



## CO-CREATION IN SUSTAINABILITY SCIENCE

### Challenges and potential ways forward in implementing co-creation in European research and innovation funding

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#### Key messages

- I Co-creation is a means to improve and foster the participation of end-users by actively involving them in innovation processes. This is believed to yield a number of benefits, including bringing in additional knowledge and creativity; building partnerships and trust; increasing end-user satisfaction; and fostering legitimacy and acceptance.
- II Implementing co-creation is challenging for various reasons, such as:
  - a Differing values assigned to scientific and extra-scientific knowledge – mixing ‘objective empirical knowledge’ with ‘more subjective and judgmental’ knowledge
  - b Need for ‘intercultural’ dialogue between scientists and societal actors to translate and integrate different kinds of knowledge
  - c Lack of flexibility in R&I funding to adapt projects to emerging co-creation opportunities
  - d Lack of skills in knowledge integration and boundary management
- III European research & innovation policy could foster co-creation in sustainability, e.g. by
  - a Fostering conceptual clarity for the term co-creation and embedding a binding and clear definition in H2020, Cohesion and Territorial funding call texts
  - b Stipulating co-creation in mission-oriented R&I calls covering topics where societal impact and hence meaningful stakeholder participation is essential
  - c Adapting existing and developing new funding instruments to provide more flexible and open-ended forms of science funding
  - d Fostering skills for knowledge integration in science education



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RECREATE is a 5-year project running from 2013 to 2018, funded by the European Commission. It is carried out by a consortium consisting of 16 key partners from European research and industry and is led by the Joint Institute for Innovation Policy (JIIP). The overall objective of the project is to support the development of the European Union's research and innovation funding programme Horizon 2020, with a specific focus on the part Societal Challenge 5: Climate Action, Resource Efficiency and Raw Materials.

<http://www.recreate-net.eu/dweb/>

# Policy support needed to foster co-creation (of knowledge, products and services) in European research and innovation

*Sustainability innovation in public and private services and products requires and benefits from involving end-users into research, design and production processes. Yet such co-creation not only faces formidable challenges in practical implementation, but also requires a clearer focus in European research and innovation funding.*

## I Co-creation – Rationale of an important concept

The concept of co-creation originated from both the private and the public sector. In either context, co-creation means

...To improve and foster the participation of end-users (customers in the private sector; citizens in the public sector) by actively involving them in innovation processes.

In the **private sector**, actively involving end-users in various stages of the production process (i.e. co-creation) allows for incorporating their experience and knowledge into new products or services. This can help corporations produce more efficiently and improve their products or services, thus increasing customer satisfaction and loyalty and eventually gaining competitive advantage.<sup>1, 2, 3, 4, 5, 6, 7</sup> Thus, end-users here are seen as co-producers of products and services.<sup>8</sup> In this context, the concept of co-creation dates back to the 1980s<sup>9</sup> but has gained momentum in the context of user innovation towards the end of the 1990s, with a recent focus on the co-creation of value.<sup>10, 11</sup>

Co-creation in the **public sector** refers to actively involving citizens in social innovation processes

with the aim of improving public service design and delivery as well as decision making processes and governance performance. This is especially relevant in times of growing social challenges (such as demographic change and urbanisation) and diminishing public budgets.<sup>1, 12, 13, 14, 15, 16</sup> Hence, in this context co-creation means encouraging citizens to take an active part in and seize opportunities to drive innovation processes, generate innovative ideas and thus enhance public innovation capacities.<sup>16, 17, 18</sup> In order to achieve long-lasting changes in the relationships and positions of different actors, such co-creation processes need to be open and honest, so that both public authorities and citizens become complementary actors in the quest for enhancing public service quality.<sup>1, 16, 19</sup> Furthermore, such processes necessitate access to information and resources and require crossing organisational boundaries.<sup>1, 16</sup> Co-creation in the public sector is a rather recent concept.<sup>16, 19</sup>

