



TOOLBOX FOR OPEN RESEARCH AGENDA SETTING

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Work Package: 6 – Stakeholder Engagement

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Foreword

A core aspect of the Arqus European University Alliance is the collaboration on openness in research. Open Science is a set of good practices, principles and goals that aims to reduce barriers in all aspects of the research process for the benefit of research and society. Opening up different steps in the research cycle for experts and laypersons outside academia is a central attribute of Open Science – open research agenda setting thereby covers the starting point in the research cycle.

With this toolbox on open research agenda setting (ORAS), the Arqus Universities want to contribute to the ongoing debate on how to better include stakeholders in the research process. As an alliance of European universities, Arqus provides a unique university view on stakeholder engagement. This document represents the first version of the toolbox. In order to facilitate implementation of open agenda setting at the research institutions and to support researchers in adopting these new techniques, some of the collected tools will be tested in local workshops and subsequently evaluated in a revised version of this toolbox. Universities have an important role in this changing society and the serious problems it faces. Making research more inclusive and responsive to societal needs is part of this role.

With this toolbox, Arqus can bring relevant know-how to our universities and embrace the increased responsibility of higher education institutions, as laid out in the European University Association's (EUA) paper on "Universities without walls". Our aim in this work is to make existing ORAS knowledge and tools accessible and to lower the threshold for researchers who want to engage in ORAS. We will engage actual scientists as well as stakeholders in this process and strive to foster connection and exchange.

Chapter 1 gives an introduction to stakeholder engagement in science and more specifically to open research agenda setting. This includes benefits and challenges of open research agenda setting, as well as relevant stakeholder groups.

Chapter 2 provides a guide to stakeholder engagement in research, focusing on social, legal, ethical and other concerns to be considered.

Chapter 3 focuses on planning a stakeholder workshop, detailing aspects to keep in mind before, during, and after the event.

Chapter 4 introduces specific open research agenda setting tools, some of which will subsequently be tested by the Arqus Universities. This section gives an overview of each tool, and how it can be applied in a stakeholder engagement workshop focusing on open research agenda setting.

1. Stakeholder engagement and open research agenda setting

Modern societies are facing increasingly wicked problems characterized by high stakes and a multitude of causes. Many of these complex issues today, such as the climate crisis or adverse effects of digitalization, are not hinging on scientific facts or technological development per se, but rather on societal changes and political action. A lot of knowledge is available, but transfer, implementation and acceptance is lacking.

Against this backdrop, there is a growing call for research and science to be more grounded within society, to engage more with lay-persons and experts outside academia in order to conduct research that is truly useful for our changing world. This is also reflected in the growing number of funding calls for research projects aiming to connect science to society (e.g. under Horizon Europe's work programme *Widening participation and strengthening the European Research Area*).

Stakeholder engagement is a way to bring in new perspectives and voices into the research process, to anchor research in regular people's desires and needs. In short, stakeholder engagement is "a mechanism to improve the efficiency, quality and relevance of research and improve transparency and trust in Science" (OECD, 2018). These processes can be especially useful for research in the Social Sciences, Humanities and the Arts, but can also be highly relevant in Science and Technology Studies or any other question that could benefit from a societal perspective.

Stakeholder Engagement in Science

At its core, stakeholder engagement is the involvement of 'outside' actors who are affected by the outcomes of a specific process. It is a common practice in companies or organizations, as well as in (local) politics, for instance when planning an infrastructure project. In science/research, stakeholder engagement is the inclusion of non-science actors in the research process. As this is the focus of this toolbox, further mentions of stakeholder engagement will refer specifically to the science/research arena. It is part of the larger notion of Open Science, which refers to more accessible, transparent and inclusive research processes and output.

There are a large number of different stakeholder engagement concepts and classifications, but basically there are a few dimensions that can vary:

Level of involvement (weakly or strongly tied to research process)

Stage of involvement (at which point of the research process)

Purpose of involvement (purely informing research question or informing policy recommendations)

Stakeholder engagement can happen at any point in a research process, from agenda setting or the formulation of a research question (co-creation), to giving input or feedback on an already existing agenda or result, to (partly) conducting the research themselves (co-production) and finally to evaluating and communicating results of the process together (co-dissemination).



Figure 1: Schematic stages of possible stakeholder engagement in research, after Mauser et al. (2013)

Of course, stakeholder involvement can be recurring, or have different forms within one single research project. In practice, phases may not be as delineated as in the figure above, but can flow into one another, or move back and forth.

When determining the level of stakeholder involvement, it is also common to distinguish between public communication (unilateral flow of information from researchers to public), public consultation (unilateral flow of information from public to researchers) and public participation (bilateral flow of information) (see Rowe and Frewer, 2005).

