

Article

Social labs as good practice for transdisciplinary engagement processes in research and innovation

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Abstract

This article discusses a 'Social Lab process' applied in the field of research and innovation as good practice for transdisciplinary processes, and elaborates upon the structure and dynamics of these processes. It sheds light on how engagement processes could be set up for a more inclusive and participant-friendly atmosphere, allowing for meaningful and sustainable outcomes. Supported by data from a qualitative analysis of 19 Social Lab experiences according to the thematic programmes of the European Commission Horizon 2020 research framework programme, this article outlines requirements that need to be taken into account when implementing a transdisciplinary process in a Social Lab. Based on the concept of transdisciplinary research and the experience of this one-and-a-half-year process, the elements of participatory approaches required for successful implementation of a Social Lab, starting with inviting participants to develop small implementation projects (pilot activities) are described. The qualitative analysis of the process documentations highlights the importance of a clear definition of the framework and purpose of the process. Concrete assignments

of the lab teams and roles, and the implementation of pilot activities, further proved crucial for successful and sustainable results. On this basis, recommendations for a fruitful participatory process are formulated.

Keywords: public engagement; responsible research and innovation; roles for participation; Social Lab; transdisciplinary research

Key messages

- Social Labs correspond with the highest level of participation, that is, empowerment.
- Public engagement processes (such as Social Labs) require clearly defined roles and responsibilities; the goals and the steps to reach them have to be (co-)defined, and the public engagement process needs to be transparent at all times, communicating expectations to everyone involved from the very beginning.
- Co-created pilot activities that create visible and lasting effects can be regarded as seed projects for outscaling activities.

Introduction

Public engagement in research and innovation (R&I) is raising questions of how to enhance the implementation of such processes. Finding ways to effectively engage stakeholders, especially from civil society, and to cope with contradictory attitudes, remains challenging (Stahl, 2013). Both the stages of innovation and the way in which the public should be involved in related processes need to be clearly defined. Commonly agreed quality standards for public engagement processes are required (Dautzenberg, 2014).

The ongoing proliferation of participatory processes in many sectors contrasts with the lack of standards for public engagement activities and their results (Emery et al., 2015; Rip, 2018; Stilgoe et al., 2013). Even practices that merely inform a defined public about research processes might be referred to as using participatory approaches (Pearson, 2019). Public engagement processes are currently implemented along a continuum, ranging from various forms of passive, one-way information to the other end of empowerment, where societal actors are actively involved in the process from the beginning, defining common goals and driving the final decision making (IAP2, 2007; Nabatchi, 2012; Nelimarkka et al., 2014). Avoiding frustration and managing expectations play crucial and challenging roles throughout the engagement process (Marschalek, 2018). It is particularly important for researchers and engaged stakeholders to agree upon a certain level of participation upfront, aligning levels of participation with clear agreements, in order to prevent unrealistic expectations of the process and a mismatch of announced actions (see Figure 1).

In relation to this, employed engagement models in R&I processes are criticised along various lines:

- Due to the increasing proceduralisation of public engagement, it has progressively lost sight of the problems it attempts to solve (Stilgoe et al., 2014).
- The engagement activities often lack identified goals or outcomes, or a clear commitment to their outcomes is missing (Powell and Colin, 2008).
- A lack of process definition also hinders an appropriate evaluation of participatory research (Stilgoe et al., 2014).
- In processes of informing and updating engaged stakeholders, in cases where communication is stopped too early, and participants are not informed of the outcomes of the R&I process and their engagement, it might be difficult for participants to judge the usefulness of their engagement and

Figure 1. Levels of participation and aligned agreements (Source: Authors' illustration, 2023, based on IAP2, 2007)



efforts (Kupper et al., 2015). Target groups often remain undefined (Human and Davies 2010), and the question of who is referred to as the 'public' or 'mini-publics' remains unclear (Stilgoe et al., 2013).

- During the deliberative activities, much critique is raised about the composition of groups of participants, the roles within the groups, and the group dynamics affecting the deliberations. There are potential challenges with these group-based activities, and also 'biased participants' (Human and Davies 2010), where inequalities between groups and individuals are often even more compounded. Too often, there is an emphasis on finding consensus within the groups (Blok, 2019; Stilgoe et al., 2014), an approach which neglects the diversity of views of heterogeneous groups.