With public trust in governments waning and governance perceived as declining in quality in Europe and globally for several years<sup>20, 21</sup>, fostering co-creation in the public sector is essential to helping re-establish trust and improving the quality of

governance.<sup>16</sup> For market-oriented innovation in the private sector, stiff international competition – resulting from increasingly global value chains and consumption patterns – and the pace of technological change require companies to involve their customers in new product development. Co-creation via end-user involvement allows companies to better match customers' needs and avoid market failure.<sup>22, 23</sup> Thus, co-creation can help companies gain a competitive advantage, because co-created products and services are more customer-relevant and valued.<sup>22</sup>

Overall, the concept of co-creation

- encompasses several stages:
  - i **Co-design and co-production** of knowledge, products and services – in both the private and the public sector;
  - ii **Co-implementation** of social innovations and services in the public sector. Thus, the concept closely relates to public par-

ticipation, collaborative governance and community involvement.<sup>1, 24</sup>

- is believed to yield benefits, including
  - i Tapping into additional knowledge and creativity;
  - ii Improving the allocation of resources and hence efficiency;
  - iii Allowing the establishment of long-term relationships, partnerships and trust; thus
  - iv Increasing end-user satisfaction; and
  - v Fostering legitimacy through citizen acceptance and consent.

## II Co-creation – Rationale of an important concept

Co-creation also is of key importance in science and research. This particularly applies to sustainability science, which aims to contribute to solving pressing global social and environmental problems (e.g. climate change, biodiversity loss, resource depletion) by involving science and society in designing and co-producing knowledge for sustainable solutions.<sup>25, 26, 27, 28</sup>

In the course of the 1990s, sustainability scholars argued that, in order to tackle such complex social-ecological issues, science needs to integrate and implement new modes of knowledge production in order to generate knowledge that is

- Scientifically sound, i.e. based on extended peer review, reflexivity and accountability; and

Socially robust, in the sense that it is oriented towards finding creative solutions for real-world problems by integrating knowledge from various scientific and societal actors.<sup>25, 26, 28, 29, 30</sup>

Along with this participatory turn in science<sup>31, 32</sup>, different concepts emerged, such as post-normal science<sup>33, 34</sup>, Mode 2 science<sup>35</sup> and the concept of transdisciplinarity<sup>27, 28</sup>. These concepts share the view that

... Scientific findings should be reviewed by expanded groups of peers and generated by conducting research as an interactive system. This system should allow manifold opportunities for different stakeholders to participate in order to hold scientists accountable for science and technology choic-

