is part of the Master of “Environmental Science and Management and enhances other electives (specializations) by providing a special focus on eco-entrepreneurship. (3) University of Oldenburg, Germany: Master’s programme in “Sustainability Economics and Management” which includes the award-winning module “Eco-Venturing” with students developing sustainability-orientated business concepts in co-operation with business partners aiming at the promotion of tangible green business start-ups. (4) (1) Lappeenranta University of Technology (LUT), Finland: Green Campus Innovations Ltd. (cf. SHIFT good practice collection).
7 Assessment and monitoring of effectiveness	Make sustainability a key criterion in evaluation schemes of entrepreneurial universities (e.g. in Germany the “Gründungsradar” (Start-up radar of universities). Include universities and university spin-offs in the Green Economy Start-up Monitor provided by the Borderstep Insitute: cf. http://www.borderstep.org/projects/green-economy-startup-monitor/	No university-related good practice example of assessment and monitoring of effectiveness is known.

4.4 Strategies and recommendations for incubators

Business incubators are a form of entrepreneurship support that caters to new ventures and SMEs in particular locations and can focus on particular industries or provide generic support for all types of businesses. They make use of whatever resources that are available locally, such as universities, research institutes and existing firms, and align them in order to benefit their members. The main areas

of business incubator activities can be characterised as selection of members; provision of infrastructure; business support; mediation, i.e. development of relationships and contact networks; and graduation, i.e. strategies for exiting the incubator.

The study has addressed following general research questions: (1) What kind of entrepreneurship support is offered by existing incubators for sustainable businesses? (2) What are the strengths and weaknesses of the incubators in relation to sustainable entrepreneurship? (3) What can we learn from good practices in the sustainable entrepreneurship field?

The following recommendations are directed towards incubators (both public and private) that have interest in working more directly with sustainability-related businesses. Some of the recommendations also address the regional and national policy levels where overall policies for innovation and incubation systems are shaped.

Table 5: Recommendations and good practice examples for incubators

Basic strategy for re-designing support systems	Selected recommendations for actions	Selected good practice example
1 Put eco-innovators at the centre of support efforts	Incubators can reach out to eco-innovators and adapt their selection criteria to accommodate sustainability-related goals	Green Garage, Berlin (one of a few specialized incubators for climate entrepreneurs)
2 Easy entry and sign posting for eco-innovators	Support should be accessible but should in return demand engagement and devoting of time for participation from the entrepreneurs. There could be more focus on entrepreneurial intentions of individuals rather than on “greatness” of the ideas when selecting incubator tenants. Creating pre-incubation activities reaching potential tenants – this can facilitate access to the incubator for new ventures	LADEC in Finland uses the Pro-tomo method for team-based business development where the support organisation helps a new venture form a team of entrepreneurs with complementary competencies.
3 Encourage experimentation	A training programme for green start-ups can be offered to interested entrepreneurs (even those that are not tenants in an incubator) – such program could be seen as a pre-step to becoming a tenant within an incubator and allows for development of novel ideas and entrepreneurs. Openness towards participation in activities that promote entrepreneurial mind-sets, idea development, facilitate networking and trust-building	The Green Entrepreneurship Training Programme (ENP) in Sweden aimed towards stimulating entrepreneurship within green industries
4 Dynamic tailoring of support activities	Coaching, mentoring and workshops can be tailored to suit current demand from start-ups and incubator tenants. Creating a network of senior entrepreneurs and experts is vital in order to be able to connect new ventures with the right competencies – here it might be fruitful to use alumni tenants.	The Green Entrepreneurship Training Programme in Sweden involves flexible models of coaching and support
5 Mainstreaming sustainability in the support system	Incubators could integrate sustainability-related expertise and support for greening of conventional ventures into their processes, e.g. services within sustainable design, or environmental performance assessment. Putting sustainability in the spotlight through e.g. highlighting successful tenants and exploring possibilities for integrating sustainability into the regular business support processes.	Our studies have not clearly indicated availability of a good practice example
6 Specialisation	More specialised incubators with clear sustainability strat-	Green Garage, Berlin (one of a

