



SHIFTing the Support of Entrepreneurship in Eco-Innovation

*Summary of results and recommendations
from the Eco-Innova project SHIFT, 2012–2016*

Authors

Borderstep Institute

Klaus Fichter
Linda Bergset
Joerg Geier
Jens Clausen
Irina Tiemann

Linköping University

Magnus Klofsten
Olof Hjelm
Dzamilia Bienkowska
Wisdom Kanda

Aalto University

Alastair Fuad-Luke
Mika Kuisma
Malin Backman
Anja Lisa Hirscher

**Funded in the
framework of the
ECO-INNOVERA
network**



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Please cite this publication as:

Fichter, K., Fuad-Luke, A., Hjelm, O., Klofsten, M., Backman, M., Bergset, L., Bienkowska, D., Clausen, J., Geier, J., Hirscher, A.L., Kanda, W., Kuisma, M. (2016). *SHIFTing the Support of Entrepreneurship in Eco-Innovation. Summary of results and recommendations from the Eco-Innova project SHIFT*. Berlin, Helsinki, Linköping: SHIFT.

Contact SHIFT:



Borderstep Institut

Prof. Dr. Klaus Fichter

Borderstep Institute for Innovation
& Sustainability, Berlin, Germany
E-mail: fichter@borderstep.de



Prof. Magnus Klofsten & Prof. Olof Hjelm

Linköping University, Linköping, Sweden
E-Mail: magnus.klofsten@liu.se,
olof.hjelm@liu.se



Aalto University

Prof. Alastair Fuad-Luke

Aalto University, Helsinki, Finland
E-Mail: alastair.fuad-luke@aalto.fi

Funded by:



SPONSORED BY THE



Federal Ministry
of Education
and Research

Tekes



The Swedish Research Council for Environment,
Agricultural Sciences and Spatial Planning

Introduction

The project SHIFT – Support Systems for Sustainable Entrepreneurship and Transformation – is being carried out in the timeframe of January 2012 to January 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 primary goals of the project are firstly to study and analyse how public, intermediary and private support systems for entrepreneurship are currently being provided by six key support actor types (universities, incubators, business development organizations, design service providers, funders and interagents²); secondly, to explore how these support systems have to be changed in order to systematically boost the development and implementation of eco-innovation³, and, thirdly, to make realistic recommendations for policy makers and important actors of the support system on how to redesign support systems to boost eco-innovation. The contextual territory is predominantly focused on Europe and EU member states, in particular Germany, Finland and Sweden.

This booklet contains a summary of the scope and research approach adopted, the focal areas of the research, selected key results and subsequent recommendations. More detailed results and recommendations can be obtained from the various reports and publications of the SHIFT project (cf. SHIFT publications).

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 regarding the six relevant support actor types investigated in the SHIFT project.

1: www.eco-innova.eu

2: An interagent is defined as 'an independent actor or player who has an agenda as intermediary, interceder, mediator or middle person to bring people and other key resources together for their self-interest and the interests of others in the innovation support system'. Cf. Kuisma and Fuad-Luke (2015), p. 3.

3: The SHIFT consortium focussed on product innovations (goods and services) and process innovations and adopted the following definition: An eco-innovation is a product or process innovation that causes a significant decrease in environmental impact, while remaining economically feasible (i.e. financially viable) and being in harmony with social sustainability.

The SHIFT project: Scope and frameworks

SHIFT investigated the following guiding research question:

