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CASI: Public Participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation

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Mobilisation and Mutual Learning (MML) Action Plans: Mainstreaming Science in Society Actions in Research

CASI

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Executive Summary

This report gives policy recommendations for steering research and innovation towards more sustainable futures and for ways in which public engagement can contribute to that end. It presents key insights from the EU FP7 research project, CASI ("Public participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation"), responding to one of the Societal Challenges set out in the Horizon 2020 programme of the European Union, namely "Climate action, environment, resource efficiency and raw materials".

CASI has explored and promoted the engagement of society at large in sustainable innovation. Given its complex, contested and systemic nature, both the objectives for research and innovation towards a more sustainable future and the means by which it is pursued would – in light of CASI insights and experiences – benefit strongly from increased societal engagement. One might even say that innovations cannot truly serve sustainable futures without societal engagement.

The recommendations have been developed in close collaboration between the CASI consortium partners and are meant for EU, national, and local decision-makers, business leaders, civil society organisations, foundations, and universities alike. The recommendations are divided in three chapters:

Multi-stakeholder Collaboration in Sustainability Research and Innovation

1. Mobilisation and Mutual Learning Action Plans (MMLAP's) should be applied extensively both at the EU and Member State level in order to advance the sustainability of future innovations.
2. The Mobilisation and Mutual Learning Action Plan (MMLAP) approach should be applied to "wicked problems" that cut across more than one societal challenge.

Sustainable innovation strategies

3. Promotion and support for the diffusion of Sustainable Innovations by local, national, and EU level Government bodies can significantly contribute to a transition towards sustainable futures.
4. Sustainable innovation assessment and management can be improved by the use of a framework that seeks responses to critical issues through the engagement of government, business, and civil society, and research and education actors.
5. New policy agendas for sustainable innovation could be better informed by innovation actors' current priorities and their future expectations.
6. New infrastructures and support strategies for social innovations are required.

Citizen participation in sustainable innovation

7. Identify shared interests amongst European citizens and institutionalise the inclusion of citizens' interests in research and policy agendas.
8. Make use of citizen participation in order to draft innovative research agendas and policies for moving toward a more sustainable future.
9. More research should be directed at finding solutions that will empower citizens to help bring about a more sustainable future.

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1. Introduction

This report presents policy recommendations for steering research and innovation towards more sustainable futures and for ways in which public participation can contribute to that end.

The recommendations are addressing EU, national and local decision makers, business leaders, civil society organisations, foundations, and universities alike.

"Sustainable innovation**"** has been defined by the partners in the EU FP7 CASI project as "any incremental or radical change in the social, service, product, governance, organisational, system and marketing landscape that leads to positive environmental, economic and social transformations without compromising the needs, welfare and wellbeing of current and future generations."

Needless to say, determining what constitutes "positive", i.e. "desirable", transformation is open for negotiation, which is one of the many reasons why CASI has explored and promoted the engagement of society at large in sustainable innovation. Given its complex, contested and systemic nature, both the objectives for research and innovation towards a more sustainable future and the means by which it is pursued would – in light of CASI insights and experiences – benefit strongly from increased societal engagement. One might even say that innovations cannot truly serve sustainable futures without societal engagement.

CASI itself has experimented with a multitude of societal engagement processes and methods, combining them with more traditional, academic research approaches. This report builds on these experiences and presents those messages and recommendations that the CASI partners consider the most important to communicate to public and private decision makers.

Some of the recommendations build on new insights gained in CASI. Others add weight to insights and observations that the reader might already be familiar with. The recommendations aim to be concise and to the point. In Annex 1 we present the evidence base behind them.

The 9 recommendations are presented under three headings:

- Multi-stakeholder collaboration in sustainability research and innovation.
- Sustainable innovation strategies.
- Citizen participation in sustainable innovation.

2. Multi-stakeholder collaboration in sustainability research and innovation

Multi-stakeholder collaboration in research and innovation has gained momentum and is increasingly acknowledged as a fruitful approach to achieving new insights and results. Practicing it in a meaningful and productive way, however, can be challenging. In this first of three chapters we would like to reflect on the lessons learned from a particular approach to such collaboration, called a Mobilisation and Mutual Learning Action Plan (MMLAP). It is especially focused on R&I, and was developed by the EU Commission in order to address societal challenges with no clear solutions, and thus is more explorative in nature than traditional R&I approaches. It has been applied to R&I projects within the Commission's Framework Programmes since FP6. On a member-state level, this mechanism could potentially contribute to framing local or regional solutions to policy-relevant challenges.

A wider adoption of MMLAP approaches, specifically in local, regional and national policy-making efforts, would require a wider recognition of the significance of user-led input, as well as the desire for more integrative solutions to shared problems. It can further stimulate cooperation and dialogue among different stakeholders, who often may promote competing solutions to or interpretations of the same issue. Within an MMLAP, engagement is stimulated in order to close such gaps, or, at the very least, to drive agreement around their existence in order to start from common grounds.

An MMLAP approach to R&I is characterised by extensive public engagement of a wide variety of societal actors (including citizens) and by focusing on developing mutual understanding and joint solutions. The MMLAP implementation in CASI represents a multitude of activities and approaches. As a result, it produced a rich set of complimentary insights and fostered mutual learning among partners as well as among stakeholders and across sectors.

By definition, the MMLAP approach relies on a number of different activities addressing one or more stakeholders through a variety of methods. In CASI, there were three major tracks of knowledge generation, distinguished by both the kind of stakeholder involved and the method used. Each track reflected a major workflow within the project. The first track relied on data collected with and from innovators about their sustainable innovation practices. The second track represented the engagement of citizens and experts in an interactive process whereby both sides represented particular sources of knowledge within a process of co-creating a list of research and policy priorities. The third track included the aggregation of policy developments related to sustainability and sustainable innovation on national and EU levels. Each of the tracks contributed to the elaboration of CASI-F – the Common Framework for Assessment and Management of Sustainable Innovation, which in turn proved to be a versatile instrument that could aid stakeholders in assessing and managing their sustainable innovation initiatives.

All of the above leads us to the following two recommendations about the future application of the MMLAP approach and how it can help advance sustainable innovation:

- Policy Recommendation 1: Mobilisation and Mutual Learning Action Plans (MMLAP's) should be applied extensively both at the EU and Member State level in order to advance the sustainability of future innovations.

- Policy Recommendation 2: The Mobilisation and Mutual Learning Action Plan (MMLAP) approach should be applied to "wicked problems" that cut across more than one societal challenge.

Policy Recommendation 1: Mobilisation and Mutual Learning Action Plans (MMLAP's) should be applied extensively both at the EU and Member State level in order to advance the sustainability of future innovations.

Observations

- The many different public engagement activities organised by CASI partners clearly demonstrated that different societal actors have different views on what sustainability is.
- Innovators engaged in the CASI project consistently pointed to the value of feedback from a diverse range of societal actors to help assess and manage their innovation.
- To maximize the impact and make the engagement process even more effective, the CASI MMLAP approach has proven that engagement of external experts, i.e. "intermediaries" in the MMLAP process, who take up a role of facilitator, moderator, or evaluator, is very important. In particular for initiating and supporting the dialogue between different interest groups that do not naturally liaise, intermediaries have been proven to play a crucial role in the engagement process.

Assessment

A Mobilisation and Mutual Learning Action Plan (MMLAP) is a particular model aimed to foster multi-actor and public engagement in research and innovation. An MMLAP approach can help secure more sustainable outcomes of research and innovation processes through the co-creation principle, by engaging target societal actors and intermediaries in the process, in a systematic way. Furthermore, lessons learned in CASI point to the fact that strengthening the role of intermediaries in such process could significantly strengthen MMLAPs in the future.

However, an MMLAP should not be designed so as to aim to converge and steer all project activities towards the production of a single product or result. Instead, it would work best when multiple parallel learning strands are enabled. It is through the combination of diverse approaches and the engagement of diverse groups of societal actors that the MMLAP approach comes to its right.

CASI has organised a number of workshops, events and interviews in 12 EU Member States, which, in accordance with the work plan and the stated objectives, have targeted different interest groups. This approach has clearly demonstrated that different societal actors have different views on what a sustainable outcome of research and innovation should look like.

Thus, we recommend that the MMLAP approach is applied in a multitude of research areas, be they different societal challenges under Horizon2020 or societal challenges addressed by Member State research programmes. We also recommend that this approach is tested for other EU research programmes, such as the regional funds.

Policy Recommendation 2: The Mobilisation and Mutual Learning Action Plan (MMLAP) approach should be applied to "wicked problems" that cut across more than one societal challenge.

