Public Engagement Innovations for Horizon 2020

Summary Report of WP3

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The PE2020 Project

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Project consortium:

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The PE2020 project

PE2020 will identify, analyse and refine innovative public engagement (PE) tools and instruments for dynamic governance in the field of Science in Society (SiS). PE2020 analyses the PE tools and instruments through a systemic and contextual perspective, and contributes to the potential and transferability of new governance innovations. PE2020 will create new knowledge of the status quo and trends in the field of public engagement in science, refine innovative PE tools and instruments and propose new ones.

The project will do this by (1) further developing a conceptual model that provides a systemic perspective of the dynamics of public and stakeholder engagement; (2) creating an updated inventory of current and prospective European PE innovations; (3) context-tailoring and piloting best practice PE processes related to the grand challenges of the Horizon 2020 and (4) developing an accessible net-based PE design toolkit that helps identify, evaluate and successfully transfer innovative PE practices among European countries.

New tools and instruments for public and societal engagement are necessary to boost the quality, capacity and legitimacy of European STI governance and to solve the looming problems related to the grand societal challenges of the Horizon 2020. In order to ensure practical relevance, the project will work through intensive co-operation between researchers and science policy actors. PE2020 will expand the capacity of European and national science policy actors to integrate better societal engagement by providing an easy access to new PE tools and instruments, to be included in the requirements and implementation of research in Horizon 2020 and beyond.

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1. Introduction

The goal of the PE2020 Public Engagement Innovations for Horizon 2020 project was to identify, analyse and refine innovative public engagement (PE) tools and instruments for dynamic governance in the activities and areas of Science in Society. In this framework, the overall aims of WP3 were

(1) to test and refine novel public engagement tools and processes in the context of research programmes closely linked to the Horizon 2020 challenges,
(2) to evaluate the feasibility of using the tools and to test them in the pilot initiatives (for other countries and for other societal challenges), and
(3) to gain an understanding of the relevance of contextual factors in designing PE processes and to provide input for the toolkit which will be developed in WP4.

Work Package three (WP3) had as its specific objective to design and implement six pilot projects based on the use of innovative PE processes. Seven projects (or 'pilot initiatives') were arranged in the context of on-going research programmes in Finland and Italy. The term 'pilot initiative' was used in WP3 to refer to the actual public engagement initiatives that were conducted in WP3. This helped us to separate the initiatives from the research contexts in which the piloting activities took place. In the following sections, we present the work undertaken for WP3 in PE2020, and the seven pilot initiatives that were implemented during WP3 in the PE2020 study.

The pilot initiatives in PE2020 are collectively linked to the seven 'Societal Challenges' of the European Commission. To ensure that there is an EU-wide dimension and relevance, three of the pilot initiatives have been conducted in the context of EU joint research programmes, European innovation partnerships or other types of research and innovation activities with a transnational dimension.

More specifically, the objectives of WP3 were

- to test and refine innovative PE tools and processes in research programme contexts,
- to evaluate the feasibility of using such tools in other countries, and
- to gain further understanding of the relevance of contextual factors in designing PE processes.

The seven pilot initiatives have been co-designed and implemented with the targeted research projects and programmes funded by national funding agencies. It was deemed important that testing and introducing new PE processes be adapted to the preconditions of the target programmes. However, it was soon realised that such a transfer process would be far from straightforward. On-going research projects and programmes had their own priorities, expectations, quality criteria and operating cultures. All the selected pilot initiatives were externally funded and as such had to adhere to the quality criteria set by the funding bodies, in addition to scientific criteria and institutional requirements.

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The seven pilot initiatives, the country where they were carried out, and the partner Programme or entity are listed in Table 1 below.

Pilot initiative	**Country**	**Hosting programme**
1. Promoting science-society dialogue with blogs among early-career researchers on Baltic Sea research	Finland	BONUS Programme
2. Living lab of Global Change	Finland	Future Earth Finland – National Committee for Global Change Research
3. Joint Programming Initiative (JPI) More Years, Better Lives (MYBL)	Finland	More Years, Better Lives Joint Programme Initiative
4. Societal Interaction of Science in Strategic Research Council funded projects	Finland	Academy of Finland
5. Empowering young researchers on PE in energy efficiency	Italy	ENEA Summer School on Energy Efficiency (ESS)
6. Dialogue Workshop on mobility and transportation	Italy	IDIS-Città della Scienza's "Futuro Remoto" Science Communica-tion Initiative
7. Educating science-society relations and public engagement	Italy	Agorà Scienza's Scientific Summer School

Table 1. The seven pilot initiatives of PE2020, WP3.

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2. Context and methods in Work Package three (WP3)

The pilot initiatives were carried out taking into account contextual requirements, creation of a comparative research perspective, documentation of the pilot initiatives and the experiences to be examined for further evaluation purposes. With regard to the contextual requirements, the aim was to pay attention to the institutional and scholarly environment in which the pilot was conducted. Other requirements were the financial and infrastructural setting of the pilot, the reasoning behind working method choices of the pilot, the process from planning to implementation and follow-up, as well as timeline of the pilot.

[[In practice, the actual form of the intervention taken by PE2020 in the selected research contexts differ in the pilot initiatives depending on the case. The interventions were planned according to the needs of the host organisation in question in order to make sure that the key persons find the intervention appropriate and useful. For each case, the form of intervention was clearly defined beforehand.

The comparative research perspective is described in more detail below in section 3.1 on the analytical framework for studying of the pilot initiatives. A separate report following a standard template was written for each of the seven pilot initiatives. In these reports the pilot initiatives were analysed relating to impact, feedback from the pilot initiative itself, and advantages as well as obstacles. In addition, the methods and context of each pilot initiative were described with a focus on the partner and its situation, the planning and preparation as well as the actual realisation of the pilot initiative. In short, the context of the pilot initiatives was studied broadly with a three-tier structure: 1) issues of substance and interests or needs of the participants, 2) the process from planning through to planning and follow-up, and 3) the working logic on which the PE activities rested. Each report on the pilot initiatives takes into account the specific characteristics of the case, and places special focus on the institutional, environmental and/or structural aspects that either enable or hinder public and societal engagement activities of the project.

As a separate initiative of WP3, the living lab model was tested as a public engagement method. It refers here to the general philosophy behind the collaborative global change network activities. This testing was organised by Future Earth Finland as part of one of the pilot initiatives, in collaboration and with the support of WP3. The living lab was based on the shared spaces created to bring together researchers, stakeholders and public representatives to co-create new services, products and societal infrastructures in real-life settings. This and other methods are reported in the seven separate reports of the pilot initiatives.

WP3 was process-oriented. It worked around the idea of learning within the WP3 itself as well as by following and analysing the learning that took place in each of the pilot initiatives under study. The accumulation of knowledge from earlier phases was used to adjust and implement following phases, thus creating a dynamic process of analysis.

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3. Preparatory discussions with relevant science policy actors

In the first phase of WP3, the aim was to frame and understand the nature of pilots in a way that is both realistic and could contribute to the research done in PE2020 and in Horizon2020 planning. WP3 started the process of choosing pilot initiatives through discussions with relevant science policy actors.

The purpose of the preparatory discussion (task 3.1) was to prepare for the pilot initiatives. The work began with dialogues with the major science policy actors in Finland and Italy, aimed at preparing the ground for co-designing the pilot initiatives.