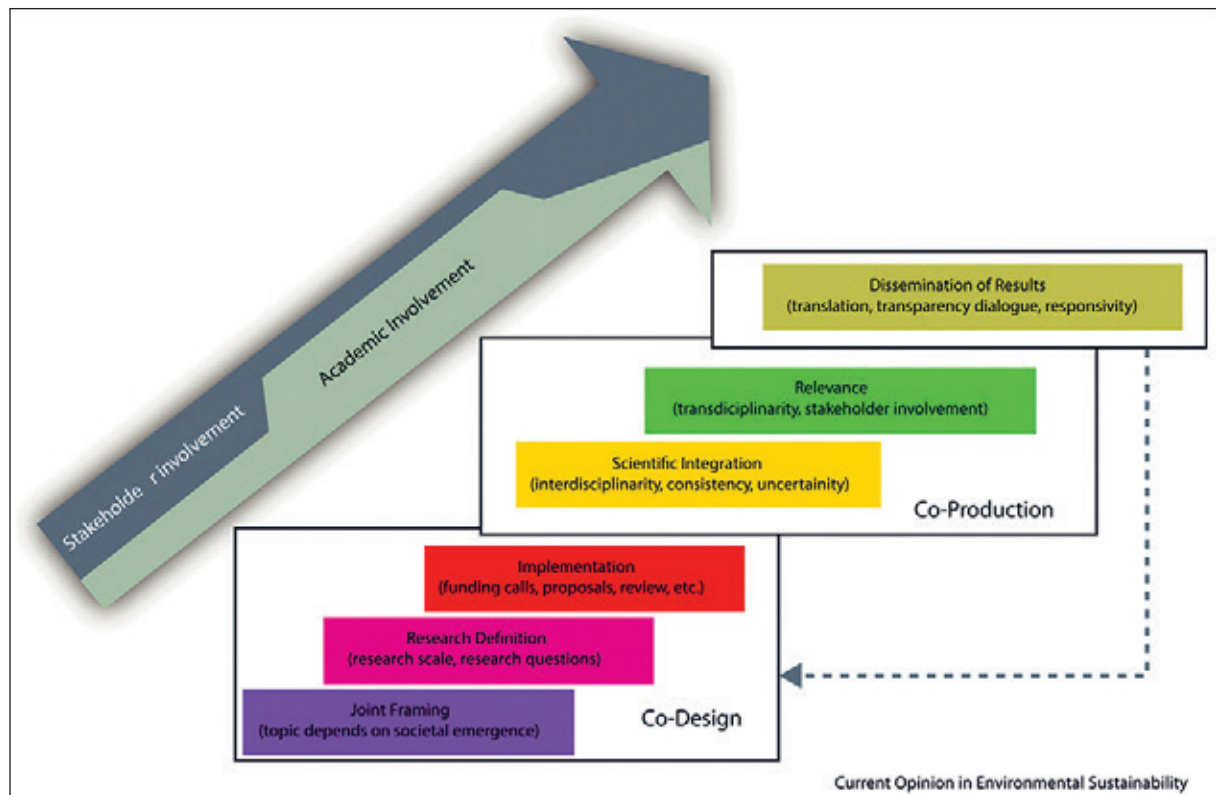
es, restore public trust and thus halt the erosion of scientific authority.<sup>32</sup>

These concepts highlight that, in order to introduce the expertise, views, expectations and reactions of non-scientific stakeholders into the scientific process, meaningful participation is required at various stages of knowledge creation, i.e. in designing, conducting and evaluating research.<sup>32</sup> This entails not only making non-scientific actors equal or main knowledge producers, but also moving away from passive consultation and beyond collaboration in data collection and analysis towards partnership and participation in the co-design of research questions, research programmes and research projects, their funding and possibly also their evaluation.<sup>32, 36, 37</sup>

The following figure from Mauser et al. (2013) depicts several consecutive steps in the co-creation of knowledge relevant for solving real-world problems:

- 1 **Co-design** of research topics and questions as well as review of research proposals – jointly done by scientific and extra-scientific actors;
- 2 **Co-production** of societally relevant knowledge through inter- and transdisciplinary knowledge integration – activities lead by scientists, but with the involvement of extra-scientific actors; and
- 3 **Co-dissemination** of the results and knowledge produced, which we suggest broadening to the co-implementation of joint solutions to societal problems and **co-evaluation** of joint research. This is done both by scientific and extra-scientific actors, with the latter being substantially involved.

Figure 1: Co-creation of societally relevant knowledge for solving real-world problems in sustainability science\*



\*Source: Mauser et al. (2013)<sup>25</sup>; p. 427

Here, we understand co-creation in sustainability science as going all the way towards fostering such partnerships, thereby allowing for mutual learning between science and society to jointly develop sustainability solutions.<sup>28</sup>

Achieving such partnerships and mutual learning is challenging for various reasons. For one thing, existing power relations and power asymmetries hamper mutual learning, as the different actors vary in their access to information, participation opportunities and being heard and listened to.<sup>28, 29</sup> Hence, establishing partnerships and enabling mutual learning requires researchers and societal actors to meet at eye level, where scientific and extra-scientific knowledge is equally valued.<sup>27, 28, 44</sup>

This creates the need for integrating different types of knowledge and ‘intercultural dialogue’. Such a dialogue involves translating the different types of knowledge so it becomes understandable and accessible to all partners involved and instigating reflexive learning among the partners for recurrent validation of findings.<sup>25, 27, 28, 45</sup>