Observations

- Although aiming to address the societal challenge of climate action, environment, raw materials and resource efficiency, many societal actors involved in CASI activities instinctively broadened the scope to cover other areas such as migration, employability, social cohesion, ageing and gender.
- Citizens' visions for a sustainable future produced by the CASI citizen panels tend to cut across several different societal challenges, highlighting the impacts of various societal developments onto the perception of sustainability.
- Innovators engaged with the CASI project were most often in the process of making innovations that required them to pay attention to more than one societal challenge such as the interlinkages between, for example, mobility, social and food challenges in urban systems. Henceforth, sustainable innovation cuts across more than one societal challenge and is not only restricted to climate action, environment, raw materials and resource efficiency.
- Some societal actors, such as citizens, or representatives of NGOs tend to be more prone to mix environmental, social, and economic dimensions when addressing societal challenges than other actors, such as researchers and policy makers who are more likely to think less holistically in the area of sustainability.
- Given the triple-dimensionality of the sustainability concept, the added value of bringing stakeholders and/or citizens together from different backgrounds/disciplines is obvious and deemed necessary to 'pool' knowledge and expertise (e.g. expertise of one's own life) in order to understand wicked problems, to identify (policy) needs and develop solutions.

Assessment

Addressing one societal challenge often implies addressing others as well. Many cross-cutting social-environmental challenges do not fit within the scope of a single societal challenge as defined by the European Commission in Horizon 2020. The need to focus research on concrete and useful outcomes comes at the expense of holistic problem solving. Whereas innovation actions often focus more narrowly on technological solutions, an MMLAP approach is particularly well suited to address cross-cutting social-environmental issues or "wicked problems", such as climate change, land degradation, and biodiversity loss. Through the engagement of societal actors not traditionally involved in research activities (e.g. citizens, civil society organisations, business associations, and policy makers from different governance levels and fields), an MMLAP can help researchers, policy makers and business understand how one socio-environmental challenge is connected to another and how research and innovation can address more challenges at the same time. The value of an MMLAP, albeit less tangible and linear than traditional research projects, is precisely in the cross-sectoral dialogue that often encompasses multiple socio-environmental challenges.

3. Sustainable innovation strategies

Innovations tend to emerge in niches. These niches need to be nurtured and strengthened in order for them to be able to rival and possibly reshape or replace existing regimes. Within the CASI project a management framework has been developed and tested in pilot cases of sustainable technological and social innovations. The framework assists actors from the relevant stakeholder groups to identify actions that can foster sustainable innovations. During the pilot process, innovators aiming for sustainable solutions often encountered barriers and opposition. Policies targeted to support, assess and manage sustainable innovations can strengthen these innovators' efforts and their sustainable solutions.

In the interactions with innovators and other stakeholders throughout the CASI project, several policy recommendations for supporting and managing sustainable innovations could be identified.

The four policy recommendations presented in this chapter are:

- Policy Recommendation 3: Promotion and support for the diffusion of Sustainable Innovations by local, national, and EU level Government bodies can significantly contribute to a transition towards sustainable futures.

- Policy Recommendation 4: Sustainable innovation assessment and management can be improved by the use of a framework that seeks responses to critical issues through the engagement of government, business, and civil society, and research and education actors.

- Policy Recommendation 5: New policy agendas for sustainable innovation could be better informed by innovation actors’ current priorities and their future expectations.

- Policy Recommendation 6: New infrastructures and support strategies for social innovations are required.

Policy recommendation 3: Promotion and support for the diffusion of Sustainable Innovations by local, national, and EU level Government bodies can significantly contribute to a transition towards sustainable futures.

Observations

- Innovators engaged through CASI in developing action roadmaps for themselves often identified tasks related to stakeholder management, cross-sectoral collaboration and awareness raising.
- Innovators often commented that one way of improving the sustainability of their social innovations would be to get more support from government bodies. Having the right policy framework would help innovators focus on key areas such as awareness raising, dissemination, multi-stakeholder collaboration and community and civil society engagement-fostering in the initiatives.
- Innovators, while assessing their sustainable innovations, stressed that they require a consistent and long-term policy strategy approach to support the diffusion of their innovations. Innovators were able to make changes to their delivery at operational and tactical level but the strategic level remains in the hand of local, national and EU policy makers.

Assessment

Government bodies are sought to aid innovators (and others) in dissemination and raising awareness, sensitising citizens, businesses and researchers, in diffusing sustainable innovations. Innovators need support for getting their sustainable innovations closer to market, and gaining citizens' acceptance. Increasing public awareness and engagement should be encouraged while paying special attention to targeting customised messages (e.g. based on age, occupation, gender, location, ethical background) for the uptake of sustainable Innovations.

The sustainable innovation ecosystem comprises a diverse group of stakeholders, including government, business, civil society/NGOs and research/education. As these stakeholders present multiple and often overlapping functions, it is important to ensure a dynamic process of interaction, ultimately leading to a sort of an "intelligence of the many" paradigm in the development and diffusion process of the sustainable innovation process. Only as such, it is guaranteed that all essential aspects and different audiences are involved and contribute to improving the innovation, making it more sustainable, increasing its adoption, and ultimately creating a more sustainable lifestyle for citizens.

Methods of engaging stakeholders into development can include e.g. collective intelligence exercises, fostering online platforms and communities, pilot tests in early stages of product development and financing cross-sectoral R&D. Citizens being more an integral part of innovation processes can also increase the uptake of sustainable innovations.

Policy recommendation 4: Sustainable innovation assessment and management can be improved by the use of a framework that seeks responses to critical issues through the engagement of government, business, and civil society, and research and education actors.

- *CASI-F is one such framework.*

Observations

- CASI-F supports the scanning and identification of sustainable innovation cases.
    - *More than 500 cases have been identified in CASI*
- CASI-F enables users to map and assess SI cases through multiple criteria analysis.
    - *More than 200 cases have been mapped in CASI*
- CASI-F assists actors to detect critical issues associated to their SI case.
    - *More than 1500 critical issues have been recorded in the CASI-F platform*
- CASI-F helps in the generation of strategic, programming or operational level actions necessary to address the identified issues.
    - *More than 700 actions have been generated with the CASI-F piloting process*
- CASI-F provides a structure to transform every action into an elaborated roadmap.
    - *More than 45 roadmaps have been elaborated during the piloting process*
- Feedback received from innovators engaged in the CASI project has suggested that CASI-F is a good framework to support their sustainable innovation assessment and management processes.

Assessment

Sustainable innovation management is a multifaceted endeavor that implies to react (i.e. find adequate answers) to critical issues from multiple actors' perspectives. A structured framework that supports the identification and analysis of these issues and assists the planning of actions would enable innovation actors to reduce barriers to innovation and take advantage of upcoming innovation development opportunities.

In particular, CASI-F embraces a set of tools and protocols to scan SI cases, map them, analyse their critical issues, devise SI actions, and elaborate SI roadmaps (see annex). In the process, the framework offers mutual learning across a wide range of stakeholders, particularly including government, business, civil society, and research and education.

Government actors can use the framework to assess and manage their SI policy initiatives. In this respect, CASI-F supports the exploration of practices in the local, national or international areas of policy influence; *Business actors* can use it to identify opportunities and learn from competitors; *Civil society actors* can use CASI-F to discover new products, services and social initiatives; *Research and education actors* can use the information available in the CASI-Fin lectures and research on sustainable innovation or to develop new SI databases and statistics. With CASI-F researchers can steer their research works in more sustainable and impactful directions.

Policy recommendation 5: New policy agendas for sustainable innovation could be better informed by innovation actors' current priorities and their future expectations.

Observations

- Within the framework of the CASI project, seven types of sustainable innovations (product, services, social, organizational, governmental, system, and marketing innovation) have been identified throughout Europe.
- The mapping of 202 sustainable innovation cases has given rise to 1852 short-, medium- and long-term goals and aspirations of the innovation actors from government, businesses, civil society, and research and education. The application of CASI framework has further served to identify 76 research and innovation priorities.
- Innovators' priorities and future expectations only partly match existing H2020 priorities.
- A systematic analysis of innovators' priorities has revealed 10 new research and innovation policy agendas for sustainability.

Assessment

The mapped information included in the CASI platform includes more than 1800 priorities from SI actors. A systematic analysis of these priorities supports the definition of research and innovation agendas that would be better aligned with innovators' expectations than current H2020 priorities. Whether or not policy makers will make such alignment a priority (there are other societal concerns than innovators' priorities and expectations) is subject to a political decision. However, the identification of innovators' priorities and expectations can help to better inform the formulation of policy agendas for sustainability.