Open Research Agenda Setting

This toolbox introduces open research agenda setting (ORAS), the involvement of stakeholders in charting out areas of interest and developing priorities for upcoming research. A research agenda is the identification of the key issues and questions related to a specific topic to be explored by a research project or within a larger research environment. Research agenda setting encompasses the alignment of the individual interests of the researcher, research environment conditions, institutional priorities, societal needs and actual grand challenges as well as considering the views of relevant actors/stakeholders. Here, including stakeholders at an early stage allows for a better anchoring of science in society as stakeholders get the opportunity to truly influence and shape research priorities/projects from the beginning. It can also lead to increased reflection about the research agenda from the researcher's side, identifying what one wants to do and where stakeholder interests lie.

However, even at this stage there are various formats and scopes for including stakeholders, ranging from stakeholders giving feedback on a pre-formulated agenda, to the co-development of an agenda ‘from-scratch’.

Some of the methods used for stakeholder engagement in research agenda setting are not exclusive to this purpose but can be used for other reasons for involving stakeholders as well, at various points within a research project. The scope of open research agenda setting can range from a few hours to processes that last several weeks or months. The most common is approach is through one or two-day workshops.

Within the research cycle, open research agenda setting is one of the first steps that can be taken when pursuing an Open Science research strategy, as visualized in Figure 2.

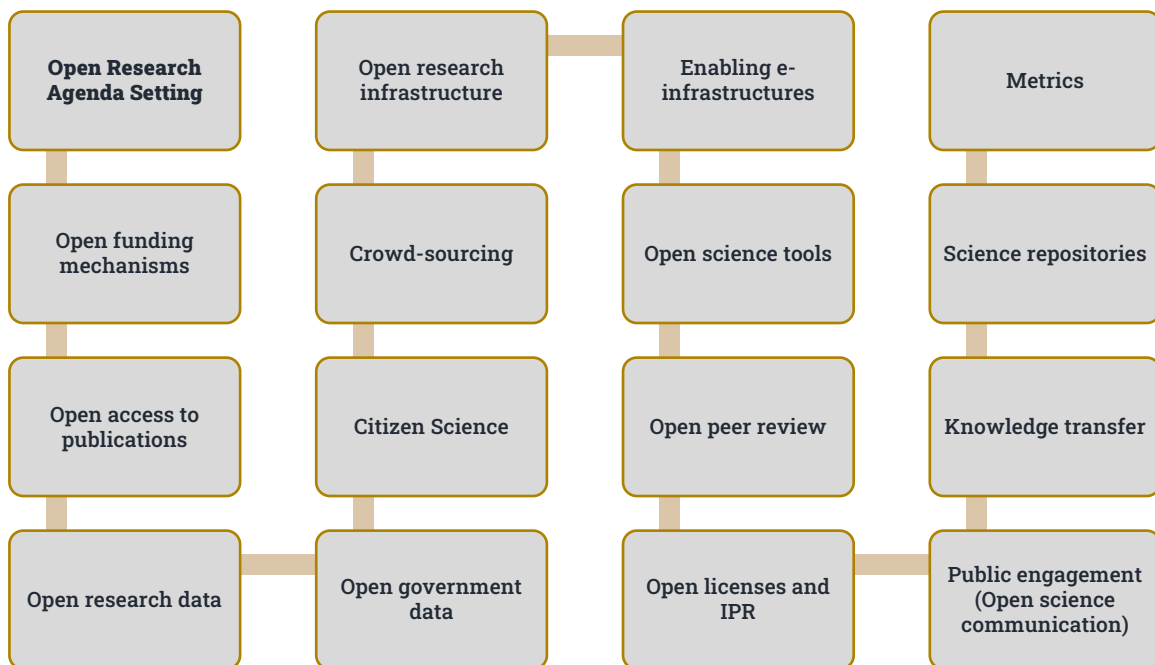


Figure 2: The building blocks of Open Science as listed by Dai et al. 2018

The Benefits of Open Research Agenda Setting

Stakeholder engagement may improve the quality of research in many ways. There is a considerable list of **benefits** which support the increased call for including non-scientific actors in science and agenda setting. For instance, involving stakeholders in the research process increases the *transparency and accountability* of science, as well as fostering *trust in science*. Especially in today’s world that is ripe with science skepticism and denial, pseudo-science and fake news, improving trust in science and science literacy are important goals.

By giving room for a *multitude of voices*, inclusion of stakeholders can lead to the *democratization* of science, pulling it out of the proverbial ivory tower and rooting it in the experiences, ideas, fears and desires of lay-persons. Being heard and included can also *foster the acceptance* of certain projects or interventions. It can thus increase the *societal impact* of science. In addition to providing stakeholders with *access to knowledge*, it can enable direct interaction with policy makers and open an arena for their needs and concerns *being heard*.