Integrating these knowledge types towards joint societal problem-solving leaves researchers on unfamiliar ground. Generating and applying knowledge for solving societal problems entails purposive and normative aspects. Hence, ‘objective empirical knowledge’ mixes with other kinds of knowledge that a scientific perspective might view as subjective and judgmental, perhaps raising questions about its quality or production process.<sup>27</sup> Alongside lacking skills in knowledge integration and boundary management, a perceived lack of scientific rigour poses a formidable challenge to (young) researchers in engaging with and pursuing co-creation in their careers.<sup>25, 27, 28</sup>

The many benefits that co-creation promises to deliver pose a strong argument to tackling those challenges and stepping up efforts to foster co-creation in sustainability science. This can – and should – be done not least via European research and innovation policy and funding.

### III Co-creation in European research & innovation policy/funding

European research and innovation policy focuses on fostering and scaling-up research and innovation – leading to new knowledge as well as to evidence that helps better understand the risks and benefits of different policy options; yielding better products and services; enhancing competitiveness and employment; and improving overall well-being in Europe.<sup>38, 39</sup>

In order to achieve this, the European Commission set forth three main goals for European research and innovation policy:<sup>40</sup>

**1 Open Innovation** – aims to improve the transfer and circulation of knowledge across and between companies, research institutions and

users in order to transform it into products and services, create new markets and thus strengthen entrepreneurship. Hence, open innovation considers the user an essential part of the value creation process, so that knowledge can be of societal use and economic value. This requires setting conducive framework conditions via regulation, financing, forging public support and facilitating market access;

**2 Open Science** – aims to make science more reliable and responsive by enhancing co-operative work in scientific processes and a greater diffusion of knowledge through digital technologies. This necessitates promoting

open access to scientific data, to research (results) at an earlier stage in the research process (while protecting intellectual property) and to open source software and tools. Thus, Open Science allows end users of knowledge to themselves become producers of knowledge, ideas and eventually innovation. Hence, it closely links to open innovation.

- 3 Open to the World** – aims to maintain Europe’s scientific presence in and contribution to global knowledge markets by fostering international cooperation in research and innovation toward solving global problems and tapping into business opportunities in new and emerging markets. This requires setting framework conditions that support international cooperation as well as open access to knowledge and scientific processes. This focal area closely links to both Open Innovation and Open Science.

Set up to pursue these three goals, Horizon 2020 forms the EU’s current framework research and innovation programme. Running from 2014 to 2020, European policy makers equipped the framework programme with a budget of almost 80 billion EUR.<sup>40</sup> While official documents on Horizon2020 make no explicit reference to co-creation<sup>41</sup>, the theme of Responsible Research and Innovation (RRI) is closely related. RRI takes the issues of open access and open innovation further because RRI is “a dynamic and iterative process by which all stakeholders involved become mutually responsive and share responsibility regarding both the outcomes and process requirements.”<sup>42</sup>

In doing so, RRI aims to foster science and innovation that delivers ethically acceptable and socially desirable outcomes.<sup>44</sup> The European Commission introduced RRI as a cross-cutting issue in Horizon 2020 in order to *“reduce the distance between science and society [...] and to involve society in discussing how science and technology can help create the kind of world and society we want for generations to come.”*<sup>43</sup>

As co-creation contributes to designing societally relevant and inclusive research and innovation, it reflects the European Commission’s approach towards RRI.

There are no overarching strategies on co-creation in European research & innovation policy apart from open science and RRI. Therefore, we turned to interviewing relevant experts involved in and tasked with implementing co-creation in ongoing projects and relevant networks. For this purpose, we

- a selected projects under Work Programme 2016/2017 for SC5, which call texts explicitly tasked with implementing co-creation
- b contacted the European network of living labs
- c to find out about how European research funding could support and foster co-creation.

We conducted, on average, 30-minute long telephone and personal interviews with the institutions tasked with a) planning and executing co-creation activities in the awarded projects, and b) running the European network of living labs. Interview partners received three key questions to prepare for the interview:

- 1 How do you define and apply co-creation in your project?
- 2 What do you see as potential barriers to applying co-creation in your project?
- 3 What should European research and innovation policy do to foster co-creation in sustainability research?