These and other issues hamper engagement activities, and they need to be considered if engagement processes are to be successful. Approaches that provide a framework for fruitful collaboration with scientific and non-scientific people already exist, but they are often neglected. One of these is the concept of transdisciplinary research (Hadorn, 2008), which has already been implemented for more than a decade. Its clear structure of the research process remains relevant. The first phase encompasses problem identification and structuring. In the second phase, the problem is analysed. Finally, the third phase is about implementation; initiators call this phase 'gaining value from the process' (*In-Wert-Setzung* is the German original; Bergmann et al., 2005). In this last phase, results are implemented in real terms, and remain sustainable in the field. Small tangible or intangible projects that are carried out in the community work best for producing fruitful results (Marschalek, 2008).

The Social Lab approach, discussed below, addresses the aforementioned requirements by providing for a clear, structured co-creation process, with dedicated roles and a clear setting for collaborative small projects, called 'pilot actions'. In line with the phases of transdisciplinary research (Hadorn, 2008), the Social Labs first provide the framework within which the various roles and tasks are defined (see the section on 'Social Lab teams', below). Within the labs, a common process of problem definition is organised (see the section on 'Social Lab workshops') to agree on the challenge that the lab process should address. Second, the teams analyse the challenges, and, third, they co-create ideas for solutions to be implemented and tested in real-life settings (see the section on 'Pilot actions'). Finally, the pilot actions are evaluated in a participatory manner.

This article describes how Social Labs were set up on the basis of a project funded by the European Commission (EC) titled NewHoRRlzon. Using reporting materials of all 19 implemented labs, the article seeks to provide empirical and descriptive evidence for Social Labs as good practices for public engagement in research and innovation processes. In particular, the article investigates the following questions: How does a Social Lab approach provide for a framework that allows for transdisciplinary research processes? What are necessary requirements in roles, respective responsibilities and assignments? How can decision making on pilot actions be enabled? What are barriers and supporting factors in the Social Lab process?

The NewHoRRlzon project

This article draws upon the experiences from the EC-funded NewHoRRlzon project, which sought appropriate means to integrate responsible research and innovation (RRI) into national and European research and innovation systems. The project started in May 2017, and it ended in September 2021. NewHoRRlzon understood RRI as an overall and cross-cutting issue, and it diagnosed the status of RRI at European and national levels and took into account its global dimension. NewHoRRlzon designed, tested, assessed and implemented so-called pilot actions to encourage the integration of RRI into R&I in specific scientific and societal fields. Pilot actions were tangible projects which addressed specific issues in the respective programme lines of the H2020 funding programme.

The Social Lab approach

The Social Lab approach was created as an open room for social experiments by Zaid Hassan (Hassan, 2014; Hassan et al., 2015). This approach explicitly strives to engage the public in complex social challenges at a systemic level. The implementation of Social Labs is highly flexible and context-dependent. The approach follows three core principles: (1) the need for diversity among stakeholders; (2) the value of using conflict productively; and (3) the benefit of having the freedom and the funding to experiment with innovative ideas and to make mistakes.

The Social Labs approach as applied in the NewHoRRlzon project, consists of three pillars: (1) a series of three face-to-face workshops; (2) pilot actions which constituted real-life experiments aimed at addressing identified challenges; and (3) the creation of communities of practice consisting of the lab teams and their networks, as well as institutions and contexts in which the pilot activities were implemented. In total, the Social Labs co-designed and implemented 58 pilot actions for enhancing RRI across all 19 thematic programme lines of the European Horizon 2020 framework programme.

Research methodology

The open-ended format, and the diversity in the material, called for the use of qualitative research methods (Flick, 2012). To get an overview of the manifold simultaneous processes happening under the facilitation of 19 different Social Labs, tailored reporting templates were completed after every Social Lab workshop. In total, 57 reports (three reporting templates each for 19 Social Labs) were drawn in the analysis. Additionally, the proceedings of two cross-sectional workshops (CSW) with Social Lab managers and facilitators (CSW 1 and CSW 2), as well as pilot hosts (CSW 2) participating, were used as the empirical basis for this article. While there are a variety of techniques available for the interpretation of qualitative data (Mayring, 2014), classification and structuration were deemed the most appropriate forms for the purpose of this study. The collected written material was analysed using the qualitative analysis software package MAXQDA. Some of the codes were generated deductively and selected on the basis of the questions in the reporting templates. One example of this encompasses the methods used by the Social Lab facilitators during the workshop. In addition, this code set was expanded during the process of analysis to allow for the integration of further material not yet covered, that is, coded inductively. For instance, 'methods for supporting pilot actions after selection' evolved as inductive codes. The final code