	<p>egies could be established in places/regions where there is a long-term supply of potential tenants.</p> <p>Incubators should take into account the characteristics of the surrounding catchment-area of potential tenants when shaping their specialisation strategy in order to ensure a steady inflow of new ventures.</p>	few specialized incubators for climate entrepreneurs)
7 Assessment and monitoring of effectiveness	<p>Some interesting indicators could be e.g. (a) demand for becoming a tenant in an incubator; (b) how many ventures that complete an incubator process (i.e. the venture including the entrepreneur/team find it worthwhile to proceed with their development regardless of viability of initial idea); (c) integration of incubator activities within the larger support system (e.g. through collaboration, co-financing, networking activities).</p> <p>Every incubator needs to continuously adapt to local/regional conditions and develop ways to reach out to and support the entrepreneurs in its surroundings. Flexibility in policy and management is therefore important.</p>	This aspect has not been directly studied in the WP, however to our knowledge VINNOVA in Sweden (and previously ALMI) have an elaborate evaluation/monitoring system used for evaluating and decisions regarding future financing.

4.5 Strategies and recommendations for business development organizations

The recommendations described in this sub-section are targeted at business development organizations including cluster initiatives. To relate to the scientific literature contributively and for learning purposes, these actors i.e. – business development organizations and cluster initiatives are often referred to as intermediaries in the work package. We refer to intermediaries as organization or entities that assist firms in the eco-innovation process by providing external impulse, motivation, advice and other specific support functions often by acting as an agent or broker between two or more parties. These actors have been studied by adapting an analytical framework from the technological innovation systems literature which emphasises on the functions of innovation systems compared to their structure. Our recommendations are based on good practices and also gaps identified with current support practices. These recommendations should be interpreted contextually and also with caution for at least three reasons. First, the countries studied, Germany and Sweden are at the forefront of eco-innovation even though improvements options can be identified in the support activities their eco-innovation support system seems progressive (or at least generating eco-innovations). Furthermore, specific support for eco-innovation is in its early phase characterised by experimentation, variety creation and duplication of efforts which explains some of the gaps identified. More so, the studied actors are public-owned/financed and are intended to complement market initiatives where there are failures and also contribute to an innovation support system and thus should not be expected to fulfil every particular need or role. With this being said, here come specific recommendations for business development organizations including cluster initiatives targeted at their support functions.

Table 6: Recommendations and good practice examples for business development organizations

Basic strategy for redesigning support systems	Selected recommendations for actions	Selected good practice example
1 Put eco-innovators at the centre of support	Intermediaries have to identify and support the needs of a broader base of eco-	The support offered by many of the studied intermediaries is appreciated by their clients and

efforts	innovators than the “usual suspects”.	also targeted at a broad base of firms. This is inferred from the client satisfaction analysis performed by Sustainable Business Hub and Malmö Cleantech City, Skåne ,The Energy Agency and The Efficiency Agency), North Rhine Westphalia, presented in the work package 4 report.
2 Easy entry and sign posting for eco-innovators	For eco-innovators seeking support from particularly public financed intermediaries, there should be no “wrong door” into the support system. The intermediaries should be willing to direct eco-innovators to better suited support if necessary.	
3 Encourage experimentation	The support system should accommodate experimentation and variety creation both in structure and functions to escape stagnation and lock-in. Intermediaries should not operate as “silos” but there should be interaction between established and new entrants, formalised and informal actors using creative approaches in supporting eco-innovations.	The support activities of The Malmö Cleantech Cluster, Skåne such as test beds and pilot projects are targeted at experimenting with various forms of eco-innovations. The Green tech Cluster; North Rhine Westphalia also uses the innovation radar for experimentation with various forms of eco-innovations. More so, the idea of the innovation radar as a way of support is new, experimental and creates variety in support approaches for eco-innovation.
4 Dynamic tailoring of support activities	Intermediary support should identify and strive to support different types of eco-innovators and eco-innovations using different approaches such as eco-innovation-specific support and general framework support for innovation.	The Greentech Cluster, North Rhine Westphalia uses a proactive approach called the innovation radar to support mainly product eco-innovations. The innovation radar program is a cost effective approach to scanning, forecasting, road mapping relevant eco-innovations and providing a platform for relevant actors to develop it further. The Energy Agency and Efficiency Agency uses technical consulting to identify and propose eco-innovation improvements in industrial processes.
5 Mainstreaming sustainability in the support system	There should be bi-directional interactive learning between established intermediaries such as the business development organizations and the new entrants such as the cluster initiatives. Learning should focus on incorporating eco-innovation support into established intermediaries and also developing new entrants into self-reliant, long existing support actors.	In North Rhine Westphalia Germany, the general focused business development organizations (BDOs in Essen and Duisburg) often incorporate the competence of specific focused actors (The Efficiency Agency and Energy Agency) in providing eco-innovation specific support programs to firms.
6 Specialisation	The support activities of general focused intermediaries such as business development organizations should be complemented with specific eco-innovation support from new entrants such as cluster initiatives.	The two studied regions, Skåne in Sweden and North Rhine Westphalia in Germany have a mix of intermediaries providing general framework support such as financial and knowledge resource mobilization; networking and partnerships; information gathering and spreading as well as intermediaries providing eco-innovation specific support such as technical consulting on material and energy efficiency, specific support for translating eco-innovation projects into bankable projects. An example is the specialized business-plan competition for “Climate, environment, energy and resource efficiency” in North-Rhine Westphalia, Germany, connected to the environmental technology cluster. Unfortunately the website of “KUER” is in German only: http://www.kuer-startbahn.de . These specialised support initiatives complement the general inno-