Examples in the Finnish context were the Finnish Funding Agency for Technology and Innovation (TEKES), the Academy of Finland and the Research and Innovation Council, as well as the Ministry of Economic Affairs and Employment, and the Prime Minister's Office. Such actors provided access to similar bodies abroad and useful information for pilot design and other relevant matters. The discussants hold strong expertise on various aspects of societal impact of research. The first discussions took place in early 2014 with the proponents of BONUS, the Baltic Sea research programme, with the aim of preparing a pilot initiative. There were also preliminary discussions to identify actors for context tailoring workshops in order to design and implement public engagement tools and instruments in local contexts.

In the case of Italy, the choice was that of linking context tailoring workshops with the pilot projects planned. Preliminary meetings were held with Agorà Scienza based in Turin, an Interuniversity Centre that specialises in science communication and public engagement, and ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development). These preparatory discussions provided much-needed information for the design of PE pilot initiatives. However, it should be noted that these discussions were held with experts in science policy, research and innovation funding and other science outreach experts. Therefore, the background data represents the view of specialists in this particular field of study, rather than laymen, the general public or actors that could be considered to be end-users of research knowledge.

Despite the absence of views from the public in the preparatory discussions as a whole, the pilot initiatives were formed in a way that would activate all the participants. They were designed to bring forward positive attitudes about continuing their work to bring research closer to societal actors. During the implementation of the pilot initiatives it became increasingly clear that the outputs of WP3 activities also have much to offer for the development of the scholarly literature on PE, in addition to identifying transferrable best practices. The contribution that is offered by the implementation and analysis of the seven pilot initiatives are directed to the development of conceptual and analytical frameworks. In addition, the focus on seven different types of pilot initiatives have created a solid base for methods to advance the practices of public and societal engagement. The main lessons are presented and discussed sections 6 and 8 on three levels: 1) practical lessons learnt that can be transferred to other projects, 2) policy implications, and 3) concrete policy recommendations.

The role of the public was one of the discussions in pilot initiatives. The question is if PE actors should treat the participators as individuals, or as representatives of stakeholders. The role of the public is discussed in the reports of PE2020 (Rask et al., 2016), for example, but less is written in direct relation to active engagement between scientific communities and the public. Literature is instead more focused on expert-oriented exchanges, and discusses the involvement of the general public (citizen involvement) more from the perspective of targets of knowledge or data acquisition or citizen science. With regard to increasing the

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use of scientific knowledge in various societal processes there are strong arguments in favour of the focus on expert dialogue. The calls to increase direct collaboration and strengthen the role of science in public policy making, business and civil society development have been strong in recent years, and the academic community has responded. In line with these developments, the seven pilot initiatives are also more focused on this form of engagement. From this point of view, the emphasis on expert dialogue during the preparatory phase of the WP3 was justified and the selection of pilot initiatives can be seen to reflect the focus of the current atmosphere.

The main criteria for choosing the pilot initiatives were based on the feasibility of using and testing public engagement tools, and cutting edge PE activity. "Cutting edge character" refers here to their novelty and potential impact in respect to Horizon2020. Feasibility proved to be an important criteria that helped transfer and adopt PE processes to new contexts of research programmes. Cutting edge in the selection of pilot initiatives could mean new types of collaboration between institutions that have not been closely linked as a hybrid model. New types of institutional collaboration and hybrid activities were considered to be particularly interesting themes in the cutting edge criteria. It was considered important for the selected practices to be strongly coupled with the feasibility and functioning character of public engagement activities. The final criteria for pilot initiatives were based on the methodological category of PE2020 Report D2.2:

- hybrid combinations of participatory tools to enhance discussions between researchers (science) and the public (society),
- methodologically novel dialogue-based engagement, participant empowerment and governance contribution,
- inclusive new ways of representation in terms of methods of selecting actors and new combinations of actors,
- potential impact on change, participants' influence and impact on public debate,
- their bearing on the seven societal challenges identified in Horizon 2020, and
- feasibility regarding effective transfer to other contexts and pilot initiatives tested within limited resources.

For the selection of pilot initiatives, the following aspects were also taken into account:

- the international research programmes and prioritisation of research were acknowledged as an interesting context for pilot initiatives
- the pilot initiatives should be chosen on the basis of not only their cutting edge PE activity but also their (expected) feasibility in practice. New types of institutional collaboration and hybrid activities were considered to be particularly interesting themes.
- the limited time devoted to the pilot initiatives and the difficulties in trying to align the schedules of the PE2020 project and the partners
- the importance of keeping in mind the limited resources available for the pilot projects.

3.1. Analytical framework for the comparison of pilot initiatives

The task to identify potentially transferable practices was based on scanning the most innovative and suitable PE practices from among those identified in WP1. This was done in co-operation within the contexts of the pilot initiatives (identified in Task 3.1). The feasibility and cutting edge criteria were expected to co-exist in

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the pilot initiatives. The initiatives were built on designing actions that are interactive, motivate all parties concerned and serve their needs without jeopardising the scientific premises of the project.

An additional criterion for the selection of the practices (and pilots) was initially the possibility of gaining comparative insights to be gained from examining at least two different country contexts (e.g. marine research programmes in the Baltic and Mediterranean contexts). It was further deemed important for the project to communicate the plan for organising the pilot initiatives before moving ahead. During the commencing phase of the pilot initiatives it was agreed that two pilot initiatives would not be enough to produce the type of knowledge expected. The original plan of doing two similar and directly comparable, in-depth pilot initiatives was changed in the negotiation phase with the EU Commission. The initial aim was to carry out two pilot initiatives with a comprehensive qualitative and quantitative analysis. It was agreed that six pilot initiatives would be required. Hence, the plan was adapted to include six (later seven) types of initiatives that all met the above-described main criteria.

The engagement frame of this study has been built around the concept of responsible research and innovation (RRI) and dynamic governance, and the PE2020 Consortium has developed an engagement frame for selecting and classifying the pilot initiatives (Rask et al. 2016). Dynamic governance (DG) refers to dynamic interactions between scholars, citizens, industry and government as an exploratory, inductive approach. In governance this will take place as an exploratory, inductive approach in setting performance standards for responsible research and innovation, or sometimes with absence of dynamics (Guldbransen 2014). Dynamic governance as evaluation criteria for the seven pilot initiatives is based on the concepts of anticipation, reflexivity and trans-disciplinarity (Neo and Chen 2007).

The analytical framework was altered to be more descriptive. It was originally stated that WP3 would analyse contextual factors that either hinder or support the introduction of innovative PE tools. The aim was to compare cases in different contextual settings in order to see how actions were designed, what tools were used and which types of impacts they could produce. Instead of systematically comparing pilot initiatives using similar PE tools, the pilots were chosen to represent different PE tools. This enabled the comparison of various PE tools in different contexts as well as a broader look on the field of innovative PE. As a result, the comparison of pilot initiatives was focused more towards identifying dimensions of the core criteria and analysing their feasibility, innovation and transferability aspects. The goal of the comparison thus shifted toward studying the impacts not only from a policy point of view but also regarding the practice of PE.

Focusing on seven different types of pilot initiatives also allowed the criterion of “cutting edge” or innovative PE to be studied more analytically. It was considered more advantageous for the overall goals of WP3 to focus on knowledge production processes. With this approach it could provide a more nuanced, deep understanding of the variety of innovativeness that has already been present and that could be developed further to be transferrable to other initiatives or funding programmes. This meant that WP3 could provide useful input that can be applied in multiple contexts and by different types of actors varying from scientific communities to public administration, business and civil society.