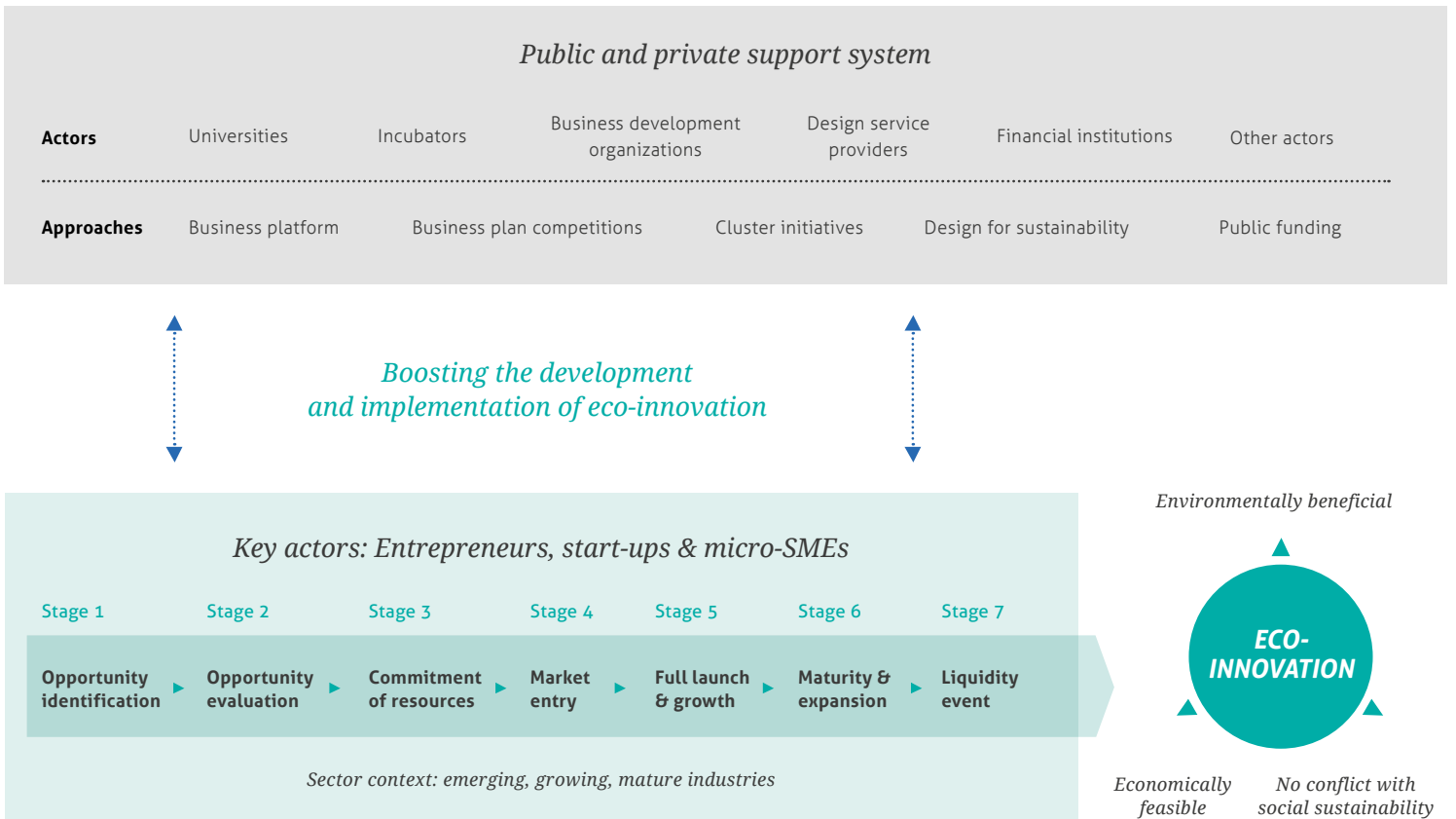
In which regard and how do support systems for entrepreneurship have to be changed in order to effectively support the generation and implementation of eco-innovation?

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)

We relate support systems to the entrepreneurial process or entrepreneurial life cycle from opportunity identification to market entry and growth, and study and analyse how public, intermediary and private support systems for entrepreneurship are currently being provided and have to be redesigned to effectively support the generation and implementation of eco-innovations (Figure 1).