Further, input received from non-science stakeholders can widen the scope or context of a project (or conversely narrow it down to a specific focus). By providing fresh sets of eyes and ideas, stakeholder engagement can therefore improve the *quality and relevance* of a research project. Researchers may not only benefit from the creativity and knowledge brought into the shaping of the agenda, they may also gain higher *impact* from their research since stakeholders are aware of the scientific work conducted and its importance for them.

For participants, stakeholder engagement can improve *social cohesion* within a specific group involved in the process, and it can foster connections and provide the grounds to establish networks of various kinds. It can also serve as a tool for *capacity building* and stakeholder *empowerment*, by providing information, tools, resources and an arena for learning and exchange. Working with stakeholders can also open up new *funding opportunities* or improve eligibility and viability for (EU) funding calls.

Challenges in Open Research Agenda Setting

However, there are also a number of **challenges** to stakeholder engagement in research agenda setting which should not be glossed over. Involving stakeholders can be fruitful, but its success depends on deliberate preparation, monitoring and evaluation. It can thus require a considerable amount of planning and resources. Therefore, the *time frame* and *cost* are some of the first things to keep in mind when considering stakeholder involvement in research.

Deciding on *who to include*, and subsequently how to reach relevant stakeholders can be a considerable challenge as well. People in general might be wary of “sacrificing” a weekend to be involved in a research process, and specific groups might be particularly hard to reach and/or *reluctant* to participate. Finding enough participants that will reliably show up at the event/meeting/workshop can be difficult. It is also important to reflect on the relevance of the envisaged stakeholder group, and what level of previous knowledge is needed to give valuable input.

In order to have a successful event, *skilled facilitation* is key. If the research group does not have a facilitator themselves, finding an external one might be necessary. This might mean including an additional actor in the planning process, as well as increased staff costs. The need for additional moderators or facilitators as well as timekeepers or note-takers can also arise.

While transdisciplinary research and stakeholder engagement in science is increasingly called for by funding bodies such as the EU, there is still a widespread lack of scientific recognition for and consideration of such activities in *research and career evaluation* processes. Traditional research assessment focuses heavily on publications, disregarding other forms of scientific output and processes. While there is also a movement to make research assessment more open and inclusive, the current system can be a disincentive to engage in open research agenda setting and other stakeholder engagement activities.

Relevant Groups for Stakeholder Engagement and ORAS

In its simplest definition, a stakeholder is someone who has an interest or concern in a particular situation or process. This can mean that they are directly involved in a course of action, or being affected by it. The assessment of who are relevant stakeholders has to be made for each given situation. If inclusive, this can involve a high number of groups and individuals. Indeed, there is no limit or regulation on who could be involved in Open Research Agenda Setting processes as a stakeholder, as long as their interest and/or concern is relevant to the research. In practice, this cannot always be decided up front; however, commonly included stakeholder groups are:

- Specifically affected local populations
- Businesses/Business owners
- Policymakers
- CSOs and Activist Groups
- NGOs
- Students
- Certain occupational groups

2. Building and maintaining an efficient and trusting relationship with stakeholders

The idea of open research agenda setting is that anyone who engages in any specific research issue, regardless of status, profession or expertise, cannot only participate in ongoing research but also participate in defining the very objects of the research. What better way to respond to social demands than to ask society to express its questions, needs (of knowledge, of expertise, of rationality), doubts and desires?

This toolbox provides methods to facilitate and develop interactions between the research ecosystem and the largest possible range of stakeholders. This chapter explains why this relationship needs to be thought through in advance and what it requires in concrete terms from the parties involved to ensure the sustainability of the relationship and the project, during its implementation and beyond.

Open research agenda setting can stand on its own, but it can also be part of a larger process of stakeholder engagement and open science. While focusing on research agenda setting, the recommendations in this chapter are contextualized within a broader open science process.

Involving and co-building

Stakeholder engagement aims to generate research agendas which are beneficial to society at large while meeting the needs and aspirations of the researchers themselves. Open research agenda setting therefore starts with building reciprocal relationships between researchers and stakeholders. For researchers, this new way of working with people who may not be trained in the scientific method can be a challenge as it radically changes the way research activities are carried out.

However, as we have seen in chapter 1, rather than questioning stakeholders' roles and legitimacy in producing knowledge, this approach can be seen as an opportunity. First, it allows researchers to broaden their research habits, discover new methods, and benefit from other perspectives and skills (users experiences, emotional feedbacks, etc.). Second, engaging directly with stakeholders addresses the common critique of researchers as "detached" from society.

Third, this approach is a fruitful way to bring civil society closer to academic research and thus fight against the possible sense of instrumentalization of science.