We took interview notes and sent them to the interviewees afterwards for a final check or possible corrections. The finalised notes we then used for this policy brief. We will describe the main findings in the next section along the above three questions.

## Selected H2020 projects

We selected potentially relevant calls by searching and scrutinizing the call texts for the term co-creation and for its logic and scope as detailed in the call texts. Furthermore, we selected only projects that, by the time of the interview, had already been

running for at least half a year in order to allow for greater insight on co-creation processes.

This procedure yielded the following calls for interviewing:

Topic code	Topic title	Project title	Project acronym
SC5-06-2016 a) Managing technology transition (2016)	Pathways towards the decarbonisation and resilience of the European economy in the timeframe 2030-2050 and beyond	Innovation pathways, strategies and policies for the Low-Carbon Transition in Europe	NNOPATHS
SC5-06-2016 a) Managing technology transition (2016)	Pathways towards the decarbonisation and resilience of the European economy in the timeframe 2030-2050 and beyond	Realising Innovation in Transitions for Decarbonisation	REINVENT
SC5-06-2016 b) Assessment of the global mitigation efforts in the perspective of the long-term climate goal (2016)	Pathways towards the decarbonisation and resilience of the European economy in the timeframe 2030-2050 and beyond	COP21: Results and Implications for Pathways and Policies for Low Emissions European Societies	COP21 RIPPLES
SC5-10-2016	Multi-stakeholder dialogue platform to promote innovation with nature to address societal challenges	Development of a multi-stakeholder dialogue platform and Think tank to promote innovation with Nature based solutions	ThinkNature
SC5-13-2016	New solutions for sustainable production of raw materials	Sustainable Low Impact Mining solution for exploitation of small mineral deposits based on advanced rock blasting and environmental technologies	SLIM



## Living labs and the European Network of Living Labs

Living labs constitute a specific approach to involving end-users in innovation processes so that they have the opportunity to adapt and co-develop cus-

tomised products to better fit their needs.<sup>8, 46</sup> Living Labs are defined as

... open ecosystems that enable business and societal innovation [...] [and] offer an open-innovation space for co-creation, testing and validation of products and services like scaling up of products and services to new markets.” (Bódi et al. (eds.) 2016: 15)<sup>47</sup>

For this purpose, living labs are organised as public-private-partnerships and designed for real-life experimentation and extensive stakeholder involvement.<sup>47</sup> Thus, co-creation in living labs enables end-users to have a lasting impact on and contribute to innovation.

The idea of living labs dates back to 2006 when, under Finnish Presidency, the EU considered living labs a first step towards “a new European R&D and innovation system, entailing a major paradigm shift for the whole innovation process”.<sup>48</sup> Pushing the technology frontier and translating research & innovation results into new products and services to improve community life via living labs bridges the agendas of Horizon 2020, the Cohesion Policy and Territorial Cooperation Programmes while position-

ing regions and cities as leading actors in European innovation strategies.<sup>48</sup>

In order to advance and ensure the quality of processes and results from living labs across Europe, the EU launched the European Network of Living Labs (ENoLL) in 2006. ENoLL works on, inter-alia, creating pan-European experiments, prototypes, standards and inter-lab protocols following standardised excellence criteria.<sup>47</sup> One hundred and sixty living labs worldwide are currently members of ENoLL.<sup>49</sup> In order to become a member, living labs must submit an application via annual waves of calls for membership; based on an evaluation process, ENoLL selects benchmarked living labs and grants them the use of the ENoLL label.<sup>49, 50</sup>

## IV Lessons learned on (barriers to) applying co-creation

### Lessons from selected Horizon2020 projects

#### Definitions and applications of co-creation:

According to the selected projects, co-creation means engaging stakeholders early on and continuously to

- i generate legitimacy and improve decision making for all involved in the context of plural values and deep uncertainties;

- ii build trust with and among different stakeholders from business and industry, civil society, policymaking and academia; and
- iii mobilise stakeholders to get involved in jointly developing and discussing project-relevant strategies and pathways. This, in turn, necessitates identifying the scope, space and times where stakeholders can be directly involved and testing ways to best engage them.