system consisted of 40 inductive and deductive codes encompassing 1,953 coded text sequences; of these, 529 explicitly referred to the Social Lab methodology. On the basis of these codes, the content was restructured and summarised.

Results

This section elaborates the experiences gained in the NewHoRRizon project, based on reports of the different workshops (WS) from all Social Labs (SL). The source of direct and indirect quotations is provided in brackets (WS x, SL x). At the end of each subsection, the main insights, the most important challenges and the facilitating measures are summarised. The first subsection focuses on the composition of the Social Lab teams and pre-established roles, the second elaborates on the pilot actions created by the Social Lab participants, and the third delves into the processes of physical collaboration in a workshop setting.

Social Lab teams: participants, predefined roles and group dynamics

All 19 Social Labs began with an invitation process to engage 15 to 20 persons who were connected in some way to the lab's programme line. Researchers, representatives of companies or industries, policy makers, funding institutions and civil society members were reached via personal email invitations. Participants for the Social Labs were recruited by reaching out to existing personal contacts and asking them whether they wanted to take part in the process, and requesting them to forward the invitation to other potentially interested parties. Several invitees who had been contacted by email asked for more information, and they often also preferred to talk about procedures in phone calls, as this enabled more direct contact and the possibility to immediately clarify open questions. Against the background of the required effort, it was essential to transparently share information about the nature and purpose of the labs, and the reason for inviting them in person, and to demonstrate the potential benefits of participation in the lab process. This strategy proved helpful in attracting participants across all 19 Social Labs.

As outlined in the Social Lab handbook (Griessler et al., 2021), the participants in a Social Lab are supposed to be integrated into the team, and they are invited to remain part of the overall Social Lab process for a period of at least one-and-a-half years. A total of 314 persons, mostly researchers, followed the entire Social Lab process in the framework of the NewHoRRizon project. However, not everyone who participated in the first Social Lab workshop stayed throughout the whole process, and about 27 per cent of all participants recruited (83 persons) dropped out of the process. Of the lab participants who accompanied the whole process, some were not able to attend all the workshops, but they nevertheless wanted to remain members of the Social Lab. Lab managers emphasised that not everyone who did not take part in a workshop was automatically eliminated from the Social Lab, 'which is why it is important to differentiate between the workshop participants and the team members as a whole' (SL 5, WS 2).

Roles

The roles assigned to members of the Social Lab strongly influence the participation processes. As a result, the roles in the NewHoRRizon Social Lab approach were explicitly defined prior to the start of the process, and communicated right from the beginning, making it easier for the participants to understand their responsibilities and requirements in relation to their role.

The **Social Lab managers** were pre-identified as part of the project consortium and, as such, were responsible for organising the entire Social Lab process. The managers connected the individual Social Lab with other labs and with the overall project. Their importance became even clearer when there was a discontinuance of their role: 'Due to staff changes, the SL management got stuck, which caused difficult situations' (SL 7, WS 2). The Social Lab managers provided the groups with information about resources, timelines and expectations, as well as with background material, especially on best practices. They

monitored the progress of actions and ensured that necessary steps were taken. Sometimes, they had to 'push for action, try to get additional people on board, and link to other SLs' (SL 15, WS 1). In addition, the Social Lab managers 'continuously advised people to realise their agency and activate their networks and/or institutions' (SL 10, WS 2). One of their main tasks was also to ensure that 'ambitious pilot ideas are feasible but still keep their strong RRI vision' (SL 18, WS 1). The Social Lab managers had to constantly reflect on their own role, by completing reporting templates, which involved meticulous documentation of all the processes, comparing goals and objectives of the workshops and lab activities with the actual results, and also reflecting on the lab process in terms of methods, outcomes, group dynamics and so on. They ensured a continuity of work in the Social Lab, keeping an eye on everything that had happened before and needed to be done afterwards. As was noted afterwards: 'We have been in continuous contact with them [the SL participants] via email to hear how things have been going and whether we could assist them in any way, just as we have had a few follow-up Skype calls throughout the process' (SL 18, WS 3).