Policy recommendation 6: New infrastructures and support strategies for social innovations are required.

- *Even though the importance of social innovation for sustainability has become widely recognised, policy support is still mainly directed at technical innovation.*

Observations

- Pilot initiatives for sustainable innovations and workshops with different stakeholders implemented throughout the CASI project show that the management of sustainable innovation can benefit from the inclusion of different stakeholder groups. Especially social innovations include, and have an impact on, different types of stakeholders and levels of action.
- One of the actions of importance to the management of sustainable innovation most frequently mentioned by innovation managers themselves, when interviewed by CASI researchers, is to search for collaboration, partnerships with other stakeholder groups, cooperation and engagement in multi-stakeholder dialogues.
- Many of the sustainable innovations mapped in CASI are by nature social innovations.

Assessment

Social innovation has gained importance and attracted the interest of many stakeholders in the last years, especially for a transition to a sustainable future. The growing importance of social innovations is as well evidenced by the many sustainable innovations gathered in the CASI project that are by nature social innovations. From other research, we have the insights that social innovation and behavioural change play a significant role for sustainable development in interplay with technological sustainable innovations, as well as on its own. Social innovations provide solutions for complex problems concerning society and therefore tend to deal with different structures, actors and goals, while handling multidimensional approaches, multi-stakeholder alliances and co-creation. Therefore they require different support structures and strategies.

New support strategies could focus on the expansion of stakeholder involvement in the social innovation process. This is evidenced by the cases of social sustainable innovations (which have been mapped and analysed in the framework of the CASI project) where importance is given to collaboration, partnerships, and dialogue. Social initiatives for sustainable development also need reliable funding mechanisms. Overall, the exchange of knowledge between different stakeholders and co-creation processes are crucial for the genesis and adoption of social innovations for sustainability.

The impact of social innovations depends on the creation of supporting institutional infrastructures. Although the European Union made some efforts towards strengthening public awareness on social innovations, their potential for achieving positive impacts on society remains underexplored when compared to technological innovations. To enable problem solutions for the societal challenges of our time, it is necessary to facilitate a stronger mobilisation of institutions with a high affinity to social innovations, to support the development of appropriate infrastructures and the creation of funding instruments. With such measures, the dynamics of social innovation could be furthered significantly.

4. Citizen participation in sustainable innovation

While stakeholder participation in research and innovation processes has become a commonly used and acknowledged practice, citizen participation is less so. The CASI project has featured and explored both types of societal engagement.

One of the societal engagement methods used in CASI[1] builds on the CIVISTI method[2] and involved 230 European citizens and 23 experts in 25 consultation events (24 citizen panel meetings in 12 EU countries and 1 expert workshop). The participation process involved three key steps and activities:

1) The first Citizen Panel Meetings (CPM1), which produced 50 citizen visions for a more sustainable future.

2) An expert workshop, at which experts translated half of the visions into research priorities and ranked them.

3) The second Citizen Panel Meetings (CPM2), where citizens validated and ranked the research priorities produced at the expert workshop.

Both rounds of citizen panel meetings (CPMs) were organised in the 12 CASI partner countries across Europe, following the same method and guidelines, allowing for comparison of results. Citizens were recruited with the purpose of reflecting the demographic diversity in their country with regards to age, gender, education, occupation and geographical zone of residency.

The results from the different steps of the process have been closely analysed by CASI partners and provided noteworthy insights, the most interesting of which are presented on the following pages.

Three recommendations focus on citizen participation:

- Policy Recommendation 7: Identify shared interests amongst European citizens and institutionalise the inclusion of citizens' interests in research and policy agendas.

- Policy Recommendation 8: Make use of citizen participation in order to draft innovative research agendas and policies for moving toward a more sustainable future.

- Policy Recommendation 9: More research should be directed at finding solutions that will empower citizens to help bring about a more sustainable future.

[1] For a recent overview of methods for societal engagement, see the websites of Engage2020 and PE2020

[2] http://www.civisti.org/

Policy recommendation 7: Identify shared interests amongst European citizens and institutionalize the inclusion of citizens' interests in research and policy agendas.

Observations

- Citizens across Europe have remarkably similar priorities for future research on climate action, environment, raw materials and resource efficiency, as the CASI citizen engagement process observed.
- Citizens' priorities were different from those of experts and stakeholders.

Assessment

CASI has compared the research priorities of citizens with those of stakeholders and experts for bringing about a sustainable future. The fact alone, that citizens across Europe have so similar priorities, should give decision makers in government and research institutions the rationale to identify and institutionalise citizens interests, visions and priorities – both in research agendas and in policies meant to advance the transition to a more sustainable society. This would make citizens genuine actors in the development of European research and innovation and complements stakeholder interests in the process.

Citizens' priorities differ from those of experts and stakeholders, which makes it imperative to consider them in research and policy agenda setting. This will increase both democratic legitimacy and social robustness of outcomes.

Policy recommendation 8: Make use of citizen participation in order to draft innovative research agendas and policies for moving toward a more sustainable future.

Observations

- Citizens' visions for a sustainable future identified in the CASI citizen participation process typically cut across different topics and societal challenges.
- What citizens saw as the most relevant research to bring about their visions for a sustainable future were different from that of experts and stakeholders in the field.

Assessment

It is clear from the CASI citizen participation process, that citizens bring new and different perspectives and ideas to the table when asked to identify research topics to help bring about a more sustainable future. Decision makers would be well advised to make use of that creative power.

By including citizen's ideas, experts and analysts can build a richer base of possible decisions. This is also an opportunity for experts, researchers, scientists, and policy makers alike to learn directly from citizens – a process, which is frequently undermined and ignored. Lay citizens' perspectives can supplement expertise and scientific paradigms as they reflect both different rationales and rationalities. This difference is not best understood as a question about citizens' ability to properly understand the logics of research and policy but rather as a reflection of citizens' ability to connect the dots and look across different fields of research. Moving towards a more sustainable society is a complex task and a wicked problem, requiring both incremental and cross-cutting initiatives and solutions. It would be a mistake not to count citizens into the equation.

DG Research and Innovation, national research councils, private foundations, and universities across Europe could make good use of citizen participation for the purpose of defining priorities and challenges that cut across established fields of research and innovation.

Policy recommendation 9: More research should be directed at finding solutions that will empower citizens to help bring about a more sustainable future.

Observations

- Citizens engaged in the CASI project identified the following Top-3 priorities for future sustainability-focused research: 1) *producing food closer to their home* 2) *education on how to live a more sustainable life* 3) *assisting citizens with producing renewable energy themselves.*
- 6 out of the citizens' Top-10 research priorities focus on ways to empower citizens to live and act more sustainably.

Assessment

When given the possibility to develop and prioritise between research topics aiming to bring about a sustainable future, citizens show a remarkable preference for research agendas that will enable them to take an active part in local production of food and energy; provide them with the skill-set needed for "eco-citizenship"; help them change diets and other consumption patterns, such as leasing; and make urban spaces greener.

Many citizens want to participate in bringing about a sustainable future. They are ready to take responsibility for a transition to a more sustainable future but seem to lack sufficient tools to do so. Policy makers and researchers would be thus advised to put more efforts into providing citizens with such tools, given the fact that CASI results indicate an untapped potential for supporting the objectives of bringing about sustainable futures and products in the EU research programme, Horizon 2020, and a multitude of public and private research agendas across Europe. Citizens want to help, so more research should go into finding ways in which they can do so.

5. About the CASI project

The CASI project ("**Public participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation**") aims to respond to one of the Grand Challenges set out in the Horizon 2020 programme of the European Union, namely "Climate action, environment resource efficiency and raw materials". It represents an EU-wide cross-sectoral partnership on innovation-related challenges and considers not only the impacts of social and technological innovation, but also the types of actors involved and their inherent interests. It thus effectively integrates the perspectives of civil society, SMEs, industry, policy stakeholders, and leading academics.