The methodology used to analyse the pilot initiatives consisted of several methods, adjusted to the character of each pilot initiative. The approach was dynamic, and evolved as the process developed and knowledge accumulated on the forms that public engagement took in the pilot initiatives. Despite variation in the methodology, the analytical framework and the criteria used to study the pilot initiatives remained solid. The methods of each of the pilot initiatives are summarised below in Table 2

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Pilot initiative	PE method tested	The context and method of analysis	Timing for engagement
1. BONUS young scientists' initiative	Social media platforms	The online platform, analysis of the blogs	Mid-stream
2. Global Change Living Lab	Living lab	Townhall; network analysis	Upstream
3. Joint Programming Initiative (JPI) More Years, Better Lives (MYBL)	Deliberative engagement	The Societal Advisory Board; qualitative content analysis	Mid-stream
4. Societal Interaction of Science in Strategic Research Council funded projects	Societal interaction plans	Systematic content analysis	Mid-stream
5. Empowering young researchers on PE in energy efficiency	Expert meeting, stakeholder dialogue	Summer school; hermeneutic approach	Midstream
6. Dialogue Workshop on mobility and transportation	Dialogue workshop	Discussion outline; hermeneutic approach	Upstream
7. Educating science-society relations and public engagement	Consultation and public deliberation workshops	The scientific summer Academy; hermeneutic approach	Downstream

Table 2. Methodology and context of analyse pilot initiatives.

The changes that are taking place in the role(s) of knowledge producers such as these are reflected in the ways in which questions are formulated in innovative research projects applying public engagement tools. This analysis is further linked to discussions on how such changes affect universities as organisations and main actors of science. Their role is possible to define based on the time for engagement. In Table 2, public engagement is shown to vary from 'upstream', 'midstream', or 'downstream', referring to phases of the process. Upstream engagement refers to dialogue and deliberation amongst affected parties about a potentially controversial technological issue at an early stage of the research and development process and in advance of significant applications or social controversy. Downstream engagement occurs late in the research and development process focusing the impacts of society (Rogers-Hayden & Pidgeon 2007, 346). It may also be initiated bottom-up or top-down, placing focus on whether the interaction was initiated by those in decision-making power positions or those representing civil society or the common people. Midstream engagement may also embrace 'mixed-stream' situations. This appears in the implementation stage of a large, distributed, and dynamic decision process, or alternatively a mix characterised by dialogue between the actors (Wynne, 2011). The pilot initiatives of WP3 represent different types of cases, with a mix of bottom-up and top-down led ones, as well as cases with up-stream and down-stream dimensions. Overall, the organisation of the pilot initiatives was considered to be 'product development', during which on-going PE practices would be boosted with the knowledge gained from the research in PE2020.

To sum up, the pilot projects were carried out having taken into account:

- the international research programmes and prioritisation of research were acknowledged to be interesting contexts for pilot initiatives

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- the pilot initiatives should be chosen on the basis of not only their cutting edge PE activity but also their (expected) feasibility in practice. New types of institutional collaboration and hybrid activities were considered to be particularly interesting themes
- the limited time devoted to the pilot initiatives and the difficulties in trying to align the schedules of the PE2020 project and those of the partners
- the importance of keeping in mind the limited resources available for the pilot projects.

3.2 Planning and organisation of context tailoring workshops

One of the tasks of WP3 was to plan and organise (one or multiple) context tailoring workshops in order to design and implement public engagement tools and instruments in local contexts, to establish guidelines for future context tailoring workshops, and to establish detailed guidelines for pilot initiatives based on the available resources. The purpose of the context tailoring was to consider the factors that precondition successful design and implementation of PE tools and instruments in local contexts. Both contributory and hindering factors were discussed by the researchers of PE2020 and local STI actors. This task was a necessary pre-requisite for the more detailed planning of the pilot initiatives. An outcome of this task has been reported separately in Report D3.1 as a guideline for future context tailoring workshops.

This was the starting point for the PE2020 context tailoring workshop that took place in Helsinki on 9 May 2015, and it was carried out as part of the pilot initiatives' start-up phase. The discussions during this first workshop were more focused on the 'context' rather than the 'guidelines'. The workshop was designed and implemented in conjunction with our partners Dr. Seija Kulkki and Dr. Petra Turkama from the Aalto University Centre for Knowledge and Innovation (CKIR). The discussions in the context tailoring workshop had the target of creating a shared understanding about the foundational organisational, methodological, and infrastructure challenges of public engagement through living labs. The participants discussed how living labs as research strategy and methodology can help in engaging people, cities, regions, public agencies and firms when solving the major societal challenges of our time.

The presenters represented European experts of living labs and public engagement. As both the speakers and the participants were highly knowledgeable regarding the topic, it was possible to discuss the differences and similarities between the living lab approach and the public engagement perspective. These two landscapes are close to each other, but the debate took place partly in different contexts. During the workshop, it became clear that the conceptual frameworks were quite close to each other.

WP3 identified and started to work with six pilot initiatives related to Societal Challenges. A seventh was added later in the process when it became clear that the new Strategic Research Council (SRC), and projects funded from its first call, could possibly be studied as part of the project. The addition was done in a budget-neutral manner, as the number of context tailoring and piloting of best practice PE processes in the pilot initiatives increased to seven. The pilot initiatives were collectively linked to all seven Societal Challenges as described in Table 3. The pilot initiatives were organised in the context of on-going research programmes in Finland and Italy. The initial plan of potentially including pilot initiatives from the other two partner countries was changed. To ensure EU-wide dimension and relevance, most pilot initiatives took place in the context of EU joint research programmes, European innovation partnerships or other types of research and innovation activities having a transnational dimension. The design of the PE processes to be tested took into account a) contextual requirements, b) creation of a comparative research perspective and c) documentation of the pilot initiatives experiences for further evaluation purposes (participant observation, and manager and

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participant surveying and interviews). Practical scripts were prepared and included in report D3.1 (refer to the report at the link above) to support of the implementation of the pilot initiatives.

Early identification of the test sites was considered important. In addition to the BONUS programme, the Mediterranean counterpart of that programme was contacted by partner Laboratorio di Scienze della Cittadinanza (LSC). These discussions commenced immediately after the initial meeting. Joint Research Programs were considered to be another relevant context for pilot initiatives, since they provide access to international research programmes.

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4. Design and implementation of the pilot initiatives

The resources of pilot initiatives have been of concern in the Scientific Advisory Panel (SAB) discussion concerning the PE2020 project. Therefore, it was important for the pilot initiatives to be conducted in collaboration with research programmes and actors that have their own budgets for undertaking PE. It was also considered important to frame and understand the nature of pilot initiatives in a way that is both realistic and contributes to the research done as part of PE2020 and in Horizon2020 planning. There are seven societal challenges in the Horizon work programme, and we have committed to the production of seven pilot initiatives. The societal challenges in the seven pilot initiatives followed a specified division of the work.

Societal challenges for Horizon 2020	UL / UH	LSC
1) Health, demographic change and wellbeing	x	
2) Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy	x	
3) Secure, clean and efficient energy		x
4) Smart, green and integrated transport		x
5) Climate action, environment, resource efficiency and raw materials	x	
6) Europe in a changing world - inclusive, innovative and reflective societies	x	
7) Secure societies - protecting freedom and security of Europe and its citizens		x

Table 3. Societal challenges and division of work between the partners in WP3: University of Lapland (UL)/University of Helsinki (UH) and Laboratorio di Scienze della Cittadinanza (LCD).