Figure 1: Actors and approaches of the support system for entrepreneurship in eco-innovation



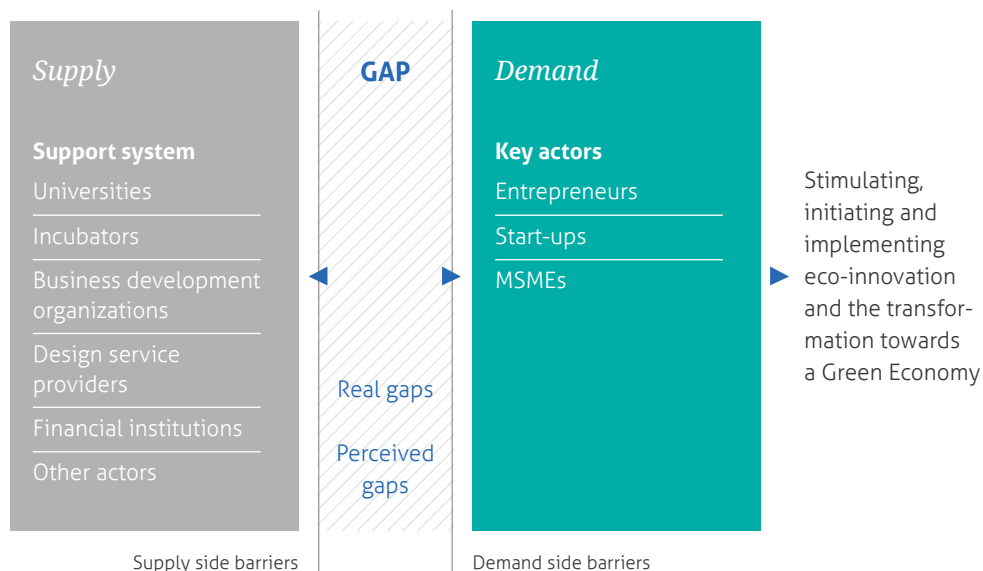
The guiding research question contains several distinct components, which reveal the complexity of the object of research in the project. It emphasises the need for change, in a systemic manner, in a range of actors related to entrepreneurship and eco-innovation, as well as the exploration of the kinds 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 investigations in SHIFT focused 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. These actors act within and/or across macro, meso and micro levels in a Multi-level perspective (MLP) framework (Loorbach 2007).
- **Key actors** – for SHIFT we selected six key support actor types: universities, incubators, business development organizations, design service providers, funders and interagents, and investigated the existing 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 Micro Small and Medium sized enterprises (MSMEs) and/or established SMEs.

A 'gap concept' was developed in Work Package (WP) 1 of the SHIFT project to identify potential mismatches between the existing support system for innovation and entrepreneurship and the innovators. This was applied in the empirical investigations of WP 2 to 7. Based on insights from these work packages and discussions within the SHIFT team during the project a conceptual diagram (Figure 2) was developed to see how support systems might have to be changed.

Figure 2: The SHIFT gap concept for exploring the (mis-)match between the support system and innovators



The SHIFT consortium also explored where individual actor types sit within the MLP, and if they are active within and/or across the macro, meso and micro levels.

Is there are need for a paradigm change in support systems?

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 empirical investigations allows for describing several phases of a paradigm change in support systems for innovation and entrepreneurship (cf. Table 1.)

Table 1: Paradigm change in 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 SHIFT make clear that all three countries that we have investigated (Finland, Germany and Sweden) have very sophisticated support systems for innovation and entrepreneurship. These support systems have largely been developed during the past two to three decades. Our results also point out that in all three countries sustainability is considered to be important by the respective governments and that there is a growing consensus in the population and business that society should promote, facilitate and design more sustainable production and consumption patterns. 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. However, the results of our investigations also make clear these activities are for the most part still an exception and a niche phenomenon. 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 leading eco-innovative countries (EU Eco-Innovation Scoreboard, 2013), such as Finland, Germany and Sweden, are still in Phase 3 of the evolution of a paradigm and that a mainstreaming of integrating sustainability systematically and holistically in the support system for innovation and entrepreneurship has not yet occurred in practice.

Strategies for redesigning support systems to boost eco-innovation

Mainstreaming of integrating sustainability systematically and holistically in the support system for innovation and entrepreneurship has not yet occurred in practice. Based on this central understanding from the SHIFT project and the detailed findings from our empirical investigations, seven basic strategies are presented 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 support models do not exist yet. Therefore experimentation with innovative support activities and models 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 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 on economic goals. With regard to sustainability they require 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 support systems.

For implementing these seven basic strategies we have made recommendations for European policy makers, as well as for different actors of the support system, below.

Strategies and recommendations for European policy

Based on findings and good practice examples from SHIFT 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), the DG Environment and the DG for Research and Innovation (DG RTD) of the European Commission.