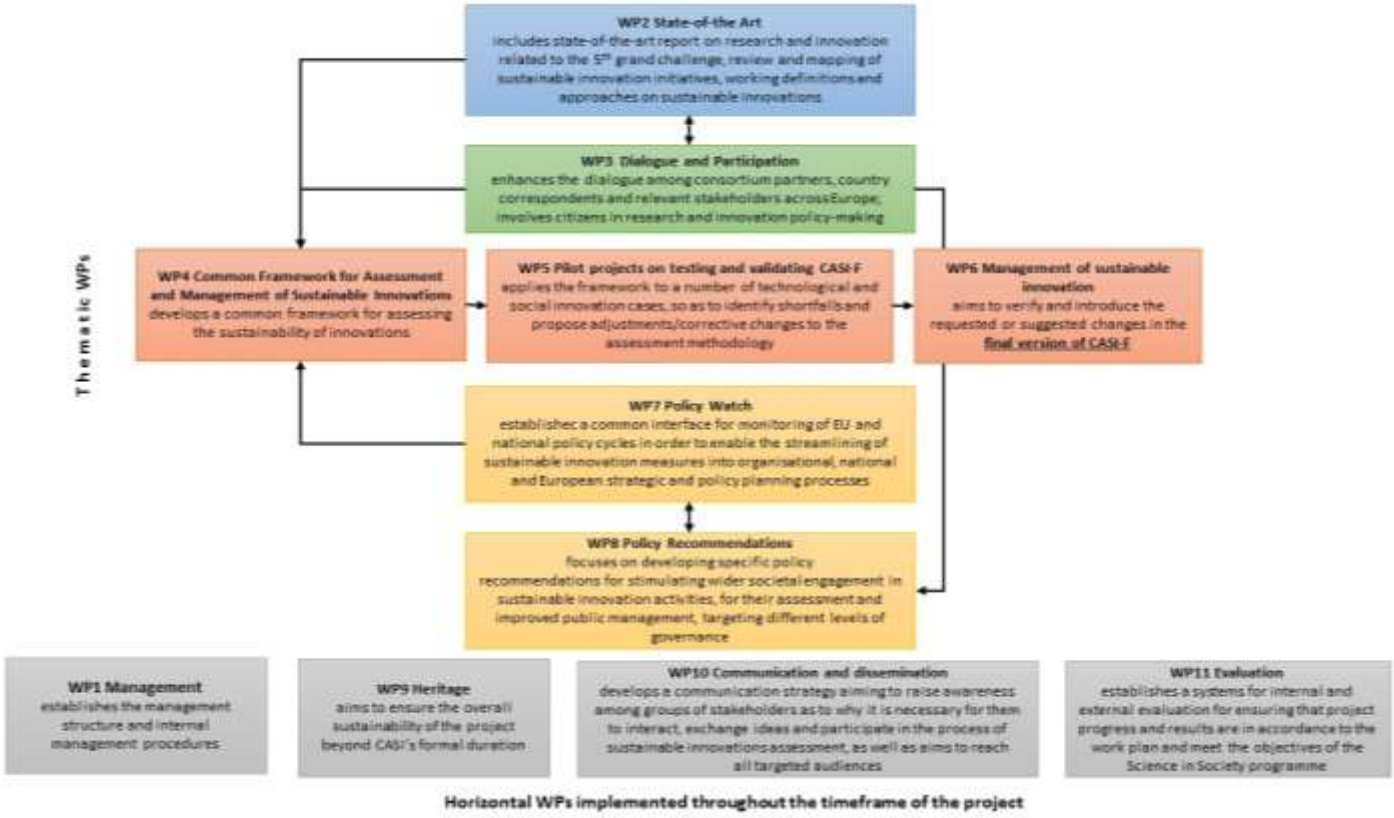
CASI is based on the understanding of innovation as a key driver of societal progress in the age of technology and of imminent uncertainties about the future. Sustainable innovation, on the other hand, further enhances this understanding by introducing sustainability as a focal core of the innovation process and as an objective of innovation diffusion through social and market opportunities. At the same time, this is not an attempt to introduce yet another distinctive type of innovation. Rather, **CASI fosters a debate on conceptual dimensions, policy boundaries, and good practices combining innovative pursuits with sustainability objectives**.

The collaboration of partners investigates the scope of sustainable innovation as a societal phenomenon and enables the elaboration of an **assessment and management framework of sustainable innovation practices**, based on a sound conceptual framework and a shared understanding of sustainability in innovation processes among stakeholders. CASI further **explores the impacts of innovative practices, as well as of specific technological and social innovations**, vis-à-vis the persisting challenges of climate change and resource depletion, and the societal effects thereof. Thus, it **makes a thorough inquiry into the balance between the social, economic and environmental impacts of innovations**, and **helps determine the scope and priorities for national and EU policy making**.

CASI is supported by the Science in Society Programme of FP7, Theme SiS.2013.1.2-1 "Mobilisation and Mutual Learning (MMLAP) Action Plans: mainstreaming Science in Society actions in research". It is coordinated by the Applied Research and Communications Fund (ARC Fund), a Bulgarian non-governmental policy and innovation research institute. The project's consortium includes **19 partner organisations from 12 EU countries** and relies on an extended network of national experts in the remaining 16 countries not represented in the consortium to ensure coverage and inquiry in every EU member state.

CASI includes a rich and intensive set of activities carried out across the EU. The methodology of the project is structured into the following work packages:

5.1 CASI – Organigramme of WPs



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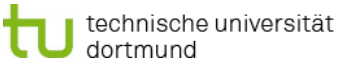 	**PP5**/TUDo	**Sozialforschungsstelle Dortmund** Evinger Platz 17 44339 Dortmund Germany T +49 231 8596-0 www.sfs-dortmund.de

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ANNEX 1 Evidence base

In this annex, the evidence behind the recommendations given is presented. By "evidence", we mean a detailed description of the observations highlighted for the respective recommendations given and have they were produced.

Evidence Base – Multi-stakeholder Collaboration in Sustainability Research and Innovation

Policy Recommendation 1: Mobilisation and Mutual Learning Action Plans (MMLAP's) should be applied extensively both at the EU and Member State level in order to advance the sustainability of future innovations

Using the Citizens-experts-citizens process (refer to D3.3)

Through the CASI projects, an MMLAP approach was carried out in order to generate a set of recommendations for future research priorities. The aim of this particular activity in the CASI project was that citizens and experts efforts combined together would provide the Top-10 of research priorities for a more sustainable future for Europe. As mentioned in the report D33, this method consists in three rounds of consultative workshops, following the methodology developed and tested in the CIVISTI project (for a presentation of the CIVISTI method and results please see e.g. Rask & Damianova, 2009 or Andersen & Jacobi, 2011). For the needs of the CASI project this was done in separate 3 workshops and stages. Firstly, the 12 partner countries organised national workshops where citizens were asked to develop visions for a more sustainable future in Europe. Secondly, EU experts were asked to turn these visions into research priorities. And finally, citizens were asked to prioritise these – with the end result being a transnational citizen Top-10 of research priorities for a more sustainable future in Europe. This process is called the 'citizens-experts-citizens process'.

What was very interesting to see in this process, was that the visions that were produced by the 12 countries and then presented to the EU experts, were very similar in some ways and were addressing the same challenges, concerns and topics. Experts and citizens somehow confirmed to each other that research agendas and citizens expectations were often very convergent and that such exercises were valuable. After the last stage and when citizens saw their visions translated into research priorities, not only they felt proud to see that their visions were taken into consideration but they also validated the work of the experts by ranking them in a top 10. Across the partners countries, the top 10 EU research priorities also had many similarities with the top 10 selected at their national list. This was also documented in the policy brief number 5 (please refer to the CASI website www.casi2020.eu), citizens and experts despite their different knowledge and motives, tend to have commentary views if not similar. Based on feedbacks received after the stakeholders went through the process, both recognised that the input of other stakeholders' group was valuable and needed, in order to reach a more representative outcome.

Multi-stakeholder engagement for innovators and the support of intermediaries (refer to D5.1-5.2).

One of the main objectives of CASI was to develop a framework for the assessment and the management of sustainable innovation. Through the CASI project, cases of sustainable innovations across Europe were collected and innovators had the opportunities to try the framework. Through the pilot of more than 40 cases, innovators mentioned several times that too often stakeholders management was not looked at. With the CASI experience they had the opportunity to reflect and receive also feedback from the team but also from others. They have greatly benefited from this valuable engagement of stakeholders. The pilot highlighted that a more systemic management and involvement of stakeholders through the design, development and implementation of sustainable innovations was crucial to their success. Examples of the roadmaps and actions for the piloted cases can be found on the CASI website. Likewise innovators realise that sometimes they were not able to engage with all desirable stakeholders for several reasons. It is often found that different type of stakeholders are not able to dialogue or even interact as they often operate on different arena or have different objectives. Through the CASI project it was interesting to see that through the pilot, the CASI team often played the role of intermediary supporting innovators to understand how other stakeholders could support, influence or improve their innovation (based on the CASI framework). This became even clearer while looking at the roadmaps and actions that innovators could undertake at operational level or strategic level for example. This particular exercise emphasised the need for intermediaries to support and initiate at times, the engagement between for example citizens and policy makers or businesses and researchers, which would improve greatly the assessment and management of sustainable innovations.