In Finland, the following pilot initiatives were the focus of analysis:

- **BONUS young scientists' initiative** – BONUS is the joint Baltic Sea research and development programme for years 2010–2017. It involves European countries from the Baltic Sea region. The BONUS pilot initiative was a scheme for empowering young scientists (doctoral students and postdoctoral researchers) by providing them with skills in the new social media that they can use in communicating their research activities in a recently established, bottom-up structured research website of the BONUS programme. The BONUS programme rests on previous projects that originate in 2003. Hence, the pilot initiative took place in a setting where the current BONUS phase had had a chance to make use of previous experiences. The current phase has been able to utilise the knowledge created by its predecessors in order to make the programme respond to the needs of participants and changing working environment better. The pilot initiative is related to the societal challenge on 'food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy'.

  The objectives of the pilot initiative were also to deliberate on the options for using social media as a public engagement tool, and to support the bottom-up initiatives of junior researchers in a traditionally hierarchical academic environment. The objectives of this pilot initiative were threefold:

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- to support junior-level researchers' skills and capabilities to engage with stakeholders and citizens in the various phases of the research and innovation process;
- to deliberate on the options for using social media as a public engagement tool, and
- to support the bottom-up initiatives of junior researchers in a traditionally hierarchical academic environment.

- **Global change living lab** – The second pilot initiative aimed to co-design global change research priorities and joint projects in collaboration with researchers, other actors in the public and private sectors, and civil society organisations. Whereas co-design ideas have already been used in the innovation context, opening up the processes at an early stage to a wider audience is innovative in the field of academic research. The context of the initiative is a Finnish Global Change living lab network. The Finnish national committee collaborates with fellow national committees abroad and their regional clusters. The Global change living lab was coordinated by the Future Earth Finland – National Committee for Global Change Research. The Finnish national committee collaborates with fellow national committees abroad and their regional clusters. As an interdisciplinary and multi-actor network, the aim of the Global Change living lab was to create an interface between research, decision-making, business, and civil society. As part of the pilot initiative, a town hall meeting and a seminar held in 2015 as a collaboration between Future Earth Finland and PE2020. PE2020 supported the creation of the living lab by providing input on public engagement methods and ways to engage citizens. Hence, the context of the pilot initiative was a fairly new setting but one that had been built around the idea of societal interaction and that had already built a basis for reflective deliberation.

  The pilot initiative is related to the societal challenge on 'climate action, environment, resource efficiency, and raw materials'. The objectives of this pilot initiative were twofold:

  - to deliberate on the options for supporting and strengthening multi- and interdisciplinary, multi-actor research collaboration related to solving societal challenges;
  - to elaborate on the options for how intermediary organisations can strengthen inter- and multidisciplinary and multi-actor collaboration in the co-design of research priorities and support the continuity of living labs.

- **Societal impacts and stakeholder involvement in research grants** – The third pilot initiative aimed to analyse the contents of societal impact and stakeholder involvement in research grants. Whereas requirements for more societal interaction aspire to balance academic peer review and societal relevance in granting research funding, little is known about the content of such interaction plans in relation to dimensions of public engagement. The context of the initiative is an EU joint programming initiative (JPI) on demographic change: More Years, Better Lives (MYBL). Thirteen European countries are providing support for the JPI. The pilot initiative is related to the societal challenge on 'health, demographic change and wellbeing' and the challenge on 'Europe in a changing world - inclusive, innovative and reflective societies'. The JPI/MYBL is a collaborative project between participating countries with a Societal Advisory Board (SOAB). The task of the SOAB is to bring "societal pull" to the research agenda by evaluating joint activities in each phase of their development, implementation and evaluation against societal needs. Hence, in such a context the pilot initiative was set to explore and enhance the understanding of societal impacts and stakeholder involvement

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in studies on the relationship between society and science. The pilot initiative is related to the societal challenge on 'health, demographic change and wellbeing'.

The first objective of the pilot initiative was to discuss with the JPI MYBL programming initiative organisation the importance of a societal interaction and stakeholder involvement in the upcoming JPI MYBL programming initiative research calls and the initiative of the SOAB to the General Assembly of JPI MYBL to include more explicit information on societal impact and stakeholder involvement in call texts. A concrete aim of the pilot initiative was

- to hold the initial meetings and to find mutual understanding;
- to attend networking events and meetings
- to have a clause or clauses concerning societal impacts and stakeholder involvement in future JPI MYBL calls for research proposals.

Societal Interaction of Science in Strategic Research Council (SRC) funded projects was added to this type of pilot initiative during the piloting process. This addition was considered important as it became clear through negotiations with the Academy of Finland that it would be possible to include a new funding instrument, considered novel internationally, in the study. This formed a second and parallel case to the same type of initiative as the JPI/MYBL, and hence forms a separate report. This second part of the pilot initiative was to unravel the meaning and role of societal interaction in the Strategic Research Council funded projects under the Academy of Finland. The pilot initiative presents discussion about how the interaction relationship is formed, how the partnerships are served, and how research activities are integrated with societal interaction activities. As the first funding decisions of the SRC were made in late 2015, this pilot was set in a context of an entirely new and bold type of funding instrument. The SRC instrument, its requirements and functionality were still being developed and refined while the pilot initiative was implemented. This provided a chance to analyse a process in the making and allowed reflective discussions to take place with the projects and SRC staff alike.

The pilot initiative is related to the societal challenge on 'Europe in a changing world - inclusive, innovative and reflective societies'. The aim is to investigate the types of objectives the interaction activities aim to serve, the forms of practices chosen to do this, and to understand how the practices are integrated into the timing patterns of the projects as well as the stakeholders, and finally, to study the kinds of expertise and the capacities that are considered necessary for the successful implementation of societal interaction. The goals of the SRC pilot initiative were divided into three parts:

- To unravel the meaning and role of societal interaction in the SRC-funded projects. Central questions include how the interaction relationship is formed, how the partnerships are served, and how research activities are integrated with societal interaction activities.
- To investigate the types of objectives the interaction activities aim to serve, the forms of practices chosen to do this, and to understand how the practices are integrated into the timing patterns of the projects as well as informing the stakeholders.
- To study the kinds of expertise and capacities that are considered necessary for the successful implementation of societal interaction.

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In Italy, the following pilot initiatives were the focus of analysis:

- **Empowering young researchers on PE in energy efficiency (Rome)** – The fifth pilot initiative was developed on the basis of an interaction between Laboratorio di Scienze della Cittadinanza (LSC) and ENEA, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development and was conceived as an itinerary aimed at making PE a strategic element in the training programme of the two-week long ENEA Summer School on Energy Efficiency (ESS) targeted at young professionals and researchers. The pilot initiative included the organisation of an internal workshop involving a group of ENEA project managers aimed at developing a common understanding about the ENEA experience in PE, and the production of a handout on PE in the energy sector. Further, the pilot included the organisation of a four-hour training module devoted to PE in the framework and the presentation of the results of the module in the ESS final plenary session with the participation of a group of private companies working in the energy sector. The rationale of the pilot project was that of supporting the ENEA project managers in capitalising on their experience. In addition, it aimed at identifying the stock of knowledge to transfer to the ESS trainees on PE theory and practice in the energy sector and then actually implementing such a knowledge transfer process through the training module included in the ESS. The context of the pilot initiative was one of a multidisciplinary training course that aims to boost matching of young talents and high-profile industry.

  This pilot initiative was related to the challenge 'Secure, clean and efficient energy'. The pilot project pursued the following objectives:

  - Raising the awareness of the ENEA project managers on their own approach to and practice of public engagement in energy projects;
  - Transferring a stock of theoretical and practical knowledge to the trainees on why and how to use PE mechanisms in designing and implementing energy efficiency programmes;
  - Sensitising the private companies concerned with the ESS about the role of PE in the field of energy efficiency.