<p>7 Assessment and monitoring of effectiveness</p>	<p>Intermediaries should assess their clients' satisfaction as a basis for communicating the value addition from their support activities to their key stakeholders.</p>	<p>vation support initiatives.</p> <p>Sustainable Business Hub and Malmö Cleantech City, Skåne use general indicators such as the number of firms supported, number of networking meeting held, and number of new projects developed per year to communicate their value addition to their funders. The Efficiency Agency and Energy Agency in North Rhine Westphalia use eco-innovation specific indicators such as reduced resource inputs (material and energy savings) and reduced externalities (reduced carbon dioxide emissions; reduced air, soil, noise pollution, replaced dangerous material, recycled waste, water or materials) as a result of the intermediation support to communicate the value of their support activities to their funders</p>
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4.6 Strategies and recommendations for design service providers

There is not a universally adopted system of design service provision (often called 'design support') across EU member states. Each national territory has its own mix of design policy, design promotion, design support and/or design centres (see Whicher, Swiatek, & Cawood, 2015). Consequently there are diverse actors and organisations providing design services to support innovation at the micro-level (where they interface with the SMEs or start-ups) in a system viewed from a Multi-Level Perspective. This diversity is also apparent across the meso-micro level where national, regional or local design-related organisations interact with the design service providers (the majority being (M)SMEs themselves) and/or SMEs and start-ups at the micro-level. Most of the design support schemes across the EU do not specifically promote 'design for eco-innovation'.

These basic supply-demand functions of a support system for design are strongly influenced by policies emanating from different DGs in the European Commission, especially DG Enterprise & Industry (now incorporated in DG Internal Market, Industry, Entrepreneurship and SMEs (GROW)), and the DG Environment. DG Enterprise & Industry initiated the European Design Innovation Initiative (EDII) which currently still has one project still operating – Design for Europe (DfE) co-ordinated by a consortium of 14 organisations co-ordinated by the UK Design Council. Action Plans originating in these DGs do not promote design, ecodesign and sustainable design to address the development of a green economy. This is hindering the integration of design as a means to develop eco-innovative enterprises and also sending mixed signals to the supply side.

Recommendations are therefore targeted at the policy makers to address issues at the macro level, national, regional and local design-related organisations to focus on the meso level and to the design service providers (designers, design agencies, specialist research units) at the micro level. A macro level focus means that 'design' including 'ecodesign/sustainable design' should be embedded in all new Horizon 2020, Innovation Union, Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME) and other relevant EU/EC initiatives, calls, programmes and bids to integrate design into other innovation fields.

Key demand-side recommendations call for placing the eco-innovators, the eco-SMEs and eco-startups, at the centre of an accessible and visualised support system, organising the system to maximise the benefits to these demand-side actors. This must include better access to micro-financing,

matchmaking events between design service providers and the eco-enterprises, the development of one-stop shops where design services can be accessed with other business support services and so on.