Policy Recommendation 2: Mobilisation and The Mutual Learning Action Plan (MMLAP) approach should be applied to "wicked problems" that cut across more than one societal challenge

The mutual learning seminars (Task 3.2, D3.2)

Between January and March 2016, a total of 12 national Mutual Learning Seminars (MLS's) were carried out with the objectives of i) raising awareness on the issue of sustainable innovation (SI) and sharing the knowledge of the Mobilisation and Mutual Learning Action Plan (MMLAP) partners and independent subject-matter-experts in the field of sustainability and SI with different groups of participating stakeholders; ii) reaching a working agreement on the concept of SI as promoted by CASI; and iii) generating new knowledge through the interaction and discussions among the different stakeholders' groups on the different aspects of sustainability and the stakeholders' positions on the issue.

By and large, participants noted the usefulness and need for wider public participation at different stages of the decision-making process (especially in the domain of SI). Involving several stakeholders in such activities was deemed widely beneficial given that it could help the development of ideas that have been formulated with consideration to numerous viewpoints and allowances made for the overall benefit of different stakeholders.

With regard to the CASI-F tool, the MMLAP approach and the stakeholder feedbacks received, lead to concrete improvements, namely to a more concrete description of the frame of usage.

Example of SI that incorporates different societal challenges into their innovation

Fairphone is a social and product innovation that aims to address social and environmental detrimental impacts of current consumer electronics supply chains such as the use of conflict minerals, affordable production at the cost of poor working conditions and planned obsolescence. Fairphone started in 2010 as a project of Waag Society, Action Aid and Schrijf-Schrijf to raise awareness about conflict minerals in electronics and the wars that they fuel and fund in the Democratic Republic of Congo. In 2013, they established an independent social enterprise to design and produce a 'fair' smartphone. The Fairphone is a storytelling device to reconnect consumers to their products and to uncover the story behind the sourcing, production, distribution and recycling of electronics. This sustainable innovation cuts across different societal challenges such as the depletion of resources and raw materials, environmental footprint and life cycle assessment of electronics, in addition to social protection and working conditions of people working in the value chain of smart phone production. The dialogue set up with innovators such as Fairphone in CASI, in the context of developing a framework for assessing and managing sustainable innovations, demonstrates that innovation policy should acknowledge that sustainable innovations cut across multiple socio-environmental challenges.

Examples of citizen visions cutting across different societal challenges (D3.3)

- Sustainable agriculture: Sustainable agriculture is an agriculture using resources in such way that future generations will not face disadvantages. It secures the healthy growing and production of food for the EU's population. Other aspects are the preservation of the countryside and the improvement of animal welfare. Citizens discussed challenges in the environmental domain and at the same time human health related issues (both for farmers and consumers) and business related issues.
- Distributive justice of essential resources: The just distribution of resources considered essentials of life, supplying basic needs, is a human right. The access to and use of e.g. water, healthy nutrition, housing, clothing, energy, education and knowledge, mobility, health care (both physical and mental), financial minimal living standards. These resources must not be supplied by profit-oriented companies.

Evidence Base - Sustainable innovation strategies

Policy Recommendation 3: Promotion and support for the diffusion of Sustainable Innovations by local, national, and EU level Government bodies can significantly contribute to a transition towards sustainable futures

CASI-F pilot results

The CASI Framework (CASI-F) was developed in order to support the management and assessment of Sustainable Innovations. A draft version of the framework was produced by the partners and it was piloted by partners and Innovators based on specific case studies that were mapped. The main aim of the pilot of the CASI-F was for Innovators to try the CASI-F and understand how this could help improve the sustainability of their innovations. Innovators were able to look at the different critical issues that were highlighted in their case studies and generated sets of actions detailed in stakeholders specific roadmaps.

PART –A

Once CASI-F pilots were completed by partners, an initial analysis was carried out to review the actions and place them, where possible, **into a cluster referred to meta actions.** These meta actions were quite expansive to accommodate the way that actions had been recorded. For example, awareness rising housed a breath of actions, amongst them production and distribution of leaflets, talks, events etc. When there was cross over between the meta action groups then the aspect perceived as the most important to the innovator, from the way the action was recorded, was taken as the most dominant.

Of the 280 meta actions across all the management levels and stakeholder groups, 147 (53%) were to be found in 3 meta actions:

- Establish contacts, collaborations/co-operations, partnerships, 58 (21%),
- Awareness raising through various channels 52 (19%)
- Business Development Strategies 37 (13%).
- Changing the regulatory and tax system 21 and Government plan and strategies 25 (adding to 15%)

Actions at the government level were quite diverse as the stakeholder is clearly perceived as a means by which **regulatory and tax changes can be made**, incentives or finance made available and interventions made within the marketplace – all areas that are seen as potential routes to make the SI more viable when applied in a beneficial way. However, it was also clear that there needed to be long term commitment and consistency in **government plans and policies to allow innovators to confidently proceed with SIs**. Whilst there was some cross over in actions, for example finance and funding were mentioned at all levels, certain actions were more prevalent at one management level than another – for example the operational level was seen as a conduit to promote and raise awareness of SI topic areas and to support training to spread knowledge – such as that of sustainability.

PART –B

The data utilized from this section comes from the pilot action plan, part B of the pilot process. In this section innovators were asked to select 2-4 actions and revise them into a SMART format. Whilst the meta action type does not change from Part A, the innovator reduced the actions down to those that were most likely to aid progressing the SI.

Whilst the same 3 meta clusters attracted the most of the actions (36, which represent 69%), the distribution was slightly changed against that of part A. Although establishing contacts, collaborations and partnerships was still the most important activity, business development strategies became of greater importance to the innovator:

- Establish contacts, collaborations/co-operations and partnerships 14 (27%),
- Business development strategies/modelling/processes/tools 13 (25%),
- Awareness rising through various channels 9 (17%).

Only 8 of the actions in part A were carried forward in part B of the pilot and consolidated into 5 meta actions across all 3 management levels. However, the actions fell into a very logical distribution with the strategic management level attracting the actions relating to government plans and strategies at the EU or national level, overarching business development strategies actions that could only be gained by the changing of regulatory systems. At the operational level, awareness raising, business development strategies were focused more at a market level and establishment of contacts and collaborations locally to achieve a working group. **At the tactical management level, the government plans, and changing the regulatory and tax system targeted local / regional government for assistance.**

Policy recommendation 4: Sustainable innovation assessment and management can be improved by the use of a framework that seeks responses to critical issues through the engagement of government, business, civil society, and research and education actors

CASI-F has been conceived as a set of protocols (interconnected methods) and tools (interconnected web-based applications) to support the assessment and management of sustainable innovation. CASI-F is not meant to compete with or replace other sustainability assessments but to support multi-level and multi-stakeholder decision-making related to sustainability-oriented innovations, policies and aspirations. In practical terms, "CASI-F consists of five interconnected sets of protocols and tools": (Popper et al, 2017) as illustrated in the CASI sustainability cube:

- for sustainability relevance and scanning;
- for multi-criteria analysis and assessment;
- for critical issue analysis and assessment;
- for multi-level advice management;
- for action roadmaps management.

CASI Sustainability Cube

Sources: Popper, R. et al. (2017).

References

- Popper, R., Velasco, G. and Popper, M. (2017). CASI-F: Common Framework for the Assessment and Management of Sustainable Innovation, CASI project report. Deliverable 6.2.

- Popper, R. and Velasco, G. (Eds) (2017) Sustainable Innovation Policy Advice. CASI projectreport. Deliverable 7.2.

Policy recommendation 5: New policy agendas for sustainable innovation could be better informed by innovation actors' current priorities and their future expectations

An analysis-clustering sequential process has supported the identification of 10 SI policy agendas, i.e. recommended research and innovation areas that should be supported and promoted, as follows (Popper M. et al, 2017; Popper R. et al, 2016):

a) Strengthening eco-community empathy and crowd-funded development.
b) Developing sustainable urban and rural infrastructures for the bioeconomy.
c) Deploying responsible environmental and resource-efficiency strategies.
d) Creating sustainable bio-fuel and renewable energy solutions.
e) Promoting foresight for sustainability governance and intelligence.
f) Advancing recycling and circular use of waste and raw materials.
g) Embedding sustainability in cultural and holistic education models.
h) Fostering eco-local-agriculture and bio-resources efficiency.
i) Implementing sustainable transport and smart mobility innovations.
j) Dealing with climate issues and managing greenhouse gas emissions.