The **Social Lab facilitators** were responsible for designing and facilitating all face-to-face workshops (three per Social Lab), with a focus on co-creation workshop techniques. The vital role of the facilitator and the importance of good moderation as key components for a successful lab were highlighted across all Social Labs. Being agile and flexible in adapting to the needs of the groups and individuals tailored to the programme were important facilitation skills described in the reporting templates. The facilitators had to cater for the different levels of knowledge among the lab participants: 'While Social Lab methodology fosters active engagement of the facilitator, it is yet to be further explored how much involvement makes sense in which setting. We believe that the amount of involvement needs to be adapted to the specific Social Lab and workshop setting/sample' (SL 17, WS 1). The facilitators also had to be familiar with multi-stakeholder learning processes. It was important 'to address different levels of the discussion, so that each participant feels confident and motivated to intervene' (SL 12, WS 1).

Although the roles and tasks of the managers and facilitators were indistinct at times, the main tasks of the lab facilitator focused upon the preparation and facilitation of the workshops. The Social Lab facilitator was in charge of the structure, time management and coordination of group dynamics during the workshops, as well as of establishing a common thread between the different workshops. The role of the facilitator was important in steering the discussion and balancing the contribution of participants, as demonstrated by the statement: 'The facilitator had to intervene several times to get the discussion going into a productive direction, and help them to move towards convergence and actionable ideas' (SL 3, WS 3).

Pilot hosts were Social Lab participants who volunteered to lead and implement a pilot action which addressed an already diagnosed 'problem' in the respective field, for instance, lack of responsible open-access standards. This meant that they had to invest a lot more of their time throughout the process, compared to other participants. Some pilot hosts received adequate support from their team members; others, unfortunately received less than required. Several participants 'complained about this unequal distribution of efforts' (SL 4, WS 3). Work-sharing became a recurrent question: How to distribute the workload of pilot hosts? How to motivate other team members, especially from other pilot actions to additionally contribute? However, 'mostly, hosts themselves carr[ied] out the work' (SL 15, WS 1). The facilitators strove to lighten the workload of the pilot hosts, or to offer more backing: 'Pilot hosts are agents of change who need as much support as possible to get the message out, and to be able to have an impact (e.g. on institutional change)' (SL 4, WS 3). In some cases, transformative pilot actions were carried out in a downsized version, as these activities had to be realistically implementable within the labs, and participants were 'resorting to their usual comfort zones/areas when concretising the pilots' (SL 10, WS 1). However, in many cases, the hosts participated on their own initiative, and they contributed even more than could actually be expected of them. In addition, the 'personal involvement of several pilot action protagonists led to a positive and co-creative atmosphere' (SL 3, WS 2).

Finally, the **Social Lab participants** were stakeholders of the related Horizon 2020 funding line, who were neither directly in charge of pilots as pilot hosts, nor indirectly through contributions to pilot