Interviewees deemed participation and stakeholder involvement important in all project contexts, but with the scope and depth of co-creation differing. For instance, in the context of mining, co-creation supports raising social awareness and discussing social licenses to operate mines. Hence, any exploration activity would do better to plan ahead in terms of a social license to operate where a mineable deposit has been found. But in terms of co-creation for project development and guidance, open innovation appeared the more important form of stakeholder participation.

Another project employed co-creation via a co-creation panel (consisting of NGOs, civil society members, public policy/government and business groups) to identify and discuss future pathways, thereby helping the project to make choices about its direction. The project viewed this as a weaker form of co-creation as it does not follow the rationale of co-creation to improve decision-making.

Actual co-creation approaches, i.e. ways of engaging stakeholders, also varied across the selected projects. Overall, interviewees considered workshops with stakeholders a key element for the co-creation of project-relevant strategies and pathways. However, stakeholder exchange should be tailored to respective target group needs to allow for and motivate participation in the exchange. For instance, involving city officials via workshops lasting several hours (a half-day or so) seemed to work better than trying to get industry involvement. In the latter context, setting up local and industry-specific think-and-do-tanks for pooling practice appeared to work well. In addition to face-to-face meetings, online platforms are another means to engage multiple stakeholders in identifying problems and good practices via a kind of „mini facebook“.

## Potential barriers to applying co-creation

The interviewees noted different barriers as hampering and complicating co-creation.

**Integrating diverse kinds of knowledge and expertise**, from academic/scientific to practical, into project guidance proved difficult because views and advice seemed partially contradictory or to pull the project in different directions at the same time. Hence, synthesising diverse kinds of knowledge and expertise for project guidance constitutes a challenging task in co-creation. Linked to different kinds of knowledge and expertise, interviewees stated that involving a diverse set of external experts is essential to ground the discussions in relevant and salient issues. However, the different kinds of knowledge

and expertise also yielded advice that did not fit the technical specificities of the project or went beyond what the project could accommodate given its personnel, financial and time capacities.

Another major barrier to co-creation through stakeholder participation is **getting stakeholders to attend co-creation events**. People have limited time and cannot or might not want to participate in co-creation activities. As there is neither any obligation to attend nor, often, sufficient resources available to compensate stakeholders for their attendance time and travels, engaging them continuously is challenging. Stakeholders rightly ask, “what is in co-creation for me?” While they might learn

interesting things by attending co-creation events, the project (team) usually learns more and acquires proprietary knowledge. Mostly, project teams succeed in getting general interest from stakeholders to participate. Yet if stakeholders find first encounters not relevant to their activities and co-creation events receive significantly fewer participants than invited/targeted, then actual participation stops. Therefore, interviewees considered it essential that the projects and their stakeholder events maximise relevance to external stakeholders. This could be done by teaming up with key actors from different stakeholder categories, for instance with business associations, municipalities, government agencies or civil society organisations.

The **culture of an(y) organisation** might be more or less conducive to working with or “against” open innovation as a form of co-creation. For instance, any company based on patents might be reluctant to or against engaging in open innovation and co-creation.

In the context of the **H2020 programme**, interviewees felt that to win bids projects, they had to go for co-creation. That led to many co-creation activities and workshops, even if this does not entirely fit the premise of the project. This, in turn, could lead to rather pointless workshops and frustrating participation events for all those involved. Furthermore, interviewees perceived the **project action descriptions (DoA)** to be **inflexible**. As these are often the documents according to which the projects are monitored, projects need to follow the schedule of deliverables and meetings as laid out in the DoA. However, the DoA often becomes outdated as the project progresses, and changing DoAs is time-consuming. Hence, having to follow the DoA clashes with co-creation needs for flexibility, new stakeholder constellations and varying co-creative engagement approaches. Thus, following the DoA precludes the ability to adapt the project pathway to emerging needs and opportunities.