Table 2: 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
1 Put eco-innovators at the centre of support efforts	<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 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. 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>
2 Easy entry and sign posting for eco-innovators	<p>Create a 'one-stop shop' which eco-innovators feel is orientated towards them and their needs. This might include e.g. offering micro-funding for specific activities.</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>DG GROW and DG Environment should co-ordinate with 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 and how it adds value.</p>
3 Encourage experimentation	<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 together for micro-funding for joint SME-DSP eco-innovation proposals.</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</p>	<p>Develop an audit tool to help start-ups and SMEs identify their current and latent dynamic needs. 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 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 green start-ups so they can articulate their immediate and longer-term needs. The 'Design Acupuncture' game (see SHIFT WP 5 report, cf. SHIFT project reports) 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 are tailored to the local/regional needs and conditions and builds on regional strengths.</p>
<p>5 Mainstreaming sustainability in the support system</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 the support actor organisation through Key Performance Indicators (KPIs).</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 Planner from Austria, the Handbook for Business Planning of the Berlin Brandenburg Business Plan Competition or the Sustainable Business Canvas.</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 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</p>	<p>Create a platform or Internet portals for green start-ups providing information, resources and networking specifically targeted at green businesses and sustainable entrepreneurs.</p> <p>Support hybridisation of eco-innovation support services.</p>	<p>The European Commission should support 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>It should also 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 in order to leverage their impact. 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 SHIFT report WP 4) and interagents (see SHIFT report WP 7) 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</p>	<p>Benchmark the existing support system showing how it integrates sustainability and supports eco-enterprises and green start-ups.</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 green start-ups.</p> <p>As an illustration based on the actors investigated in the project, we suggest the following indicators when evaluating support of incubators:</p> <ul style="list-style-type: none"> (a) demand for becoming a tenant in an incubator; (b) how many ventures that complete an incubator process (i.e. the ventures 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 co-financing, networking activities). Such indicators show how well the incubators are anchored in their local/regional environment.

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.





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 focused 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 entrepreneurship 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. (see SHIFT publications).

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 3: Recommendations and good practice examples for universities

Basic strategy	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 specifically and establish centers that focus on eco-innovation/greentech and for introducing 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”; Innovations-Campus 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: 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. Let yourself get inspired by the different approaches and select approaches that seem to fit your university.	SHIFT good practice collection of university support for sustainable entrepreneurship with nine good practice cases from Europe and U.S.A

4 Dynamic tailoring of support activities	<p>(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;</p> <p>(2) Develop specific support activities for eco-innovators and green start-ups</p> <p>(3) Provide access to sustainability experts and networking support for green entrepreneurs.</p>	<p>(1) Technical University of Hamburg, Germany: Start-up Consultant Green Technologies and</p> <p>(2) Santa Clara University: GSBI Accelerator for social entrepreneurs from developing countries preparing to scale and GSBI (cf. SHIFT good practice collection .</p>
5 Mainstreaming sustainability in the support system	<p>(1) University policy: Recognize the need for connecting the concept of the entrepreneurial university and the concept of the sustainable university.</p> <p>(2) Develop an award for the "Sustainable entrepreneurial university".</p> <p>(3) Entrepreneurship policy: Change government funding programs for start-up support at universities. Make 'Sustainability' an obligatory requirement in start-up funding programmes (e.g. for funding proposals, for business plans etc.).</p> <p>(4) Make sustainability a key criterion in evaluation schemes of entrepreneurial universities (e.g. in Germany the 'Gründungsradar' (Start-up radar of universities).</p>	<p>(1) Lappeenranta University of Technology (LUT), Finland: Strategy 2020 is based on sustainability; entrepreneurship is strongly related;</p> <p>(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 (cf. SHIFT good practice collection .</p>
6 Specialisation	<p>(1) Establish sustainability and entrepreneurship as core values and as basic principles of the university strategy;</p> <p>(2) integrate them in the Key Performance Indicators (KPIs) and the scorecard of the university</p> <p>(3) Establish centers that focus on eco-innovation/ greentech;</p> <p>(4) Introduce chairs / tenure positions for eco-innovation / sustainable entrepreneurship.</p> <p>(5) Offer specialized teaching and support programmes for eco-innovators and green start-ups.</p>	<p>(1) Chalmers University of Technology, Sweden, is Climate-KIC's first network partner in Sweden.</p> <p>(2) Bren School, UC Santa Barbara: Module in 'Eco-Entrepreneurship (Eco-E)'. (3) University of Oldenburg, Germany: Award-winning module 'Eco-Venturing' (cf. SHIFT good practice collection .</p>
7 Assessment and monitoring of effectiveness	<p>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.</p>	<p>No university-related good practice example of assessment and monitoring of effectiveness is known</p>