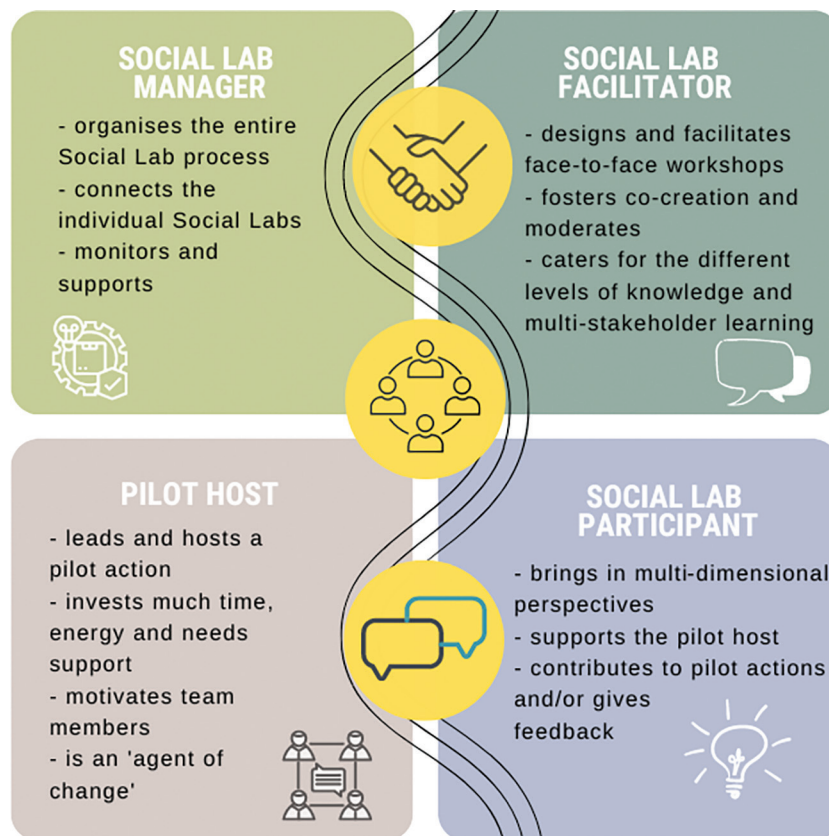
actions as a member of a specific pilot team. Social Lab participants were part of the co-design process of possible pilot ideas (WS 1), and they consulted and assisted pilot teams with the implementation in face-to-face workshop settings (WS 2 and WS 3), as well as in between. Within this group, fluctuations were higher, and continued participation was a challenge. From the facilitators' point of view, the participants needed to be motivated to remain active in the lab, but also the fresh ideas from newcomers brought in an added value that needed to be integrated. Some participants chose to send other representatives from their organisation in case of unavailability, or forwarded lab communications from the Social Lab managers to other people in their network, which indicated their interest.

Some of the participants only partially attended the workshops. They would, for instance, only stay for about half a day, which caused difficulties in group dynamics. One solution sought was to move the lab teams to more remote locations, which required more commitment to get there and back home (for example, SL 4, WS 2, and SL 9, WS 2). Despite the often reduced number of participants, the labs were able to operate, sometimes even more smoothly, since those who remained were particularly committed to the process.

Figure 2 summarises the four different roles in the Social Labs, as well as related responsibilities.

Where a clear assignment of roles and commitment was missing, pilot actions worked out poorly or were dropped completely. In cases where hosts took on the responsibility, and invested sufficient time and effort, pilot actions thrived. Furthermore, according to the last step of the transdisciplinary research concept, the final phase of *In-Wert-Setzung* (Jahn et al., 2012), the implementation of real-life and tangible projects, the pilot actions, were crucial. Many pilot action outcomes have become sustainable, even after the end of the Social Labs, in the form of institutionalised activities or materials, and tools such as the online tool for accessing information on renewable energy (see the section on 'Social Lab workshops',

Figure 2. Roles and responsibilities in a Social Lab (Source: Authors, 2023)



below). These outcomes are visible signs of fruitful lab processes with clear effects. The processes towards their implementation supported and strengthened the role of pilot hosts as agents of change in their institutions, as pilot actions were specifically tailored, addressing commonly identified needs, co-created, co-decided and evaluated along the course of their development. Thus, these pilot actions have great potential as seeding projects for further changes and scaling-up of activities.

Teamwork and group dynamics

The Social Lab managers supported the lab team-building process in order to allow for better collaboration, enabling 'more familiarity and trust among participants, and the group growing as a unit' (SL 7, WS 2). For example, the Social Lab managers prepared a folder with short CVs of all participants. This 'created a feeling of a group, and it was supportive to get to know each other faster' (SL 1, WS 1). These and similar settings further enabled the team to work on challenging group dynamics, such as diverging perspectives, values, needs and problem definitions. This plurality–consensus dilemma is not solvable by maintaining the emphasis on consensus processes perpetuating a normative focus on reconciling perspectives. In the NewHoRRizon Social Labs, joint problems were identified at the face-to-face workshops, enabling every participant to contribute to their solution. Instead of seeking a content-based consensus, focus was put on trust and appreciation (Asveld et al., 2015). This follows the premise that only if participants trust that information and ideas presented are valued by others, will they share information openly.