Supply side recommendations call for dramatic, significant and co-ordinated actions between the DGs for GROW (the Internal Market, Industry Entrepreneurship and SMEs) and the Environment to liaise with the European design industry (e.g. through DfE, BEDA, ENEC and other relevant actors, including specialists and academics) to develop a more systematic approach to design support across Europe because it is highly fragmented and variable in terms of quality, availability and effectiveness. Recommendations include the creation a **European Directory of Design Services**, including specialists in ecodesign & sustainable design – the latter defined by a ‘state of the art’ report on the capacity and capability of the designers and design agencies to provide these specialist services. Furthermore the DGs and design industry should co-ordinate with the European Enterprise Network to determine the best way to make these design support services available to SMEs, especially those SMEs driven by the eco-innovators. Another option is to link up with specialist KICs focusing on the green and/or circular economy e.g. Climate KIC, KIC InnoEnergy, and forthcoming KICs, such as Food4future in 2016.

Table 7: Recommendations and good practice examples for design service providers

Basic strategy for re-designing support systems	Selected recommendations for actions	Selected good practice example
<p>1 Put eco-innovators at the centre of support efforts</p>	<p>Place the eco-innovators at the centre of a visualised support system.</p> <p>Design support programmes need to facilitate the meeting and networking of eco-startups and eco-(M)SMEs with DSPs. For example, develop matchmaking events where MSMEs and DSPs have to create a joint proposal to obtain micro-funding to prototype an eco-product or eco-service.</p> <p>Make micro-funding easily available to eco-startups and eco-(M)SMEs and the DSPs (as they are often MSMEs too). This could be through joint MSME/DSP proposals via a matchmaking platform, or vouchers or other scheme. Target small sums of money, Euros 10.000 or less to large numbers of MSMEs.</p>	<p>The city of Lahti, Finland has developed a ‘design ecosystem’ where different beneficiaries (civil servants – municipality works, businesses, events organisers and citizens) can see the kind of support that is available. This was developed by the Cleantech Co-design Centre with Aalto ARTS, Aalto University, supported by LADEC, Lahti Region Development (Fuad-Luke et. al. 2015).</p> <p>The CoDeCo (Co-Design Coaching) project, Lahti, Finland supported by LADEC, Lahti Region Development which raised the competence of local designers to co-design with local companies.</p> <p>The SME Wallet scheme in Flanders, Belgium http://designforeurope.eu/case-study/sme-wallet ; Design Bulldozer, Estonia http://designforeurope.eu/case-study/design-bulldozer , and the now defunct Design Leadership programme, UK, are the better examples of voucher/subsidy schemes for design support for SMEs (N.B. not specifically for eco-SMEs).</p>
<p>2 Easy entry and sign posting for eco-innovators</p>	<p>Make support services ‘visible’ by creating a 1-stop-shop, either a local space, and/or a digital address, where eco-MSMEs and green start-ups can easily get access and information on what support is there and how to be part of the support system.</p> <p>Ensure ‘design support services’ sit alongside</p>	<p>See the ‘design ecosystem’ of Lahti, above.</p>

	<p>more traditional business support services across the European Enterprise Network (ENN) or other local business advice centres.</p> <p>Supply side improvements: The DGs for GROW (the Internal Market, Industry Entrepreneurship and SMEs) and the Environment should liaise with the European design industry (e.g. through DfE, BEDA, ENEC above) to create a European Directory of Design Services, including specialists in ecodesign & sustainable design.</p>	
3 Encourage experimentation	<p>Prioritise eco-innovators (the existing visionary & green champions) by placing them in the centre of a pan-European 'green economy and eco-accelerator' ecosystem (perhaps by linking up existing Climate KIC, KIC InnoEnergy, and forthcoming KICs, like Food4future in 2016) where design support can be critically mixed with other support activities, in particular marketing and entrepreneurship support. The design element of this ecosystem could be supported and co-ordinated by Design for Europe (DfE an EDII project), the Bureau of European Design Associations (BEDA) and the European Network of Ecodesign Centres(ENEC) in collaboration with the European Enterprise Network (ENN). Gather momentum for this project through the EU member states whose national organisations have shown above average awareness of ecodesign and sustainable design – Austria, Belgium, Denmark, Germany, the Netherlands, Spain, Sweden and the UK.</p>	<p>The Cleantech Co-design Center, Lahti, Finland supported by LADEC, Lahti Region Development (see http://www.ladec.fi/en/cleantech and http://www.ladec.fi/en/design) and eco-design centres in the European Network of Ecodesign Centres (ENEC) http://www.ecodesign-centres.org/ offer examples of local/regional best practice.</p> <p>Best practice EU member states for ecodesign/sustainable design are Austria, Belgium, Denmark, Germany, the Netherlands, Spain, Sweden and the UK.</p>
4 Dynamic tailoring of support activities	<p>Develop an 'audit tool' which helps green start-ups and eco-(M)SMEs determine their immediate and longer-term specific needs.</p> <p>This needs linking with the development of the EC's Green Action Plan 2014 and liaison with the Enterprise Europe Network (ENN). This will help support organisations understand what kind of support is required – this needs linking with activities to make visible and signpost the support systems (Strategy 2 above).</p> <p>Provide more funding support for the supply side, especially micro- and small DSPs.</p>	<p>The 'Design Acupuncture' game, prototyped by NODUS, Aalto ARTS for the SHIFT project, has the potential to be developed in to an interactive 'audit tool' to help eco-start-ups and eco-SMEs understand their needs and identify support services to meet them (refer to full WP5 report).</p>
5 Mainstreaming sustainability in the support system	<p>Design Policy - 'Design' including 'ecodesign/sustainable design' should be embedded in all new Horizon 2020, Innovation Union, Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME) and other relevant EU/EC initiatives, calls, programmes and bids to integrate design into other innovation fields.</p> <p>Ensure 'design support services' sit alongside more traditional business support services across the European Enterprise Network (ENN) or other local business advice centres.</p>	<p>Currently, The Green Action Plan, GAP, http://ec.europa.eu/growth/smes/business-friendly-environment/green-action-plan/index_en.htm published by the DG Internal Market, Industry, Entrepreneurship and SMEs (GROW), European Commission in 2014, is the best attempt to integrate eco-innovation with design and ecodesign to expand the green economy, but future APs could emphasise this integration further.</p>
6 Specialisation	<p>Supply side improvements: DfE, BEDA, ENEC above) should co-ordinate a 'state of the art</p>	