- **Dialogue Workshop on mobility and transportation (Naples)** – the sixthpilot initiative was developed with the intention of testing a PE approach in connection to one of the grand societal challenges considered by Horizon 2020, i.e. 'Smart, green and integrated transport'. The rationale of the pilot was that of putting PE at the very centre of the debate on mobility and transportation in a given local context so as to improve the development and management of transportation, with special reference to the involvement of citizens, civil service organisation (CSOs) and stakeholders in orienting research programmes and policy design. The pilot initiative focused on the organisation of an initiative of public dialogue aimed at discussing the present and potential role of PE and participatory mechanisms in the mobility sector. The context of the pilot was a four-day long event of public communication and debate. IDIS, Città della Scienza, which provided strong support for the organisation of the initiative, is one of the most important science centres in Italy, developing different initiatives in public communication, public engagement and support to innovation. This pilot initiative was related to the societal challenge on 'smart, green and integrated transport'.

  The objectives of the pilot were:

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- To activate a dialogue between them on the use of PE in the above mentioned field, with special reference to the relationships between researchers and research institutions, on the one side, and citizens and CSOs, on the other;
- To give an opportunity for the key stakeholders in the field of transportation and mobility in Naples to establish stable contacts and interactions so as to create a permanent cooperation platform;
- To draw out of the dialogue experience useful information and recommendations on obstacles and development perspectives of PE in the mobility sector in Naples.

- **Educating science-society relations and public engagement (Turin)** – the seventh pilot initiative was organised to test the possibility of using PE mechanisms to raise the awareness of and transferring knowledge to young students on the complex and changing relationships that exist between science and society. The opportunity to undertake such a test was given by the Scientific Summer School (SSA), a week-long informal education initiative targeted at high school students that Agorà Scienza holds each year in Turin with the participation of researchers from universities. The rationale of the pilot project was that of directly involving the researchers concerned with the SSA in a common reflection on their own experiences in science communication and science engagement and their views of science-society relationships. This was in order to hear their suggestions about how to raise the awareness and increase the knowledge of students on science-society relationships and to put such suggestions into practice by adopting PE mechanisms in the framework of the 2015 edition of the SSA. Agora Scienza was founded in 2006 as a centre of the University of Turin and in 2009 it turned into an Inter-university Centre that is managed by four universities in the region. The Center aims to be a meeting place, a crossroads of cultures and professions that promotes innovation and dialogue between science and society. The scientific summer school context of the pilot initiative was set in an atmosphere where thinking out-of-the-box was encouraged from the very early phases of academic careers. Specific attention was devoted to the societal challenge on 'secure societies - protecting freedom and security of Europe'.

  The pilot project pursued the following objectives:
  - To test how to put science-society relations at the centre of training and education initiatives also via PE-based initiatives;
  - To open a space for dialogue for the researchers involved in the SSA on PE and science-society relationships, encouraging exchanges of ideas and good practices;
  - To enable researchers involved in the Summer Science Academy to contribute through suggestions, comments and proposals in the planning of the 2015 edition;
  - To insert stably PE methods and science-society related issues as key features of the future editions of SSA;
  - To allow the students participating in the SSA to live a direct PE experience.

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5. Results and deliverables

5.1. General results

Overall, during the analytical process of the pilot initiatives we have been able to identify innovative PE methods that have created positive results with regard to the quality of the research projects as well as the actors involved in them. The PE methods used in the pilot initiatives vary from more conventional science communication and focus group discussions to highly collaborative co-creation practices. They were implemented in varying contexts and circumstances, and in different scientific disciplines. However, in all of the pilot initiatives, the PE methods that were chosen and applied in the research projects were found to be useful by and for the projects in question.

The focus of the analysis was geared toward studying the impacts of PE activities more broadly. It was expected that policy impacts could be identified in each of the pilot initiatives. Interestingly, while evidence of impact could be traced in each of the seven pilot initiatives, it was not always with regard to policy. Instead, in some cases – such as the Living Lab (Finland) – the impact was clearly visible but focused towards the *practice* and spreading of PE, rather than policy as such. In other words, responsiveness to the interests of collaborative partners should be included in the list of indicators of PE impact. PE actions within projects can have an effect through a method of repeating similar exercises that develop partners' skills in PE while remaining open to adjust actions during the process if such needs arise from the collaboration itself. In such cases, policy impacts as such may not materialise but the practice of PE is strengthened and spread in a snowball effect manner. This finding, although somewhat unexpected, supports the view that effective PE needs to include room for altering approaches that are geared toward the needs of the partners and take into account the context in which activities take place.

Another finding with regard to the process of studying pilot initiatives was the evidence. The pilot initiatives were expected to increase knowledge on new institutional collaboration and hybrid activities as reported in PE deliverables D1.2 and 2.1. In the Finnish-based cases it was clear that the public engagement in pilot initiatives was found to be context-dependent emphasising the importance of feasibility. For this reason, the commitment was emphasised and the piloting work of PE2020 had to be accepted and supported by the host organisations. Thus, with the pilot initiatives we also had to take into account the interests of the host organisations. This also affected planning the timing for the pilot cases.

As mentioned above, the findings on impact were intriguingly elaborate. Whereas little evidence of policy impact could realistically be expected in the form of content change in policy documents within a period of only two years, the policy impact can be found in the more active discussions relating to PE. These discussions have increased in number and intensity with policy officials at the Ministry and agency levels. Further, similar discussions continue to take place with organisations, foundations and research institutions that were not directly involved with the pilot initiatives but showed interest in particularly the practice-related analytical knowledge that the study of pilot initiatives produced. With regard to the content of policy documents and political discussions, it remains to be followed-up whether changes are visible in the substance or in the state funding programmes. Regarding changes in the substance of particular policy sectors, it is expected that the SRC-funded projects can provide input into the planning processes through a form of drizzling of information throughout the lifespan of the projects (Aarrevaara and Pulkkinen 2016). To what extent this happens remains to be seen. This type of evidence is expected to be seen in background memos and planning documents if the knowledge produced the pilot initiatives and their analyses has borne fruit. Such policy

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impact is, however, of longer-term character and cannot be expected in the WP3 timeframe of only two years.

The scholars, science administration and stakeholders make choices to use public engagement tools, and also test and assess these practices critically. It is possible that even small steps can get a multiplier effect, whereby small experiments may become system-level practices that have the potential for policy impact on several sectors. The pilot initiatives in this report have highlighted practices that might have an opportunity to become finance requirements in Horizon2020 calls.

In four of the seven pilot initiatives, collaboration with the PE2020 project was reported to have directly positive effects. These were reported as part of the reflective feedback process that was built into each of the pilot initiatives. The process gave a chance for the core staff as well as participants of the workshops, trainings, funding calls etc. to provide their views and describe the impact that participation in the pilot initiative had on their own work situation, the setting in which they work and the ways in which they address PE after the initiative. The method of giving feedback varied from online forms to face-to-face discussions. The experiences at institutional level of core staff were possible to compare as they had been actively involved in the design of the pilot initiatives themselves. In contrast, the participating researchers of the pilot initiatives gave a more personal and/or project level feedback that reflected more their everyday realities and capacities on PE.

While all these initiatives had a proactive and positive attitude towards public engagement to start off with, there was strong motivation and ability to test PE tools and develop their functions during the process of cooperation and analysis. This openness to apply new working methods was visible in both on-going research projects (Global Change and BONUS) as well as programmes that were in the final planning or initial application phases (SRC and JPI/MYBL). Such a constructive attitude at the programme level seems to have trickled down to individual research projects. These benefits were seen, above all, in the fact that the pilot initiatives improved the quality, awareness and effectiveness of the activities tested in the pilot initiatives. The feasibility was verified in connection with the BONUS pilot initiative, for example. Regarding the use of ICT technology (including social media platforms), the extended dissemination and opportunities were improved especially for young researchers of the projects.