CASI 4-Helix-based R&I Policy Agendas for SI		H2020 priorities		
1	Strengthening eco-community empathy and crowd-funded development	2 CA	3 RE	5
		0 RM	0 EN	
2	Developing sustainable urban and rural infrastructures for the bioeconomy	3 CA	2 RE	5
		0 RM	0 EN	
3	Deploying responsible environmental and resource-efficiency strategies	3 CA	3 RE	11
		3 RM	2 EN	
4	Creating sustainable bio-fuel and renewable energy solutions	1 CA	2 RE	9
		6 RM	1 EN	
5	Promoting foresight for sustainability governance and intelligence	5 CA	1 RE	12
		2 RM	4 EN	
6	Advancing recycling and circular use of waste and raw materials	2 CA	2 RE	8
		4 RM	0 EN	
7	Embedding sustainability in cultural and holistic education models	3 CA	1 RE	6
		1 RM	1 EN	
8	Fostering eco-local-agriculture and bio-resources efficiency	2 CA	2 RE	5
		0 RM	1 EN	
9	Implementing sustainable transport and smart mobility innovations	2 CA	2 RE	4
		0 RM	0 EN	
10	Dealing with climate issues and managing greenhouse gas emissions	4 CA	0 RE	4
		0 RM	0 EN	
Total		39% CA	26% RE	22
		23% RM	13% EN	

Note: H2020 related priority areas are indicated as follow: Climate Action (CA); Resource Efficiency (RE); Raw Materials (RM) and Environment (EN).

The connections of the new R&I Policy Agendas with H2020, as described in the table, reveal that there are more discrepancies than alignments between the new agendas (emerging from SI actors' practical objectives) and the existing four priorities on the pillars of H2020 SC5, i.e. climate action, environment, resource efficiency and raw materials. As for discrepancies, we find the lowest overlapping rates on agendas 1, 2, 7, 8, 9, 10, which may be considered a weak-up call to policy makers to putting into place, among others, more effective eco-community oriented policies, developing bioeconomy related infrastructures, or more intensively fostering sustainable transport and mobility solutions. The table only shows high alignment on those sustainable innovations that demand responsible strategies (i.e. *Deploying responsible environmental and resource-efficiency strategies*) and those policy actions that include long-term oriented instruments of governance (i.e. *Promoting foresight for sustainability governance and intelligence*). In this respect, the combination of both agendas, namely fostering responsible innovation through the organization of participatory and forward-looking discussions, should be helpful to engage experts, public, and other legitimated actors in the formulation of more effective, impactful and democratic SI policy initiatives.

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Policy recommendation 6: New infrastructures and support strategies for social innovations are required.

"Social innovation is a new combination of social practices in certain areas of action or social contexts with the goal of better satisfying or answering social needs and problems than is possible on the basis of existing practices. (…) In this sense social innovation encompass new practices (concepts, policy instruments, new forms of cooperation and organization) methods, processes and regulations that are developed and/or adopted by citizens, customers, politicians etc. in order to meet social demands and to resolve societal challenges in a better way than existing practices" (Howaldt, J. et al. 2014: p. 3).

Social innovations differ significantly from technological innovations. They aim at the intentional change of social practices and have the potential to be used in areas with different economic and societal contexts (Howaldt, Kopp & Schwarz, 2015); e.g. the sharing economy. In recent years, their potential for contributing to a more sustainable future have become widely recognized (Schultze et al., 2015). Although social innovations have also received an increasingly central position in EU and national research funding, support and management structures for sustainable innovations are still mainly directed at technical innovations.

The importance of social innovation for sustainability results also of a structural lack of technical innovation: Even if the resource and energy efficiency for example of cars or housing is increased by technical innovation rebound effects destroy the saving of resources and energy. People drive more efficiently, but buy bigger cars or live in larger housing. This indicates, that attitudes and social practices need to change.

The empirical work with piloted initiatives for sustainable innovations and workshops with different stakeholder within the CASI project shows that the management of sustainable innovation can benefit from the inclusion of different stakeholder groups (D8.1, D6.1). Social innovations include, and have an impact on, different types of stakeholders and levels of action. As social innovations, more than technological innovations, aim at a conscious change of behaviour and social practices, these innovations require a different management and support structure.

In CASI work package 5 and its consequent deliverables (D5.1 and D5.2), the difference between the management of social and technological innovation came to the fore nicely. Deliverable 5.1 focused on technological innovation, D5.2 focused on social innovation. The applied method in both analyses was the same. The management process of the CASI-F pilots (selected pilot projects for testing the management framework and process) was analysed and 1000+ actions were collected. D5.1 analysed the results for technological innovation and clustered the actions identified by the innovator into meta actions; D 5.2 did the same for social innovations. Although some of the identified meta actions were very similar (e.g. the need to raise awareness about the innovation or the need to overcome legal and/or administrative hurdles), a number of meta actions were specific for social innovations.

Innovators working on more social rather than technological innovations, for instance, mentioned more regularly that there is a need for support infrastructures including various programmes or funding opportunities. In the case of technological innovations, funding is also important, but there funding usually takes the shape of investment.

Social innovations aim at changing practices, therefore, support programmes need to be set up differently. Support for technological innovations is often based on investments in new technologies which usually can be patented and can generate returns through sales. Social innovations often cannot be commercialized as they do not aim at introducing new products, but aim at changing practices. Financial support can therefore not be based on investments waiting to bring returns, but they have to rely on alternative sponsorship models. Besides, financial support, social innovations also require other kinds of support, including other tools (for instance to raise awareness or to overcome barriers in their implementation) and alternative business models (i.e. less based on profit maximization and investment and more on fund raising and sponsorship contracts). A second important difference regards cross-sector collaboration, especially together with civil society. Establishing contact, collaborations/co-operations, and partnerships was also mentioned as relevant meta action for technological innovations. But besides this general cross-sectoral collaboration, the top meta actions for social innovations also included ‘encouraging civil engagement’ and ‘empowerment’.

Social innovations have a different dynamic; they have a different focus, different approach and involve different stakeholders (or at least they involve stakeholders differently). It is therefore evident that support strategies for social innovations have to differ from those in existence for technological innovations and different and new support programmes and strategies have to be developed.

References:

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Evidence Base for Citizen Participation in sustainable innovation

The citizen participation method used in CASI builds on the CIVISTI method[3] and involved three key steps and activities:

1) The first Citizen Panel Meetings (CPM1), which produced 50 citizen visions for a more sustainable future.

2) An expert workshop, at which experts translated half of the visions into research priorities and ranked them.

3) The second Citizen Panel Meetings (CPM2), where citizens validated and ranked the research priorities produced at the expert workshop.

Both rounds of citizen panel meetings (CPMs) were organised in the 12 CASI partner countries: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and the United Kingdom. All partners followed the method, training and guidelines developed by the Danish Board of Technology, to ensure a uniform process in all countries, allowing for comparison of results.

In all countries, citizens were recruited with the purpose of reflecting the demographic diversity in their country with regards to age, gender, education, occupation and geographical zone of residency.

Policy recommendation 7: Identify shared interests amongst European citizens and institutionalize the inclusion of citizens' interests in research and policy agendas

The citizen participation process resulted into two lists of prioritised research priorities: one of the citizens in each of the 12 countries and one for the experts. Comparing the rankings in these two lists we found that the citizens' rankings in the participating countries are very similar but differ greatly from those of the experts based on an analysis of Spearman's rank correlation:

- The association between European and national citizen rankings on research priorities was strong or moderate for 9 out of 12 countries (4 countries: rho ≥.646, n=27,p<.001; 5 countries: rho ≥.460, N=27, p<.001 [p<.05 for one country])
- The association between European expert and citizen rankings on research priorities could not be considered statistically significant for any country (rho =.145, n=27, p=.47).
- The association between national citizen and expert/stakeholder rankings on research priorities could not be considered statistically significant for any country at the p<.05 level.

This means that the policy makers should aim to identify shared interests amongst European citizens as their interests appear to be similar based on this analysis. In addition, in order to take into consideration something novel, the citizens' interest should be included in research and policy agendas as they produce something different than the experts' prioritisations.