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 4: Recommendations and good practice examples for incubators

Basic strategy	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 Protomo 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 strategies could be established in places/regions where there is a long-term supply of potential tenants. 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.	Green Garage, Berlin (one of a few specialized incubators for climate entrepreneurs)
7 Assessment and monitoring of effectiveness	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 ventures 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). 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.	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.

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, below are specific recommendations for business development organizations including cluster initiatives targeted at their support functions.

Table 5: Recommendations and good practice examples for business development organizations

Basic strategy	Selected recommendations for actions	Selected good practice example
1 Put eco-innovators at the centre of support efforts	Intermediaries have to identify and support the needs of a broader base of eco-innovators than the "usual suspects".	The studied business development organizations target a broad base of firms and have largely satisfied clients (cf. client satisfaction analysis by Sustainable Business Hub, Malmö Cleantech City, Skåne, Sweden, The Energy Agency and The Efficiency Agency, North Rhine Westphalia, Germany, cf. SHIFT report WP 4).
2 Easy entry and sign posting for eco-innovators	There should be no "wrong door" for eco-innovators into the support system. The intermediaries should 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.	Support platforms such as test beds, pilot projects (Malmö Cleantech City, Skåne) and the innovation radar (Greentech Cluster, North Rhine Westphalia (NRW), Germany) encourage experimentation both with eco-innovation and the support approach.
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, NRW uses the innovation radar program to scan, forecast and roadmap eco-innovations for relevant actors to develop while The Energy Agency and Efficiency Agency uses technical consulting to support eco-innovation in industrial processes.

5 Mainstreaming sustainability in the support system	There should be bi-directional interactive learning between established intermediaries and new entrants. Learning should focus on incorporating eco-innovation support into established intermediaries and also developing new entrants into self-reliant, long existing support actors.	The general focused business development organizations often incorporate eco-innovation specific support provided by new entrants such as the Efficiency Agency and Energy Agency, NRW and Sustainable Business Hub and Malmö Cleantech City in Skåne.
6 Specialisation	The support activities of general focused intermediaries should be complemented with specific eco-innovation support from new entrants.	Specialised support targeted at eco-innovations or the environmental technology sector is found in the studied regions. An example is the specialized business plan competition for "Climate, environment, energy and resource efficiency" in North-Rhine Westphalia, Germany, connected to the Greentech Cluster.
7 Assessment and monitoring of effectiveness	Intermediaries should assess their clients' satisfaction as a basis for communicating the value addition from their support activities to their key stakeholders.	Both direct- e.g. quantification of money, energy and material saved (Sustainable Business Hub, Malmö Cleantech City) and indirect-e.g. number of firms and new projects supported (The Energy and Efficiency Agency) assessments are used by the studied business development organizations to communicate their value addition to their funders/owners.

Strategies and recommendations for design service providers

This study focused on three specific types of design service providers (DSPs) – individual designers, design agencies and specialist university design research units – and their roles in (eco-)innovation support systems for eco-SMEs and green start-ups. 'Design' includes communication design, concept design, design management, design research, ecodesign/sustainable design, graphic design (including visual identity, identity design and brand design), interface design, (new) product development, industrial/product design, service design, spatial design, strategic design, user-centred design, web design and other services. The diversity of these design services means that there is not a universally adopted system of 'design support' across EU member states. Each national territory has its own mix of design policy, design promotion, design support and/or design research and a pan-European design policy has only emerged in the last eight years (Whicher et al 2015).