## The role of European research and innovation policy in fostering co-creation in sustainability science

Alongside the barriers identified, interviewees suggested several ways how European research and innovation policy could foster co-creation in sustainability research.

**Supporting researchers in organising and achieving co-creation.** In H2020 calls and project reality, the burden to organise and achieve co-creation is mostly on researchers, and less on other actors targeted for involvement in co-creation. This leaves researchers somewhat alone in understanding what to do with co-creation and how to manage it. Hence, there should be support from and dialogue with the European Commission to foster co-creation through guidance on how to engage stakeholders and how to

take up feedback and advice obtained. Such guidance should help researchers to answer the following questions relevant to meaningful co-creation:

- Who are relevant stakeholders that should be contacted?
- How to contact them?
- What are appropriate options for engaging which stakeholders?

As many researchers have no direct contact to private sectors partners, a platform facilitating exchange, for instance, would be helpful. This could be linked to the matchmaking or knowledge broker-

age events that some national contact points offer. Support by the European Commission should also encompass financial support to reimburse stakeholders for participation, both in terms of travel costs and time spent. If everybody (not least government and research policy) wants co-creation but there are no incentives for the non-scientific actors to take part in co-creation, then this is a very asymmetric relationship.

**Increasing the flexibility of project management and budget.** The rather linear processes laid down in DoAs to first prepare research work and then hold co-creation workshops with stakeholders hold up poorly in a non-linear reality and need to be adapted to ongoing processes and relevant emerging issues. This requires the flexibility to deviate from DoAs in order to foster co-creation and enable projects to make more use of professionals with expertise in

PR, government relations and knowledge brokerage. This seemed more promising to interviewees than having academic researchers trying to invent novel and interesting ways of engaging people. This also needs more budget flexibility, including for sub-contracting, over the course of a project, e.g. to hire specialist firms for communication and relations management.

**Linking funding to certain conditions.** Co-creation has a place in mining as a way to involve stakeholders from the very beginning. R&I policy could foster co-creation by linking the funding provided to mining companies to conditions they must fulfil, such as involving some stakeholders early on. In particular larger mining companies would know the impacts of their excavation actions and could tell people from the start what they are doing and potential impacts and benefits.

## Lessons in regard to living labs

### Definitions and applications of co-creation

According to the interview, the international network of benchmarked Living Labs (ENoLL) has collected and shared a large number of scientific research materials and study results about open innovation and end-user engagement methods and tools throughout its 12 years of existence. For the purpose of analysing innovation stages and categorising Living Lab projects, ENoLL usually references Dimitri Schuurman's<sup>8</sup> matrix to identify where a Living Lab (LL) is placed as regards the

- 1 maturity stage an innovation is at: idea, concept, prototype, pre-launch, launch, post-launch; and
- 2 level of analyses of a LL project: micro, meso or macro.

ENoLL also uses this approach for evaluating LL applications and selecting new members. Every year, ENoLL invites new LL members to apply to its network. Of the around 50-60 submissions annually, ENoLL selects only 20-25 based on a list

of 20 criteria<sup>49</sup>, including:

- Co-created values from innovation processes;
- Strength and maturity of multi-stakeholder partnership (quadruple helix, i.e. ensuring the involvement of actors from the four groups of academia, citizens, private sector and public sector);
- Commitment to open innovation practices; and
- Openness of the stakeholder partnerships.

Past years of labelling experience show that simply rejecting applications for LLs reduced the interest and commitment of the applicants towards engaging in LL type activities. Therefore, as part of the annual Open Living Labs Day event, ENoLL now officially offers a Learning Lab on day 0 of OpenLivingLab Days, where ENoLL discusses unsuccessful submissions with the applicants to improve their bids for re-submission. ENoLL aims to scale this kind of learning further but has to look for additional

funding because the current membership fee is too low to cover the costs. Based on estimations, the network has a potential outreach to 50 million citizens through the LLs already labelled (more than 400 since ENoLL's establishment in 2006).