	study' on the ecodesign capacity in Europe's DSPs (designers, design agencies, specialist research units and other centres).	
7 Assessment and monitoring of effectiveness	<p>Reports on Return-on-Investment (ROI) from design services show clear benefits to SMEs (e.g. UK Design Council's Design Leadership scheme), but a universal agreement and measurement of how different design services add value to an SMEs activities is absent. This could be tracked by collecting statistics from experimentation under Strategies 3 and 4 above.</p> <p>(M)SMEs should also be able to comment about the overall support system (all the different types of services, including design support), its ease of access, quality of services and effectiveness from whichever support organisation they obtained the service. Data should be gathered in a shared European-wide database, possibly co-ordinated through the ENN.</p>	

4.7 Strategies and recommendations for financing and funding

Investors, financial institutions and public funding programmes play a central role in entrepreneurial finance, which is of crucial importance for most entrepreneurs while presenting a particular challenge for new companies. Examining the role of investors and public funding programmes specifically for sustainable entrepreneurs and green start-ups developing eco-innovation can be considered warranted for two reasons: First, due to potential differences in business model, entrepreneurial motivation and strategies between green start-ups and other start-ups, it is of interest to explore how these differences might have an impact on access to finance and funding. Second, as the promotion of a Green Economy is a clear political goal at national and EU levels, it is of interest to know how specific financing challenges might arise for new companies that are involved in eco-innovation development in order to adapt policies and programmes to the needs of these companies. The goal of WP6 was to develop recommendations for policy and public funding institutions on how to adapt public funding programmes and provide adequate incentives to private investors as well as recommendations for investors on how to adapt their product offering to the needs of sustainable start-ups. While the empirical work did not explicitly focus on the role of intermediaries for accessing financial resources, the aggregated results of WP6 make it clear that their role might be quite central to overcoming a range of challenges found. The recommendations listed here are developed primarily on the basis of the empirical work (exploratory interviews, survey and investor workshop), but also leans on the literature review carried out.