[3]http://www.civisti.org/

Policy recommendation 8: Make use of citizen participation in order to draft innovative research agendas and policies for moving toward a more sustainable future

The effective utilisation of citizen engagement-based methodologies in the elaboration of policy advice requires that input generated by citizen-led activities be critically analysed and put into perspective. That was aptly demonstrated by the way that the particularly engagement method was used within the CASI project, which helped uncover insights that could easily be considered into the formulation of priorities in new calls for proposals. This is valid both in terms of thematical scope definition, as well as in terms of methodological prescription – how to encourage citizen engagement throughout H2020 calls, how to define its relevance within a coherent methodological framework, and how to shape expectations for impact. This was a direct result of the Mutual Mobilisation and Learning approach.

It is very important to consider why those research agendas are in fact valid and can be considered credible. The way in which participating citizens are recruited strives to ensure sufficient diversity, so as to assemble people with different backgrounds and experiences and encourage different ideas and discussion thereof around the table. Even though this is by no means a representative setup, the number of ideas generated in the end, especially since seen across all countries involved, is sufficiently rich as grounds for further contextualisation by the involved experts. Additionally, since this is a multi-step process, in which the initially generated ideas were being iteratively transformed before they gained their final shape in the form of research priorities, there is certainty that such research priorities are sufficiently valid. This was also confirmed by the application of statistical methods to the observed differences in how citizens and experts ranked those priorities' importance differently (see evidence base for recommendation 7), highlighting both similarities and differences in how a certain priority is perceived.

Citizens and experts were asked to apply different criteria in order to compile the final ranking. Thus each group could evaluate independently each of the priorities, based on their own competence and aspiration. With respect to the visions, it was obvious that even though the thematic frame of the citizen workshops was clearly identified as "sustainability and sustainable future", the resultant visions were much more inclusive than that. For many of the citizens, the notion of sustainability seemed to highlight convergence among a variety of issues, including education, healthcare, social and environmental justice, food safety, perhaps reiterating that sustainability is understood more broadly in society.

Therefore the policy relevance of this is very significant and can well be rooted in a solid base of co-created knowledge. Policy makers thus have a strong foundation on which to base specific measures.

Policy recommendation 9: More research should be directed at finding solutions that will empower citizens to help bring about a more sustainable future.

Results from the 12 citizen panels were merged, resulting in a transnational Top-10 list of the citizens preferred research priorities.

Citizens' Top-10 research priorities (abbreviated version[4])

1. Support local/regional agricultural production, distribution and consumption systems
   Research should be done on how to encourage communities' local producers and suppliers to support each other as well as on how to support the creation of less polluting, local and regional alternative market production, distribution and consumption. Furthermore, research should examine how to ensure that local production is prioritised, how it could substitute part of the super market supply, how to encourage local communities to identify their local ethnical, traditional and seasonal products and dishes, and, moreover, how to develop tools to create functioning business models, quality and labelling.

   Two specific research suggestions:

   Map the existing or emerging cases of community supported agriculture (CSA), and learn from their experiences.

   Map and understand the role of the municipalities, such as in protecting local water resources, and how that links with local agricultural form.

2. Holistic Education for a Sustainable Future
   The research priority focuses on how to identify and elaborate the skill-set that is needed for 'eco-citizenship'. Research should be done on how to identify and elaborate the skill-set that is needed for 'eco-citizenship'. Further research should be directed at exploring the differences between types of educational systems in whether, and how, they promote eco-citizenship. Also, research should explore which characteristics of educational systems are relevant in this regard, and how the educational systems can adapt to a more holistic mind-set and, finally, how educational systems are perceived and valued in different countries.

3. Support people to become producers of renewable energy
   The research priority focuses on how to support people to become producers of renewable energy.

   Further research should be carried out on the possibilities of mechanisms to increase bargaining power of small-scale energy producers, and how to give them more market power.

4. Sustainable construction of buildings
   The research priority focuses on how to build and retrofit in innovative carbon-neutral ways. To this end, research should be done to identify materials that last longer, or are made of

[4] For a full version, see Bedsted et.al. (2016): "European Citizens' Visions for a Sustainable EU Future. Research Priorities and Policy Advice. CASI Project report". Deliverable 3.3.

recyclable materials. There is primarily a need for business models, incentives and understandings of what can ensure large-scale changes in the building sector. Further, there is a need for continued development of new technologies and materials.

Research should be directed at how public procurement can be a driver in this process, what kind of new innovative service designs can spur further dissemination, and how to minimise all environmental costs.

5. Sustainable transformation of existing traffic infrastructures in cities

Research priorities should ensure comparative studies of local cases of city planning targeting traffic planning, infrastructures and mobility modes. Key questions include: How can a city accomplish changes in this field, and do ideas for a transformation of traffic infrastructure exist? Solutions exist; however, they depend on political will for their implementation.

6. New working models – New economic models

The research priority focuses on new economic models of value creation as well as formal and informal economies. One could look at existing companies or cases with reduced working time, and look at the social, economic and environmental impacts and their transferability.

Interactions between regulation, labour market, social infrastructure and the public sector should be examined. Similarly, it should be explored who would be interested in ½-day labour. Development of alternative economic models and a better understanding of their dynamics and underlying discourses are required.

7. Innovate agriculture: The sustainability option

Research priorities should focus on a comparative study of experiences with public regulation to increase organic food production and consumption and, furthermore, on experiences with changes in household diets, focusing on less consumption of animal products.

Research should be directed towards the question of how to create new green jobs. Also, the subsidies that are reforming the CAP should be studied as well as how to increase the share of organic farms in the EU.

8. More green in cities

Additional research should be done on the best cases of making cities greener, and on the effects on urban liveability and living conditions. Moreover, research should focus on making comprehensive planning-instruments to increase the share of urban green areas, and in this respect build on analysis of best cases or practices.

9. Understand and implement sustainable electronics

The research priority focuses on the application of the concept of circular economy to the electronics industry, for instance, how can leasing as a new consumption model and new supply-chain monitoring systems be set up to assess the social and environmental impact of production. Research should focus on new models for the application of circular economy and the different value chains in the production of electronics.

10. Fair and participatory access to limited resources

Research should focus on the excuses of different actors for not acting on the problems of limited resources. Participatory scenario-building should be done. All major intended and unintended consequences should be studied. Concept analysis should be done. We need more information about who are the gatekeepers of change and drivers with veto-powers.

ANNEX 2 – Summaries

Annex 2 includes summaries from three major CASI activities:

1. A series of policy dialogue workshops in 12 European countries aiming to engage decision makers, researchers and stakeholders in deliberations about societal engagement in sustainable innovation and how to improve it.
2. A European conference on societal engagement in sustainable innovation.
3. Policy Watch activities in the CASI project, including two annual policy reports and over 100 policy briefs at European Union and national levels.

Summary of results from local and national policy dialogue workshops on societal engagement in sustainable innovation

One of the mutual learning activities carried out in CASI was a series of policy dialogue workshops aiming to engage decision makers, researchers and stakeholders in deliberations about societal engagement in sustainable innovation and how to improve it. The national and local government level dialogues (13 in total) took place in February 2016 across 12 countries, and included a varied group of stakeholders. Scientists, interest groups, industry, CSO's, public management, national and regional policy makers have contributed to the results produced during the workshops. This summary compares the barriers and recommendations identified and developed at the workshops.

Numerous barriers for public engagement in sustainable innovation were identified, some of which were highlighted in several workshops across Europe:

Governance
Several workshop participants pointed to the need for changes in legislation, political support, funding mechanisms, and general institutionalisation in support of public engagement in sustainable innovation.

Who and how to engage
Many workshop participants pointed to challenge of motivating and including both citizens and the right stakeholders; and to the lack of practical understanding of how to choose and implement participatory methods.

Resources
Many participants saw the lack of time and resources as a challenge.

Will to engage
Resistance to change, lack of transparency, and a reluctance among decision makers to open up decision making to more societal actors was seen by many participants as a challenge.

Recommendations for how to stimulate societal engagement in sustainable innovation

The participants at all 13 policy workshops were given the same task, namely to identify ways to stimulate societal engagement in sustainable innovation. Even though the starting point and context differed from workshop to workshop (some focused on a specific issue while others were more general in scope) and the profile of participants varied from workshop to workshop, cross-cutting patterns in the issues addressed can be of interest:

Governance
Discussions at the workshops very much focused on governance mechanisms to institutionalise participation and make sure that the notion of involvement is embedded into the way government administrations work.

Legislation, culture and bureaucracy

Recommendations developed in several workshops addressed the need to make demands in legislation for the practice of societal engagement in sustainable innovation, while in others the promotion of a "culture of participation" was seen as the way forward. In some workshops, participants recommended to put efforts into remove bureaucracy impeding the free use of and experimentation with participatory methods. Long-term strategies and systemic changes was recommended in some workshops as well, emphasising the awareness among many participants that the implementation of more societal engagement is not a simple task.