Overall, a key finding of all the pilot initiatives as well as the study of them in WP3 is the steep learning curve that is strongly present. Learning was not a focus of the analysis of pilot initiatives as such, where emphasis was clearly on the PE tools and practices used in projects. However, in the feedback that participants of the pilot initiatives provided both direct and implied comments on learning are clearly present. These relate to growing awareness of project staff's own actions, current working methods and roles as well as to the functionality of the new methods that were introduced by the piloting activities and collaboration with the PE2020 project. In the majority of cases the feedback is positive also with regard to the participants gaining an understanding of the variety of PE tools. This includes the realization of the possibility to find the tools that are best suited for each situation, rather than a one-size-fits-all solution. The feedback of pilot initiatives are available in the separate pilot initiative reports.

Learning as a result corresponds with the variation found on aspects of impact of PE activities. As regards impact we found them to from those related to policy, to more practice-focused or discussion activating impacts. As for learning, the working methods, timeframes and approaches of PE activities have changed as part of the piloting. This reflects the participants' understanding of the context in which they work and the

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need to accept that a 'one size fits all' solution is neither available nor desirable. Such reactions are visible in the SRC and JPI/MYBL cases, for example. In the case of the pilot initiatives carried out in Rome and Turin, the learning process was favoured by the interest of the involved researchers who wanted to have a better understanding of their own professional work and role. In the case of the pilot initiative in Naples, the learning process was activated by the interest of the parties to interact with each other in a common public space. It is therefore not surprising that the pilot initiatives and WP3 itself have evolved during the process. They have altered plans as a reaction to realisations that the methods or practices initially planned could not produce the results they were after or help to meet the strategic goals they had defined. This type of learning can be seen in the Living Lab and BONUS pilot initiatives.

5.2. Results related to each pilot initiative

- **BONUS young scientists' initiative**

In the BONUS case, the innovativeness of the pilot initiative lies in the combination of active contribution by a research and development programme, which provides a platform, support and inspiration for science outreach, and junior-level researchers, who are given ample freedom to try out blogging as a PE tool and to learn gradually by experimenting. The younger generation of academics proved to be a fruitful target group for a pilot case oriented in social media and blogging as they were both motivated and eager to learn and try new things. For them, blogging may serve as a first, low-threshold PE activity before trying other, more advanced PE tools. As one early-career researcher noted in an interview after the training, some senior researchers may think 'science is a serious thing' and that academics should not waste their time in outreach activities. On the contrary, many members of the younger generations have a more open approach and use social media also for personal matters. Thus, the threshold for blogging about work-related matters may be lower.

- **Global change living lab**

With regard to the Living Lab pilot initiative, the large-scale events in Helsinki and in Tampere served as a starting point for a long-term, continuing process that will further elaborate on the phenomenon of global change. This process is expected to lead to collaborative research projects between different groups of actors. It has already lead to a practice of co-design in a spirit of learning-by-doing among potential partners, with the Living Lab "host", Future Earth Finland secretariat, acting as a facilitator. Thus, instead of focusing on individual events or project-based partnerships, the aim of the organisers of the pilot initiative is to create stable interaction relations and a long-term collaboration network between different actors. The aim is to tackle the challenges related to sustainable development.

- **Societal impacts and stakeholder involvement in research grants**

The pilot initiative is aimed at analysing the contents of societal impacts and stakeholder involvement in research grants . Whereas requirements for more societal interaction aspire to balance academic peer review and societal relevance in granting research funding, little is known about the content of such interaction plans in relation to dimensions of public engagement. The context of the initiative is an EU joint programming initiative (JPI) on demographic change: More Years, Better Lives. The pilot initiative is related to the societal

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challenge on 'health, demographic change and wellbeing' and the challenge on 'Europe in a changing world - inclusive, innovative and reflective societies'.

- **Societal Interaction of Science in Strategic Research Council (SRC)**

In the Strategic Research Council funded projects, public engagement activities are clearly an integral part of the research. Societal interaction isn't considered to be an additional task, although there has been a steep learning curve in several of the projects regarding the methods and practices of societal interaction. However, the learning seems to be taken as part of the process of increasing the researchers' own knowledge and as such reflects an attitude of constant capacity building (Rask et al., 2016). Those responsible for SRC projects are aware that they were selected through fierce competition and that their interaction plans, capacities and potential to deliver played a critical role in the game. Thus, their ability and willingness to develop their own skills and knowledge on public engagement – in addition to the scientific work – is at the centre of the projects' working logic. In other words, societal interaction is not a task but rather a cross-cutting working method.

- **Empowering young researchers on PE in energy efficiency (Rome)**

In the case of the pilot aimed at empowering young researchers on PE in energy efficiency carried out in Rome, a contradictory message emerged about the possibility of diffusing public engagement as a current practice, at least in some specific sectors. On the one hand, the focus group held during the pilot project with a set of ENEA project managers (all involved with energy-related issues) helped them recognise which of their activities were linked to public engagement. Such activities consisted of, for example, negotiations with stakeholders and local authorities, organisation of public meetings with citizens on energy-related issues, dialogue on new low-carbon more efficient technological solutions. In this sense, unravelling the practical meaning of PE could be helpful for researchers and experts to understand their own work better. On the other hand, the pilot project also showed how difficult it is to diffuse PE in professionally and culturally strong disciplinary communities. In fact, the trainees involved (engineers, economists and legal experts) met many difficulties in recognising the relevance of PE in their professional practice. They made an effort to "translate" PE into the language and concepts of their own discipline only in some cases, however with some mistakes and simplifications.

- **Dialogue Workshop on mobility and transportation (Naples)**

The Dialogue Workshop on mobility and transportation carried out in Naples showed the importance of PE when public services involving many parties (eg. local authorities, local researchers and university institutions, NGOs, private enterprises) are concerned. In the case of transportation in Naples, none of the actors concerned were connected with each other. Putting them together in the pilot was therefore, in itself, perceived as a success by all the participants. This also shows the pivotal role played by mediators as promoters of PE initiatives. They are not involved in the local dynamics. For this reason, they are more able to convene local actors and to express a novel point of view. Finally, the pilot also suggests that PE cannot be viewed only as an event to be organised, but also as a long-term process to activate, at least when "big issues" (like the development of the transportation system in a large urban area) are concerned. The pilot has been viewed by the participants as a useful triggering point but the need for continuity and an evolution in the dialogue experience was also clearly manifested.

- **Educating science-society relations and public engagement (Turin)**

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Finally, the pilot project on the education of students on science-society relations and public engagement, carried out in Turin, allows us to identify two important points connected to PE (among the many). First, the pilot showed the need to use PE for dealing not only with scientific content but also (and sometimes mainly) with research institutions. Considering how they work, the problems they meet, the kind of support they need raises awareness of people (including researchers) about the complex web of connections linking science and society. There is the risk of transferring a naive and abstract image of science which overlooks or does not consider the social and policy processes continuously underlying the scientific and technological development. Secondly, the pilots also made clear how PE should be increasingly part of the current practices of research institutions. The researchers' involvement was exclusively on a voluntary basis and their research institutions were only formally involved. The limited commitment of research organisations impedes the activation of institutional learning processes as well as making it difficult (if not impossible) for professional recognition of researchers who participate in this kind of experience. In effect, they may be not stimulated to participate further or to devote the necessary time and attention to the initiative.