Several personal meetings and ongoing interactions between the workshops contributed to the fact 'that they [the Social Lab participants] became fairly familiar with each other and ... could exchange ideas very openly' (SL 7, WS 3). The nature of the different personalities also influenced the discussions: 'This generated a bit of inequality between participants, especially between those who are comfortable speaking in public and those who are less' (SL 12, WS 1). Therefore, many group-forming activities were carried out by the facilitators. Addressing these issues required clear workshop facilitation and structure.

Although on the whole the Social Labs process worked well, in a few cases, some lab managers decided not to continue the collaboration, for instance because 'one of the participants intervened with several less constructive remarks, so we decided not to host this participant again for another workshop' (SL 15, WS 1).

The lab team composition was specifically meant to counterweight dominant perspectives. Persons of different hierarchical levels were present at the workshops, which influenced the discussions, as some persons were in 'hegemonic positions and act[ed] accordingly' (SL 17, WS 1). The diversity of lab teams did not always result in a collaborative atmosphere, with some participants also remaining 'deep[ly rooted] in their usual roles' (SL 19, WS 3).

In most cases, the lab participants appreciated the collaboration as a team, and the 'group energy was very positive and enthusiastic' (SL 2, WS 1). Group dynamics worked well: 'the group bonded quickly. It was felt that everyone had something valuable to contribute and that the mix of the group was very beneficial' (SL 7, WS 1). It was also 'suggested to continue the work [as a team], supporting each other, also beyond the project' (SL 4, WS 3).

The main challenges identified in Social Lab processes, and the facilitating measures for participants, predefined roles and group dynamics applied within the labs as a result of the analysis of the qualitative material for this study, are summarised below.

Main challenges for Social Lab processes:

- recruitment process: reaching diverse stakeholders committed to such a long process
- fluctuation among participants
- strong influence of roles on the participation process
- lack of guidance on different levels of discussions, structure and time management
- unequal distribution of efforts
- creation of teams and gelling together

- heterogeneity of lab participants
- establishment of trust among participants
- differing interests and values.

Facilitating measures supporting participants, predefined roles and group dynamics:

- clear communication of expectations, goals and objectives
- prior direct communication/personal contact for clarification
- differentiation between the workshop participants and the team members as a whole
- prior introduction and definition of roles fostering team building
- constant monitoring of expectations and support provided by managers
- decrease labour of pilot hosts by offering more support
- support lab team building through personal meetings, ongoing interactions and group-forming activities.

The pilot actions: participant-led processes

'Pilot actions' are the activities that each Social Lab implemented as part of its experimental process, as described in the section on the 'The NewHorizon project' in the Introduction. The labs designed, implemented and reflected on tailor-made actions, which addressed the critical issues identified in the diagnosis of the implementation of RRI in respective programme lines. For example, for Research Infrastructures (SL 2), one of these was the lack of accessibility of research infrastructures to a wider public. Pilot actions were to emerge organically from each Social Lab and, as such, were dependent on the specific context, as well as on the interests and motivations of the various stakeholders of the teams.

A budget was allocated to support the implementation of the pilot activities in all Social Labs (€5,000 for each pilot action). This amount could be used for so-called 'other costs', such as materials, rent or travel costs, but not for personnel costs.

The suggested method for generating pilot ideas according to the lab handbook (Griessler et al., 2021) was to establish a marketplace of ideas, giving all Social Lab members the opportunity to share their own ideas. Once the ideas had been noted down on flipcharts and displayed in the room, all team members had the chance to browse through them. This so-called gallery walk was intended to enable the team members to develop an impression of the ideas presented, and to have the opportunity to clarify any open questions by talking to the pilot idea owner. To collaboratively and transparently select pilot ideas for further collaboration, voting took place through the application of sticky dots. The criteria for the selection process varied slightly among the different Social Labs. While some used the selection criteria of pilots with the greatest expected impact on R&I in the respective field, others asked to vote according to one's own willingness to contribute, or to select pilot actions with the highest chance of being operationalised.

In most cases, the selection process went smoothly, as clear group favourites emerged. Participants expressed that they had appreciated the selection process, the related discussions and the results. However, some selection processes were more difficult, and they required agile facilitation to steer the group while still letting participants decide autonomously.

In rare cases, the participants did not identify with the selected pilot ideas, which prevented them from taking over responsibility and participating in the forthcoming work on the pilot actions. In general, the selection process was regarded as a key element of the entire workshop, and as a condition for moving forward.