The overall picture from a Multi-level perspective shows a lack of co-ordination between the Action Plans from DG GROW and DG Environment, with an urgent need to focus on the green/circular economies to promote design, ecodesign and sustainable design as essential support services to help eco-entrepreneurs develop viable businesses.

Supply side recommendations call for dramatic, significant and co-ordinated actions between these DGs and the European design industry (e.g. through DfE⁴, BEDA⁵, ENEC⁶ and other relevant actors) 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. Co-ordination with the European Enterprise Network and specialists KICs focusing on the green/circular economies should also be explored. Demand-side recommendations call for placing the eco-innovators, the eco-SMEs and green start-ups, at the centre of an accessible and visualised support system. Re-organising the system should include better access to micro-financing, matchmaking events between DSPs and the eco-enterprises, and the development of one-stop shops where design services can be accessed with other business support services.

4: Design for Europe, <http://designforeurope.eu/>

5: Bureau of European Design Associations, BEDA, <http://beda.org/>

6: European Network of Ecodesign Centres, ENEC, <http://www.ecodesign-centres.org/>

Table 6: Recommendations and good practice examples for design service providers




Basic strategy	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 green start-ups and eco-(Micro-)SMEs with DSPs and make micro-funding available to both parties.</p>	<p>The Cleantech Co-design Center in the city of Lahti, Finland, supported by LADEC, has a 'design ecosystem' where different beneficiaries can see the kind of cleantech support and of design support that is available (see also Fuad-Luke et al. 2015).</p>
<p>2 Easy entry and sign posting for eco-innovators</p>	<p>Create a 1-stop-shop for eco-MSMEs and green start-ups to facilitate access to the support system. Coordinate with the European Enterprise Network (ENN) and other local/regional business advice centres.</p> <p>DG GROW and DG Environment should liaise with the European design industry (e.g. through DfE, BEDA, ENEC) to create a European Directory of Design Services, including specialists in ecodesign & sustainable design.</p>	<p>See the 'design ecosystem' of Lahti, above.</p>
<p>3 Encourage experimentation</p>	<p>Prioritise eco-innovators (the 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 other appropriate KICs. Gather momentum for this project through the EU member states whose national organisations have shown best practice for ecodesign/sustainable design.</p>	<p>See LADEC above and the European Network of Ecodesign Centres (ENEC) 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>
<p>4 Dynamic tailoring of support activities</p>	<p>Develop an 'audit tool' which helps eco-(M)SMEs/green start-ups determine their needs and link this to the EC's Green Action Plan 2014 and liaison with the Enterprise Europe Network (ENN).</p> <p>Provide more funding support for the supply side, especially micro- and small DSPs.</p>	<p>The 'Design Acupuncture' game, prototyped for the SHIFT project, could be developed into an interactive 'audit tool' to help green start-ups and eco-SMEs understand their needs and identify support services to meet them (refer to SHIFT report WP 5).</p>
<p>5 Mainstreaming sustainability in the support system</p>	<p>'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 across different innovation fields.</p>	<p>The Green Action Plan, GAP, published by the DG GROW in 2014, tries to integrate eco-innovation with design and ecodesign.</p>
<p>6 Specialisation</p>	<p>Supply side improvements: DfE, BEDA, ENEC) should co-ordinate a 'state of the art study' on the ecodesign capacity in Europe's DSPs (designers, design agencies, specialist research units and other centres).</p>	
<p>7 Assessment and monitoring of effectiveness</p>	<p>A universal agreement and measurement of how different design services add-value to and give Return on Investment (ROI) for an SMEs activities is absent. This needs developing.</p> <p>(M)SMEs should also be able to comment about the ease of access, quality of services and effectiveness of support, possibly co-ordinated through the ENN.</p>	

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 green start-ups. While the empirical work did not explicitly focus on the role of financial 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 refer to the literature review carried out.

Table 7: 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: Förderdatenbank and StartGreen .
3 Encourage experimentation	(1) Intermediaries: develop 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.	Specifically adapted public-private partnership (PPP) programme: KfW Programme for financing social businesses (KfW-Programm zur Finanzierung von Sozialunternehmen).