In a significant number of H2020 calls, public

engagement and user involvement is either encouraged or set as a prerequisite for successfully applying. ENoLL is currently working on creating a trademark and becoming a sort of accreditation body, as many H2020 proposals use the term Living Lab without actually referring to the definitions used and standards set by ENoLL.

## Potential barriers to applying co-creation

ENoLL welcomes that public participation and end-user engagement are among the basic criteria for H2020 calls so that public participation and end-user engagement no longer remain at the will of project proposal teams. However, R&I policy could further foster co-creation by making it mandatory for all projects proposing to use LLs to apply the 3O (Open science, Open innovation, Open data) agenda.

In this context, ENoLL could furthermore recommend that its definition and quality criteria for using LL become much more visible and maybe even mandatory for any H2020 proposal that proposes to use LL (as quality criteria for LL proposals under H2020). ENoLL could act as an accreditation check for any such H2020 proposal. Alternatively, H2020 proposals should at least clearly reference ENoLL's work and H2020 proposal evaluators could be asked to specifically check whether this has been done.

Setting up and running LLs requires certain skills, such as talking to private companies and knowing

how to handle co-creation methodologies and the human factor therein. This requires a combination of skills from different professions, such as metrics, psychology and economic/business models. In order to ensure the quality of co-creation and LL activities, such skills and new professions need to be translated into curricula. Fostering such skills and professions would also help to scale the application of co-creation and LLs across Europe because LLs cannot be copied in their format from one location to another. Instead, LL hosts need a good understanding and the right set of skills to transfer LL lessons learnt to other locations and contexts.

Furthermore, there is need for political support, especially in those parts of Europe where few LLs exist and politicians are not systematically engaged in co-creation. This will also produce benefits in terms of systematic behavior change in policymaking and building skills in policy makers.

## V Policy support needs

- Stipulate co-creation in mission-oriented R&I calls covering topics where societal impact and hence meaningful stakeholder participation is essential
- Foster conceptual clarity for the term co-creation and embed a binding and clear definition in H2020, Cohesion and Territorial funding call texts
- Require project proposals that suggest using Living Labs to either
  - seek approval by ENoLL or
  - refer to and apply the quality criteria and standards for living labs elaborated by ENoLL
- Adapt existing and develop new funding instruments to provide more flexible and open-ended forms of science funding that
  - provide and allow for room for experimentation and flexibility in project execution and the use of project funding to allow adapting research processes to emerging needs and opportunities for co-creation, e.g. via unforeseen subcontracting of professionals in PR and knowledge brokerage
  - require setting up meaningful stakeholder participation processes
  - fund or provide other incentives for stakeholder participation in co-creation (travel costs and time spent)
  - foster mutual learning among different stakeholder groups
- Support researchers in organising and achieving co-creation, e.g. by
  - providing guidance on how to engage stakeholders
  - facilitating stakeholder identification and contacting for researchers, for instance by setting up exchange platforms or matchmaking events
- Fund research projects that
  - assess the added value of co-creation from a political and cultural perspective to identify, evaluate and possibly quantify the democratic, governance and socio-political value of co-creation
  - highlight the relevance of co-creation as a process and strategy to address potential democratic deficits or performance gaps in public services
- Improve the capacities of funding agencies to assess and handle transdisciplinary project applications, which may be accompanied by a higher risk-return ratio as they are open-ended and bring in changes/stakeholders that could lead to disruptions in the project
- Foster the development of standards of “excellence” for transdisciplinary research and promote their use among evaluation systems, inter-alia, for project funding, scholarly performance assessment and peer reviewing
- Foster skilling for knowledge integration and boundary management in science education

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Policy Brief No.9, May 2018

**Co-creation in sustainability science – Challenges and potential ways forward in implementing co-creation in European research and innovation funding**

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Berlin, 2018

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Cover page: AdobeStock\_@Rawpixel