Overall, 58 pilot actions in a total 19 Social Labs were successfully implemented during the project. They addressed all dimensions of the RRI concept, and they were based on problems identified by the lab teams and provided experimental solutions to address these problems. The formats of the pilot activities encompassed workshops on RRI, RRI trainings, discussions, case studies, dissemination activities

and events. Pilot actions also resulted in different kinds of tools, documents, websites and best practice examples, many of which contributed to awareness raising and institutional change. For example, Social Lab 4, which focused on research infrastructures, co-created a new interactive space for science education in the Natural History Museum of Vienna, and Social Lab 9, which focused on the topic of clean, secure and efficient energy, set up a website that provides resources and a list of stakeholders working on renewable energy across European countries (https://reknowhere.eu/?gtc_lang=EN).

These pilot activities were not only worked on during the face-to-face lab workshops, which involved members of all the pilot actions of a particular Social Lab, but also in between. The workshops served as a platform for Social Lab teams to share their experiences and, where necessary, to seek support from participants of the other pilot actions within the Social Lab. During the workshops, the facilitators supported the pilot teams to define their next steps and to organise support for their tasks. In terms of collaboration between workshops, managers helped to arrange calls and additional meetings to 'facilitate the monitoring of the pilots and to discuss pending issues' (SL 14, WS 3), to discuss contents or to interlink the pilot activity with other Social Labs of the project. Mailing lists, collaboration platforms (such as Trello) and social media networks (such as LinkedIn) were set up to foster virtual communication. Continuous effort from the Social Lab manager was needed to keep communication alive throughout the process: 'It was hard to reach people between the workshops, not much work was being done, and the process of sending countless emails, reminders, and doing calls during the 1.5 years was at times tedious and frustrating' (SL 16, WS 3). Nevertheless, virtual encounters were of 'scarce success, whilst face-to-face meetings were particularly successful reinvigorating enthusiasm about the Social Lab activities' (SL 12, WS 3).

The participants of individual Social Labs repeatedly expressed the wish to get an overview of other ongoing pilot actions, and some felt that there was a lack of common knowledge and collaboration with other labs. Thus, most Social Lab facilitators started giving updates about other labs during the workshops. Furthermore, the NewHoRRizon project homepage was kept up to date with a description of all the pilots. In order to support cross-sectional exchange and learning between the Social Labs, two cross-sectional workshops with Social Lab managers and facilitators were organised. The scope of the exchange was to coordinate and produce synergies between the Social Labs and evolving pilots. The main challenges identified for participant-led processes, and the supporting measures identified in the data, are summarised below.

Main challenges for participant-led processes:

- agile facilitation for selection processes to steer group discussions, but still let participants decide autonomously
- continuous effort throughout the Social Lab process to keep the Social Lab alive between the meetings
- lack of knowledge of and collaboration with other labs.

Facilitating measures fostering participant-led processes:

- allowing for the flexible adaptation of the workshop agenda when more time is needed
- face-to-face meetings are key to drive pilot actions forward
- fostering virtual encounters in between the times of face-to-face collaboration
- providing updates about other Social Labs
- organising cross-sectional workshops.

Social Lab workshops: processes of physical encounter for mutual collaboration

The three Social Lab workshops represented the central meeting points of all Social Lab members, and can hence be considered to be a crucial pillar of the Social Lab process.

Most of the Social Labs conducted two-day workshops; some shortened the workshop programme to one-and-a-half days to better align the workshop with the availability of the participants. Comfortable

and stimulating environments that created a calm atmosphere and provided spaces for both recreation and interaction worked best.

The workshop sessions allowed joint discussions and reflection to develop ideas, share experiences and plan new activities. Innovative workshop techniques, such as 'walkshops', that is, having guided discussions in groups while walking (Wickson et al., 2015), helped to create a trusting and benevolent working environment. Informal encounters were a key factor for the Social Lab teams to grow and to collaborate. To encourage this informal environment, while at the same time advancing serious discussions, both formal and informal elements were combined. For instance, the first part of a visioning exercise took place during the working dinner. In another case, the team stayed at the same hotel and spent some time in organised leisure activities. Also, 'coffee breaks were important spaces for recreation, trust-building and interaction amongst the participants but also with the Social Lab team' (SL 19, WS 2).