5 Mainstreaming sustainability in the support system	<p>(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.</p> <p>(2) Public funding institutions: strengthen sustainability know-how especially on the regional level where many green start-ups apply for support.</p> <p>(3) Financial institutions and public funding institutions: develop clear and simple evaluation criteria and key performance indicators for sustainable, green start-ups.</p>	
6 Specialisation	<p>(1) Policy: support efforts to develop clear criteria for what constitutes as 'sustainable, green start-up investment'.</p> <p>(2) Policy: provide incentives in the form of tax all-eviations or PPP/guarantee instruments, linked to clear criteria for what constitutes as 'sustainable, green start-up investment', by introducing or adapting appropriate policies.</p>	
7 Assessment and monitoring of effectiveness	<p>(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.</p> <p>(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.</p>	<p>E.g. Global Entrepreneurship Monitor , KfW Start-up Monitor , Green Economy Startup Monitor .</p>

Strategies and recommendations for interagents

The study focused on individuals, agents or organisations working in unusual collaborative modes by initiating new services or by hybridising with existing support services. We defined interagents (see footnote 2 above), and developed characteristics defining unusual collaboration. We selected three case studies in Finland, namely, The Local Energy Association/ Finsolar, TELAKKA® and the Peloton Club (Demos Helsinki) showing how they created, hybridised and tailored support services for SME and green start-ups. Reflecting on these findings and their relevance for eco-innovation support systems generated our recommendations.

The best eco-innovators should be selected by screening them for their 'sustainability future proofing' i.e. their ability to positively impact on achieving more sustainable products, services and experiences now and in the future. Once these SME/startup eco-innovators pass the screening they should have access to as much support as possible in a system made visible, accessible and presented in a language easily understood by the eco-innovators. Support by professionals with genuine expertise in working with SMEs and who can empathise with the SMEs' perspectives is essential.

Supply side recommendations are aimed at helping develop the capacity and capability of the interagents or agents/organisations practicing unusual collaboration. Policy makers and public sector organisations responsible for funding innovation need to encourage systemic 'intermediaries', 'interagents' and 'experts' who can see the whole support system(s) and are able to achieve functional cross-overs and hybridisation of existing support services. This addresses service duplication and fragmentation and can amplify the use of existing resources in imaginative new ways.

The primary functions of innovation support systems should be benchmarked with a set of agreed indicators, with special reference to how they add value for the (M)SMEs. Monitoring of primary functions in support systems to see where they add best value or ROI and of different promoter roles (expert, power-resources, process, relationship) to see which are more efficacious is essential.

Table 8: Recommendations and good practice examples for for interagents and unusual collaboration

Basic strategy	Selected recommendations for actions	Selected good practice example
1 Put eco-innovators at the centre of support efforts	Eco-innovators have to demonstrate their 'sustainability future proofing', but once they have they should be prioritised in the support system. This will ensure that genuine eco-preneurs, eco-enterprises and greening enterprises are prioritised over 'ordinary enterprises' (business-as-usual).	In Finland, The Energy Association/Finsolar , TELAKKA and Peloton Club (Demos Helsinki) all place the eco-entrepreneurs near the centre of their sustainable entrepreneurship activities.
2 Easy entry and sign posting for eco-innovators	Make the eco-innovation support system visible and easily understood – talk their language - 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.	See Finnish examples above. In Germany, ' The Changer ', located in Berlin, 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 'add-value'.	See examples above.
5 Mainstreaming sustainability in the support system	Develop systematic evaluation of the quality and effectiveness (sustainability impact) and benchmark the support services. 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	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.	
7 Assessment and monitoring of effectiveness	Harmonise assessment and monitoring to address the attributes of eco-innovators' businesses and their long term sustainability impacts. Benchmark primary functions in support systems by a set of agreed indicators, with special reference to how they add value for the (M)SMEs. Also enquire as to how existing key support actors/organisations benchmark their own effectiveness in relation to policies and how they demonstrate 'effective practice' (meeting real needs of SMEs).	

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Good Practice: Lappeenranta University of Technology (LUT), Finland

Good Practice: Leuphana University of Lüneburg, Germany

Good Practice: University of Manchester England, UK

Good Practice: Carl von Ossietzky University of Oldenburg, Germany

Good Practice: Santa Clara University California, USA

Good Practice: Bren School of Environmental Science & Management, UCSB California, USA