Table 8: Recommendations and good practice examples for financing and funding

Basic strategy for redesigning support systems	Selected recommendations for actions	Selected good practice example
1 Put eco-innovators at the centre of support efforts	(1) Public-private partnerships: reduce bureaucratic requirements to a necessary minimum and provide support to start-ups in finding suitable investors. (2) Intermediaries: bring together supply and demand sides by providing training and support to investors on sustainability-related issues and to start-ups on financial and business issues. (3) Intermediaries: Adapt matching formats to the specific needs of green start-ups.	Specifically adapted matching format: Ecosummit.
2 Easy entry and sign posting for eco-innovators	Public funding institutions and/or intermediaries: provide a central website with easily accessible information for start-ups seeking funding with appropriate search functions and selection criteria.	In Germany: http://www.foerderdatenbank.de/ ; https://start-green.net/
3 Encourage experimentation	(1) Intermediaries: develop instruments and approaches to mobilise a) sustainability-oriented investors for involvement in early-stage companies and b) early-stage investors for involvement in green start-ups. (2) Intermediaries: develop networks for interested investors in order to increase visibility of such investors to green start-ups and enable syndication.	Example of networks: Investors' Circle (US), Nexus (global), CREO Syndicate (US).
4 Dynamic tailoring of support activities	(1) Public funding institutions: target new public funding programme specifically at high-tech, innovative green start-ups (especially at the expansion phase). (2) Public funding institutions: target specific green start-ups with pertinent, existing programmes at the national and EU levels and support their administrative challenges in the application process.	
5 Mainstreaming sustainability in the support system	(1) Financial institutions: provide training and information to employees on the assessment of sustainable business models, products and services. Draw on external expertise (e.g. intermediaries) to cover any knowledge gaps they might have in this area. (2) Public funding institutions: strengthen sustainability know-how especially on the regional level where many green start-ups apply for support. (3) Financial institutions and public funding institutions: develop clear and simple evaluation criteria and key performance indicators for sustainable, green start-ups. (4) Policy: provide support to intermediaries that build a bridge between demand- and supply-sides.	
6 Specialisation	(1) Intermediaries: adapted matching formats for green start-ups. (2) Policy: support efforts to develop clear criteria for what constitutes as "sustainable, green start-up investment". (3) Policy: provide incentives in the form of tax alleviations or guarantee instruments, linked to clear criteria for what constitutes as "sustainable, green start-up investment", by introducing or adapting appropriate policies.	Specifically adapted public-private partnership programme: KfW Programme for financing social businesses (KfW-Programm zur Finanzierung von Sozialunternehmen).
7 Assessment and monitoring of effectiveness	(1) Public funding programmes should be assessed with regards to how well they address start-ups funding needs in different phases and to what extent and where bureaucratic barriers can be removed. (2) Stimulate quantitative, macro-level research on the supply-side with regard to numbers on specifically focussed financial institutions, institutions with mainstreaming approaches, size of investments and types of investments.	E.g. Global Entrepreneurship Monitor; KfW Start-up Monitor; Green Economy Startup Monitor.

4.8 Strategies and recommendations for interagents and unusual collaboration

On the demand side the key target group for the recommendations are the eco-SMEs and start-ups. To obtain the best return on investment on these companies it is proposed that the best eco-innovators are selected by screening them for their ‘sustainability future proofing’ i.e. their ability to positively impact on achieving more sustainable products, services and experiences with lower environmental impacts and higher societal benefits now and in the future. Once these eco-innovators pass the screening they should have access to as much support as possible.

On the supply side the recommendations are aimed at organisations that can help develop the capacity and capability of the interagents or individuals and organisations practicing unusual collaboration i.e. those individuals and organisations that (a) offer fresh ways of exchanging knowledge, resources, relationships or structures at the micro-level that help start-ups and SMEs to grow and internationalise, (b) lobby for behavioural, cultural and political system change across micro, meso and macro levels, and (c) remix or tailor support services to specific (sectorial) SME audiences and their needs.

In particular, policy makers and public sector organisations responsible for funding innovation support in EU member states need to encourage systemic ‘intermediaries’, ‘interagents’ and ‘experts’ who can see the whole support system(s) who might be better placed to understand how to get functional cross-overs and hybridisation of existing support services. This addresses symptoms of duplication and fragmentation in existing support systems, but also, potentially, helps amplify the use of existing resources in imaginative new ways.

Furthermore, the support systems should be made visible, accessible and presented in a language easily understood by the SME eco-innovators, eco-enterprises and greening enterprises. This means the support system should engage professionals with genuine expertise in working with SMEs and who understand how the system looks from the SMEs’ perspective.

Absolutely essential to improving the quality of innovation support systems is to benchmark their primary functions by a set of agreed indicators, with special reference to how they add value for the (M)SMEs. It is necessary to look for and measure examples of when primary functions in support systems duplicate, cross-over or hybridise, and if this adds better value or ROI. Different promoter roles (expert, power-resources, process, relationship) could be monitored to see which are more efficacious.