In general, most Social Lab participants considered that the lab workshops enhanced out-of-the-box thinking. The main challenges identified for physical encounter and mutual collaboration with regard to the Social Lab workshops, and the corresponding facilitating measures applied, as deduced from the qualitative data upon which this article is based, are summarised below.

Main challenges for physical encounters for mutual collaboration:

- ensuring a benevolent working environment and atmosphere
- creating spaces for recreation, trust building and interaction among the participants.

Facilitating measures fostering physical encounters for mutual collaboration:

- offering bright, friendly and appealing venues
- applying innovative workshop techniques (for example, walkshops)
- allowing joint discussions and reflection to develop ideas, share experiences and plan new activities
- fostering informal encounters.

Finally, all lab activities needed to be ended. As recommended by various authors (for example, Nitsch et al., 2013), participants contributed to the evaluation and reflection of their activities. Social Lab participants had the opportunity to participate in the second cross-sectional workshop to validate their contribution.

Conclusions

Participatory processes in R&I activities are becoming more and more important, yet the quality of their implementation can vary to a large degree. This article has shown a viable way of implementing transdisciplinary research from a practice perspective, by illustrating how the processes were set up in the context of the NewHoRRizon project, with insights for future implementations of Social Labs. Evidenced by the implementation of the Social Lab process in the NewHoRRizon project, such processes have the ability to overcome a range of challenges for public engagement processes in R&I. The approach allows for clear agenda setting, and definition of roles and tasks, and it creates ownership among participants. However, for a lab process to function and fulfil its purpose, a number of prerequisites are necessary, as described above.

The workshops implemented in the Social Labs were central to initiate the lab process, to form teams, to create and select ideas for suitable pilot actions, and to carry out the implementation and reflection process. Most importantly, competent facilitators, capable of designing the workshops in detail and offering adequate techniques, are key for emergent co-creative and solution-oriented processes.

Given the required time and resource commitment, it is recommended that the value of participating in a Social Lab is clearly outlined.

The lab is a room for experimentation. It might be necessary to strike a balance between control and creative freedom for those involved. Co-creation techniques help to think outside the box and to harness the wisdom of the group. Accordingly, much emphasis has to be put on the joint development and co-creation of pilot ideas.

The way in which the selection of pilot actions is facilitated is decisive for the further course of the activity. In terms of transdisciplinary research, pilot activities create visible effects that persist also after the lab processes and, as such, they can be regarded as seed projects for upscaling activities. From the start of the lab process, the final decision-making power was placed in the hands of the participants. This approach hence corresponded to the highest level of participation: empowerment (see Figure 1). The process of co-designing and selecting pilot actions was specifically designed to encourage ownership of those collaborating, with pilot hosts self-selecting this role for themselves in the voting process, and pilot teams opting in themselves.

Finally, a detailed reporting on the lessons learned and outcomes of the lab process is important to identify synergies, to enhance collaboration, and to make lab participants and their institutions visible as testimonials. As an approach for implementing transdisciplinary research in different contexts and with a variety of stakeholders, Social Labs have proven to be effective in terms of concrete outcomes of the co-created process. In a world of ever more complex challenges, a multi-perspective view cannot be neglected, and it needs to be furthered with respective funding opportunities dedicating sufficient resources to transdisciplinary approaches such as the Social Labs.

To sum up, there are three main requirements to be considered for successful Social Labs:

- a clear definition of goals, methods, expectations and roles
- establishment of a process with flexible and adaptive structures, allowing for creativity and experimentation in an atmosphere of trust and mutual collaboration
- competent and skilled facilitators and managers guiding the process, keeping an eye on common goals for creating visible effects.

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Declarations and conflicts of interest

Research ethics statement

The authors conducted the research reported in this article in accordance with scientific standards. The article was approved by the ethics committee at the Centre for Social Innovation, Vienna.

Consent for publication statement

The authors declare that research participants' informed consent to publication of findings – including photos, videos and any personal or identifiable information – was secured prior to publication.

Conflicts of interest statement

The authors declare no conflicts of interest with this work. All efforts to sufficiently anonymise the authors during peer review of this article have been made. The authors declare no further conflicts with this article.

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