Funding

Another governance tool highlighted in some of the workshops was public funding and the ways in which it could support public engagement in sustainable development, e.g. by dedicating funding streams for this specific purpose.

Strengthen societal engagement in sustainable innovation

The workshop participants clearly express a desire to involve citizens, users, stakeholders and experts to a higher degree and in various ways. That is quite evident from the many ideas involving public participation in innovation processes.

Societal actors

Most workshops developed recommendations pointing to the need to involve more societal actors in sustainable innovation processes. While some focused more on involving the young, citizens, users, civil society, businesses, or experts, they all shared the persuasion that there is much to be done in terms of involving larger numbers and a larger variety of societal actors.

Citizen empowerment

In addition to the call for inviting citizens to contribute to innovation processes in their capacity of being users or voters, several workshops recommended that citizens be empowered to actively seek the participation in such processes themselves, e.g. through coaching and education.

Engagement processes

In several workshops, recommendations were given to ensure that societal actors were engaged throughout the whole innovation process. Some also pointed to the need to experiment with new methods.

Capacity building

There was a clear acknowledgement in the workshops that the use and implementation of participatory methods require skills, experience and resources.

Training and sharing

Recommendations from several workshops pointed to the need for training public administrations and other decision makers in how to apply participatory methods and to share best practices. The need to plan such processes well was highlighted and some recommendations pointed to the need for neutral and specialised facilitators or mediators between the different societal actors engaged.

Reference: Bedsted, B., Clemmensen, A., Ottosen, L. (2017). *Local and national reports on policy dialogues*. Deliverable 8.1. CASI Project.

Outcomes and results from European conference on public engagement in sustainable innovation

The CASI Project co-organised a policy conference with the PE2020 project in November 2016, in Brussels. Following are some key messages from that conference, and further details are available in the Conference Report[5].

- Current engagement models are insufficient in that they are not supported by policies that aim to bring science and science-bound issues to citizens in a convenient and comprehensible way.

- There is strong impetus towards the inclusion of solutions that encourage the expansion of the public engagement paradigm to also include very practical ways to bring knowledge to the people in an effort to stimulate not only general awareness but greater understanding. This is especially important, if science is to get closer to the people.

- Continuing faliure to consider what citizens have to say could affect sustainability in a very direct way. Citizens would grow increasingly distanced from the complex challenges affecting their lives that are often themselves subject to scientific study, or are the result of rapid technological advances.

- In the long term, public engagement could contribute to improved solutions to sustainability and other societal challenges. This was as well reiterated during the conference as support for the evolution in scientific citizenship concept, which is particularly apt to more inclusive sustainability policy and governance.

- Integrating citizen input at various research stages enables the introduction of novel perspectives that are not rooted in scientific paradigms, but are nonetheless valid. This contributes further to the enhancement of researchers' accountability, and in turn increases trust in the science system.

[5] Asenova, D. and Kozarev, V. (2017). *Public Engagement for Research, Practice and Policy Conference Report*. CASI Deliverable 8.2.

Summary of Policy Watch outcomes

Policy Watch activities in the CASI project have contributed to two annual policy reports and over 100 policy briefs at European Union and national levels. This section summarizes key outcomes from the reports and the briefs.

The **first annual policy report** positioned the CASI project in a wider policy context (Damianova et al. 2015). The report observed that misalignments between policy developments across countries limited the emergence of potential policy agendas at national and local levels. It noted that a growing number of people acknowledge that our current linear, consumption-oriented and waste-dumping system should make a transition towards a circular, sustainable and life-improving system (e.g. Repo et al., 2015).

The civil society and its change in behaviour was not seen just the target of innovations, but might also be a valuable source of innovation. Despite the growing trend and increasing popularity of public engagement, the report noted that there were still barriers to overcome to fully exploit its potential for sustainable innovation (SI), for gaining support for policy measures and in society participating for the change of the consumer-production system.

Finally, the report stressed that more research and experimentation was necessary to better comprehend the nature, barriers, drivers and diffusion of sustainable innovations across Europe. It foresaw that the CASI project could shed light on the importance of sustainability and its consideration on policy levels by improving understanding of both social and technological aspects of sustainable innovations.

The **second annual policy report** provided sustainable innovation policy advice particularly through the in-project developed framework of CASI-F (Popper and Velasco, 2016). CASI-F facilitates the assessment and management of sustainable innovations by drawing on the analysis of the critical issues linked to SI initiatives, policies, and citizens' aspirations. The report noted that the development of CASI-F had already enabled the formulation of SI relevant and evidence-based advice that was brought forth as policy messages.

The first message highlighted the potential of conceptual and methodological frameworks for assessing and managing sustainable innovation and, in particular, the benefits of exploiting the versatility of CASI-F. Secondly, the report suggested that policy makers systematically analyse and make sense of the drivers of change affecting different types of SI stakeholders (government, business, civil society, and research & education). A broad concept of innovation accounting for product, service, social, organisational, governance, system and marketing innovations is also promoted.

Concerning citizen and expert participation in SI, a third key message related to the benefits of promoting public engagement for improving SI impacts at policy and societal level. It was outlined that this engagement implies the recognition that the major challenge of sustainability today resides in the systemic re-orientation of society and the economy. Fourthly, and with respect to the assessment of SI policies, the report emphasized the benefits of considering a wide variety of stakeholders when applying SI policy.

Relating to SI management, a fifth message in the report emphasized the benefits of removing barriers to SI, promoting collaboration between SI actors, and supporting the acceptance of SI actors on business and policy agendas. Finally, the report argued for more intensive public engagement in SI research. When this research aims to support policy action, public engagement would help to better match citizens' expectations with current or upcoming SI policies. Involving citizens in policy making may also contribute to address social issues linked to SI more efficiently.

EU-level and national level policy briefs addressed a number of issues: smart cities, eco-innovation in environmental policy context, Europe 2020 strategy, energy poverty, crowdfunding, societal challenges of climate change, etc. In early stages of the project, Policy Watch monitored developments in the EU-28 countries relating to the topic of SI (bullets 1-7 and 9 below). In latter stages, it has connected CASI contributions to policy developments (bullets 8 and 10-12).

Each issue of the early stage policy briefs reflected policy developments from the point of view of sustainable innovation and public participation. Sustainable innovation was seen as the main driver for smart cities, and sustainability to be considered in eco-innovation as a bridge between innovation and the market. Crowdfunding was approached as an emerging alternative for SI financing, and SI as well as sharing economy represented a new source of growth for the Europe 2020 strategy.

Public participation was a key basis for crowdfunding and sharing economy, but was considered essential also for the uptake of eco-innovations. Public participation was acknowledged in smart city policies but insufficiently. In the Europe 2020 strategy, public participation was considered to deserve more attention even though it accounted for social impacts.

The project has published 12 EU-level policy briefs and 103 national level policy briefs by the end of 2016. Each issue addressed at the national level was first introduced at the EU level (Repo et al. 2017). The policy briefs include a dedicated section of recommendations for policy makers that address different stakeholders and different levels of policies. Policy briefs have been published for the 12 countries representing partner of the CASI project (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Italy, Poland, Portugal, Slovenia and United Kingdom) and the 16 countries representing correspondents of the CASI-project (Cyprus, Estonia, France, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Romania, Slovakia, Spain and Sweden).

The policy briefs have reached a large and interested audience, which can be seen in the amount of downloads from the CASI website: 24371 downloads by the end of January, 2017. The full list of policy brief issues is presented at the end of this section.

Policy brief issues

1. Can smart cities be sustainable innovation actors? (EU and national level)
2. The eco-innovation action plan in an environmental policy context (EU and national level)
3. Public procurement of innovation & pre-commercial procurement in the context of environmental impact and societal transformation (EU level)
4. Europe 2020: towards growth and resource efficiency (EU and national level)

5. Sustainability in EU environmental policies (EU level)
6. Crowdfunding in sustainable innovation (EU and national level)
7. Energy poverty (EU level)
8. Resource efficiency and sustainable lifestyles (EU and national level)
9. Is sharing economy a new disruptive service model provider and challenge for which Europe is unready for? (EU level)
10. Sustainable innovation across key sectors and societal challenge 5. An evidence based analysis (EU and national level)
11. CASI is introducing policy options for responsible research, sustainability and innovation (EU level)
12. Societal challenges of climate change (EU level)

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