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6. Transferrable best practices of public engagement

Some practical lessons have been learnt from the analysis of the pilot initiatives. These lessons are transferrable to other research projects that have public engagement in the overall approach, and where interaction with broader society is built into the working methods of the project.

Identifying a basic cultural platform. The success of a PE initiative is pivotally linked to the capacity to integrate the participants' interests, expectations and basic concepts with each other. Doing this successfully is dependent on the research team and partners knowing and acknowledging their own needs as well as those of the cooperating actors. Mutual respect must be balanced with shared interests and a joint commitment to keeping an open dialogue going. Hence, a PE initiative needs to be understood as an interpretive and interactive negotiation, which allows the defining of a common approach about the key meanings of the PE activities. The search for shared interests and the common good are at the core of such PE actions. These could include issues such as what public engagement means in general, what the objectives of the specific PE initiative are in the particular case, and what results can reasonably be expected and why partners participated in it. This contextualisation should be a requirement for any PE as it serves the purpose of team building that is necessary for the joint efforts to be effective. In the case of the pilot initiatives, such a platform has been developed through preliminary meetings, interviews with key participants/partners, and collection of feedback through open dialogue.

Embedding PE initiatives in a broader change perspective. The public and stakeholders do not want to test new approaches, tools and procedures for themselves. They tend to participate when they see that there is something real at stake and that their participation matters, either by having an effect leading towards positive change or by seeing their own activities benefit from the results of the PE. It is therefore necessary to embed PE initiatives in broader processes or programmes targeting even small, but clear and realistic aims of change. This broader perspective and goal should be stated in a way that is also easily understood by non-experts and that motivates them to commit to the joint effort.

Incorporating the private sector in public engagement. For historical and ideological reasons, the concept of public engagement is primarily used for referring to the participation of the public or civic and policy players in science and technology. Other concepts, such as societal impact or the "third mission" are used for referring to the relationships between business and research or to the professional collaboration of researchers in society. The pilot initiatives indicate that these boundaries are blurred and irrelevant in broader societal contexts and can even be counterproductive. At the same time, local university representatives tended to distinguish artificially between their relations with industry on the one hand, and those with civic organisations and the public at large on the other hand. While the distinctions may be academically interesting, they serve the practical purposes and goals of PE poorly. Instead, the building of PE activities should be focused on building bridges between science-industry, science-public relations, and science-public administration. In institutional terms, for example, this can mean creating a unique space to manage both or coordinating the training of researchers for PE and facilitation. In substantive terms, it can lead to a systematic identification of interaction options and synergies between public engagement and innovation at a local level.

Taking professional and disciplinary resistance seriously. The pilot initiatives highlight the need to take professional and disciplinary resistance seriously. Scientists are often interested in PE but tend to consider it as an optional and marginal aspect of their professional activities (a more advanced form of public

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communication). It should be taken into account that PE is not a form of academic merit, and thus scientists need to be motivated by other arguments. Two key indications emerge. First, greater effort from research institutions and scientific associations is needed to legitimate public engagement socially and professionally as a modern practice in science and technology. In order to overcome the resistance, it is necessary to understand the reasons for it, and address them respectfully without losing sight of the goals of the PE approach. Secondly, funding bodies should specifically address the linkage of public engagement to societal issues that scientists intend to solve with their research findings.

Reducing the use of participants'/partners' time. The pilot initiatives suggest that the most limited resource for organising PE initiatives is time. Many stakeholders seem to have limited time and do not prioritise PE enough to participate, which should be considered in order to create a plan that is feasible to implement successfully in practice. In terms of planning, it means taking the necessary time into consideration while scheduling the activities, including preparation, implementation and follow-up. Goal-orientation is of the essence. Meeting practices need to be developed to make them more effective and focused. This means, for example, that agendas need to be made realistic and meetings strategically oriented. Methodologically it means using virtual communication such as emails, Skype meetings and shared online platforms as much as possible. However, the need to have personal and face-to-face contact should not be under-estimated as these are crucial for building mutual trust and a shared commitment to the issue. Documentation should be circulated but with consideration for what is necessary and useful to which groups. In other words, even in an open atmosphere, the time-management of professionals means they rarely want to be overloaded with messages and would prefer it if communication was strategic. Venues should be chosen to serve the purpose of meetings and the needs of participants in order to minimise unnecessary time for transport.

The importance of motivation and investing in a positive attitude should never be underestimated. Motivation should be upheld throughout the process. This means identifying the different stages of the PE and the type of activity that is apt for motivating participants to continue. It is crucial to show that the process is moving forward, how the participants' involvement is making a difference and the types of actions that are necessary in the next phase. Actions should be planned so that they place value on the process, the substance and the working method in a balanced manner. It has clearly been shown in the pilot initiatives that the importance of having a positive, constructive attitude as well as helping the participants / partners as well as the researchers see their role in the PE process is central to success.

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7. Discussion

The overall goal of WP3 has been to find transferrable practices and approaches for public and societal engagement. The lessons learnt and the practical tips for organising PE activities in a research project are discussed below in more detail. However, in order for these lessons to be transferred and utilised in practice it is crucial to broaden the view from the question of *what*, and move forward to consider *who* can use this knowledge and *how* they can utilise the information.

The pilot reports of WP3 indicate, that pressure to find solutions that match the style and obligations of the new funding programmes has been strong. However, the research consortia that have been successful in the early phases of including PE in research projects have shown the ability to develop both their knowledge and skills in public engagement. A major contributing factor visible in the pilot initiatives was a process that encourages commitment from researchers and partners alike. In practice, a critical impetus has been created by workshops that were organised by the research consortia in the early stages of the projects. The workshops enabled the researchers to examine critically who their central partners could be and what type of societal impact was being strived for with the project. Simultaneously, the workshops of the pilot initiatives have been a channel and tool to engage with stakeholders and partners from the very start of the project. In several cases, initial workshops were held prior to receiving the funding decisions, i.e. before the actual start of the project. Hence, the project consortia have been able to create a joint commitment to a shared cause. They have allowed space for scientific, practitioner and 'field' expertise to flourish within the project. They have created opportunities for the cross-breeding of ideas and the exchange of different types of knowledge. As a result of the process, the researchers have gained new competencies and found new ways to study major societal challenges.

The context tailoring workshop formed a particular part of the WP3 programme. It was built to identify and justify the methods before testing the PE tools in pilot initiatives. The processes of knowledge production have changed. This has caused both concern and excitement in the scientific community as it has been difficult to foresee how the change would affect the scientific process and neutral approach. It is evident from the pilot initiatives that the application of innovative PE methods has in fact not hindered the scientific process. It has become necessary to weigh scientific quality against the openness of science. As such, researchers have been provided with the task of making the scientific process more understandable and arguing for the value of this process in a rapidly changing environment. When these demands have been coupled with a new type of funding instrument as in the pilot initiatives, an improvement in the quality in the process of research projects can be seen. The research groups have developed new working methods and models for public engagement as part of their scientific work. They show an improvement in project leadership and complex knowledge management. The pilot initiatives discussed in this report were all different, and the common feature among them was to produce benefits for different actors. The feasibility criterion was a strength for all the pilot initiatives.

The organisation of the pilot initiatives was considered to be 'product development', through which on-going PE practices are boosted with the knowledge gained from the research in PE2020. The method of testing in the pilot initiatives followed a dialogue-based approach in which the logic of co-creation was outspokenly present. In addition to producing comparative knowledge from the seven pilot projects, the WP3 efforts have also allowed for the development of an understanding of the internal processes and logics which push for change in the working methods of research groups.