Table 9: Recommendations and good practice examples for interagents and unusual collaboration

Basic strategy for redesigning support systems	Selected recommendations for actions	Selected good practice example
<p>1 Put eco-innovators at the centre of support efforts</p>	<p>Eco-innovators have to demonstrate their ‘sustainability future proofing’, but once they have they should be prioritised in the support system. The eligibility of businesses to receive support from systems for eco-innovation should be based upon an assessment of their ‘sustainability future proofing’ (including environmental, social and economic performance indicators). This will</p>	<p>WP 7: In Finland, The Energy Association/Finsolar http://www.lahienenergia.org/in-english/about-finnish-clean-energy-association/ , TELAKKA® http://telakka.com/ and Peloton Club (Demos Helsinki) http://www.pelotonclub.me/ all place the</p>

	ensure that genuine eco-preneurs, eco-enterprises and greening enterprises are prioritised over 'ordinary enterprises' (business-as-usual). Interagents and organisations involved in unusual collaboration tend to promote eco-preneurs and eco-socio-preneurs gathering around a specific topic or activity.	eco-entrepreneurs near the centre of their sustainable entrepreneurship activities. Note: A criteria set for sustainability future proofing will be developed in the framework of the German project "Green Start-up Invest Alliance", coordinated by Borderstep and funded by the German Federal Ministry for the Environment.
2 Easy entry and sign posting for eco-innovators	Make the eco-innovation support system visible and easily understood – talk <i>their language</i> - and easy to access by eco-startups and eco-(M)SMEs.	
3 Encourage experimentation	Identify the interagents and examples of unusual collaboration in EU member states i.e. those individuals and organisations that (a) offer fresh ways of exchanging knowledge, resources, relationships or structures at the micro-level that help start-ups and SMEs to grow and internationalise, (b) lobby for behavioural, cultural and political system change across micro, meso and macro levels, and (c) remix or tailor support services to specific (sectorial) SME audiences and their needs. Create a European wide map of these examples indicating the type of eco-SMEs they support.	In Finland, The Energy Association/Finsolar, TELAKKA® and Peloton Club (Demos Helsinki), see web addresses above. In Germany, "The Changer", located in Berlin. Cf. http://thechanger.org , is another example.
4 Dynamic tailoring of support activities	Provide more funding support for facilitators, platform creators and interagents building new networks and relationships that, in particular, facilitate the exchange of resources and knowledge. Promote the emergence and availability of tailored, industry-specific collaborative support solutions while simultaneously updating and adding to existing 'expert' databases in support system providers – define their ability to 'talk the language of SMEs' and how they 'added-value'.	In Finland, The Energy Association/Finsolar, TELAKKA® and Peloton Club (Demos Helsinki) are interagents offering unusual collaboration and dynamic tailoring of support. In Germany, "The Changer", located in Berlin. Cf. http://thechanger.org , is another example.
5 Mainstreaming sustainability in the support system	System (policy) level, national and EU: improve coordination of decisions and support activities and develop systematic evaluation of the quality and effectiveness (sustainability impact) and benchmark of the support services . Show more action to tackle sustainability constraints in support services and business in general (regulation etc.). Break old social and organizational 'silos' while creating new collaborative contexts for sustainable design and eco-innovation.	
6 Specialisation	Public support organizations: develop sustainability and industry-specific expertise. There is a need for national support systems to encourage systemic 'intermediaries', 'interagents' and 'experts' who can see the whole support system(s) who might be better placed to understand how to get functional cross-overs and hybridisation of existing support services. New venture and business assessment: base the eligibility of businesses on sustainability future proofing (adding environmental and social impact indicators to complement economic performance indicators).	

<p>7 Assessment and monitoring of effectiveness</p>	<p>The assessment and monitoring tools should be more harmonized, reflecting and emphasizing systematically the green attributes of new businesses and their long term sustainability impacts, in addition to mainstream conventional business assessment features.</p> <p>Benchmark primary functions in support systems by a set of agreed indicators, with special reference to how they add value for the (M)SMEs. Look for and measure examples of when primary functions in support systems cross-over or hybridise and if this adds better value or ROI. Different promoter roles (expert, power-resources, process, relationship) could be monitored to see which are more efficacious.</p> <p>How do existing key support actors/organisations benchmark their own effectiveness in relation to policies and how they demonstrate 'effective practice' (meeting real needs of SMEs).</p>	
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