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8. Policy implications and recommendations

The working environment and programme context of the pilot initiatives has played a crucial role in the way researchers have reacted to the PE methods. In the contexts of the pilot initiatives, the role and methods of PE have been conceptualised in ways that promote active and continuous involvement with actors outside the scientific community. The programmes have encouraged research projects to enhance public engagement tools by providing a safe platform on which to try new ways of collaborating with external stakeholders.

Mainstreaming the PE of science is a key to increasing its role in academic work. However, it is crucial to consider carefully which measures are needed for this to happen. If mainstreaming is stated and expected but not backed up by financial and other support, it can become an empty letter with no real bearing. This development would be more likely to hinder the spread of PE rather than act as a positive force that pushes PE to become a central part of scientific work. Using the example of the SRC pilot initiative, this particular funding programme provided the applicants with ground rules and proper resources for PE activities, but left much room for creative, out of the box solutions for how to engage with stakeholders. As a result, the funded consortia embraced the freedom to test new methods and went beyond what the funders expected. Mainstreaming can, hence, be said to mean that PE and RRI are made understandable to colleagues within and outside academia, transforming it to real working methods, and including them in the systems through which performance is measured. Carrots and sticks should be in balance.

Public engagement is a counterforce to disengagement from society. It requires a long-term commitment to reach solid societal impact. However, it is also important to include short and medium-term activities that yield practical results quickly at grassroots or local levels, thus keeping the collaborating partners engaged. Currently, in light of the seven pilot initiatives, the stakeholder involvement is stronger than the direct involvement of fourth sector referring to citizen participation (Rask et al., 2016). Academics and PE activists talk instead about stakeholders and other types of expert counterparts. In some cases, such as the SRC-funded projects and the Naples workshop as well as the ENEA case in Rome, citizens are represented through civil society organisations. Based on the pilot initiatives, it could be argued that the public should be included in a higher degree in order to stress their importance and relevance as collaborators not only from the point of view of research but also from a democracy enhancing perspective. In order to achieve impacts that can support active citizenship and societal accountability of research, the public should not just interested or involved, but *engaged* as active partners over a long period of time.

Knowledge of options, tools for different stages of PE and for how to deal with clashing interests of partners are necessary in order for positive developments within PE to take place. Further, researchers in the pilot initiatives as well as the joint policy conference of the PE202 and CASI projects (Brussels 16-17 Nov, 2016) identified a need to see the academic added value of PE. There is broad understanding of the societal benefits of collaboration but how these are reflected in scientific communities remains unclear. Openness not only to tolerate but to manage interest conflicts is seen as intimidating in a situation in which the career rewards are not visible. Yet, being challenged by societal stakeholders and the public is not necessarily considered too different from the academic working ethos of science correcting itself through constructive debate.

Based on the above mentioned policy conference discussions, public engagement approaches and tools at the institutional level are often still lacking in research, placing blame on the scientific system or culture. This is in line with the findings of the pilot initiative analyses that stresses the importance of an encouraging

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institutional and scholarly environment for the promotion of PE in practice. Providing a realistic funding scheme coupled with a supportive atmosphere as well as practical tools diverts attention from to the possibilities of PE and opens new options to move away from the limitations of the traditional models. This is seen, for example, in the cases of the SRC and Living Lab pilot initiatives, where bold strategies and open-minded approaches have yielded positive results that in turn encourage other actors to follow.

A quality dimension of public engagement should be taken into account in discussions on how to embed PE into academic work. However, over-emphasising the role of academic culture can be seen to dilute the problem. In order to break the negative tone of discussion, it is necessary to move beyond the critique and focus on the role of the academic employers. For this to happen, attention needs to be given to factors that hinder researchers. One such hindrance is the apparent contradiction between the academic merit system that emphasises scientific publications and teaching of substance and a funding system that is focused on bibliometrics on the one hand, and the growing demand to engage the public and co-operate with societal stakeholders on the other. As is noted in all of the seven pilot initiatives, the attitude and actions of the academic employers are key to creating a positive atmosphere that encourages researchers to engage with the surrounding society. Despite the differences in the contexts and focus of the pilot initiatives, they are coherent needing to have the current career risks of PE decreased by making PE activities a proper, acknowledged part of academic work. The pressure to succeed in both in academic and in PE areas is increasing, yet support structures and skills development focus almost entirely on the aforementioned. Changing this imbalance requires a reconsideration of the roles and responsibilities of employers as well as the practical infrastructure that is available in academic working environments and work conditions. Researchers need proper infrastructure, skills development and support from management. Without institutional support, PE activities remain heroic actions of individuals.

Scientifically produced knowledge becomes societally usable if/when societal actors are involved in defining the problems. By including these non-scientific actors in the process from the beginning of the planning phase, the stakeholders are committed to the joint task because they have a vested interest in the expected results. This is shown particularly in the pilot initiatives of the Dialogue Workshop on mobility and transportation carried out in Naples as well as the SRC-funded projects in Finland. The non-scientific actors bring with them non-scientific expertise from the field of practice, grassroots level, business and policy world, all of which can bring broader understanding of phenomena into the process, in addition to providing valuable data, contacts and bouncing boards for ideas. In other words, reconsideration of what constitutes academic excellence is needed and include the role of non-scientific expertise in it.

Recommendations based on analysis of the pilot initiatives:

1. **Strong policies for public and societal engagement of science are needed**. This means that the expectations are clarified, linked to the academic career system and included in funding schemes where public or societal interaction is expected. Taking into account the experiences in JPI/MYBL report, this also means that the counterpart-actors in the public sector (e.g. ministries, agencies) need to be equipped with knowledge and tools of how academic partners can be included in policy and other processes. Incentive systems could also be considered for CSOs and private sector actors who actively engage in PE activities.

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2. **Public and societal engagement should be mainstreamed by making it a mandatory part of relevant funding programmes.** The inclusion of PE should be strengthened by financial resources and support structures. Focus should be in the context rather than guidelines.
3. National funding agencies and **Horizon2020 funding programs should include resources for public engagement**. It should, however, be taken into account that the need to apply specific public engagement practices and tools varies. For example, if a high-level of technical readiness (H2020 criteria) for participation in programmes already exists within a particular field, upstream engagement requirements with particular PE methods may not be necessary.
4. **PE should be treated as an irremovable part of academic working environments.** Based on the pilot initiative in Turin, this means that it should not be treated as being separate from academic work but rather take a part of it. It also means that the responsibilities of employers in the advancement and implementation of PE should be taken seriously and skills provided for support staff. Fair working conditions can enhance co-operation between institutions and mobilisation between the research institutes and higher education institutes.
5. **Development of skills necessary for PE should be made a core part of doctoral training, comparable to methodological skills.** This means that researchers are provided practical training at the beginning of their careers, and continuous re-training throughout the length of their academic careers. As stated in BONUS pilot initiative report such training should include science communication skills, negotiation skills, stakeholder analysis and skills to facilitate interest conflicts.
6. **PE activities should be included in the academic merit system as a form of incentive.** This means that the threshold for societal interaction would be lowered and the risks of engaging actively with stakeholder would be minimised. In the SRC pilot initiative this challenge was clearly stated to be a hindrance for PE activities in projects that did not require PE and hence provide an indirect incentive. Such incentives are seen by the SRC-funded projects to promote a swift transfer of knowledge between the collaborating partners. By making PE a part of the academic merit system, the current contradiction between the two could be dealt with. Further, it would make the mainstreaming of PE more effective.

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