From the researcher's point of view, it is therefore necessary to be able to hear what participants from outside academia propose, and even to be able to stimulate social demand and aid the expression and materialization of needs. Establishing this **dialogue** and offering a framework in which stakeholders can express their requests and issues without fear should be considered an essential first step. An investment in cultural translation can be necessary here in order to see if questions and expected results match the concerns of the researchers involved. Listening and empathy are needed! To do so, various activities are possible:

- Inviting different people or organizations which might have some interests in common to share their concerns (whether they are about their daily lives, their region, their activities, or their responsibilities) and express the kind of knowledge and expertise they would need. Sharing one's own concerns with other actors is often a particularly fruitful way of taking a step back and giving rise to new issues for potential new research questions.
- Inviting each other to relevant events, seminars, and general assemblies in order to raise awareness about each other's perspectives and points of view and to understand from "where" attendees are speaking;
- Sharing previous experiences (citizen science projects or equivalent) with all interested stakeholders to illustrate the added value of this collective approach and the different possible ways of collaborating.

When it comes to stakeholder engagement, one of the key elements to keep in mind is the need to foster a relationship of **respect, trust and transparency** among the different actors that mobilized in the production of knowledge, whether they are "knowledge professionals" (teachers and researchers, students) or not (civil society, citizens, companies, NGOs etc.). No research, no project, can be successful if this is not understood and agreed upon from the start. This is especially true when it comes to setting the research agenda, including identifying the themes, topics and issues that are considered legitimate for investigation. It is vital to bear in mind that the involvement of multiple stakeholders in setting the research agenda and conducting research activities has two aims: generating research questions, data and results and creating awareness, a sense of belonging, and citizenship.

Generating **reciprocity** requires taking into account the expectations of all the actors actually involved and their diversity from the very beginning, in terms of contexts, norms, references, values, ways of working and so forth. In contrast to a traditional research project designed and carried out unilaterally by a researcher or a research team, the technical qualities – in the sense of "how to produce knowledge concretely and lead an investigation" – cannot be the only ones considered. The diversity of the actors involved must also be considered in designing and

carrying out activities to ensure the success of the project and to make the most of the skills, know-how and qualities of each stakeholder.

The way in which the research project itself will be designed and constructed also depends on the **degree of commitment** expressed by each stakeholder. A project that is too ambitious in comparison to the involvement of the participants is bound to fail. On the other hand, a project with too limited objectives is likely to frustrate those involved who have shown strong ambitions and high expectations. Here it is one of the responsibilities of the lead researcher – as project manager – to coordinate all the actors and to balance the aspirations, needs and capacities of each stakeholder.

As in every scientific research project, the choice of methods depends on the discipline in question, the topic and the objectives pursued. This point is especially important when all stakeholders are not professional researchers: in the continuity of the “what” and the “why”, clearly defining the “how” of the collaboration is a necessity. The right tools, from ideation to formalization to problematization, must be identified and agreed upon by all from the very beginning.

More broadly, **clarity** and **flexibility** are two additional core concepts: clarity in the expression of the ambitions and objectives of the project, in the definition of its process and its different phases, in the vocabulary used to avoid any misunderstanding; flexibility in the sense of the ability of the actors to change their positions, to adapt to “others” and to unforeseen developments, to readjust their expectations in the course of the project. The willingness of each partner to be challenged their choice of methods is critical. As always in collaborative ventures, there is a risk of misunderstanding and conflict which must be anticipated and prepared for.

That is why it is important to discuss the objectives, potential challenges, responsibilities, and expectations of all stakeholders before the collaboration starts. For a longer collaboration, this may be formalized in writing as an “informal contract” which will be the document to refer to if the cooperation meets some obstacles. The document can also outline quality standards and other ethical or legal considerations.

Quality standards and ethical/legal considerations

Needless to say, involving multiple stakeholders in setting the research agenda should not be at the expense of the quality of the research itself, but rather lead to added value for all parties. As with any project, research projects involving many stakeholders are evaluated for their scientific output, data quality, participant experience and wider societal or policy impact. Therefore, **aligning objectives and requirements**, whether time-related, operational, technical, legislative or budgetary, is essential and requires special attention. This section outlines broader

considerations and common issues regarding quality standards and ethical/legal considerations when working with stakeholders.

Recruitment standards. Who can participate in the project, why and how? The way the team is constituted and its composition must be transparent, in addition to the respective responsibilities within the project. A key aspect is the role of each individual in the decision-making process, and particular attention should be paid to potential conflicts of interest (who is involved and why). How to engage vulnerable and marginal groups, not typically involved in science or research, should also be a concern.

Funding issues and ethical principles. It is essential to draw up a provisional budget for the project in order to identify possible needs (including equipment, personnel, infrastructure) and potential funders. The origin of any funding sources should be publicly disclosed and shared with all stakeholders involved. Concerns about possible conflicts of interest should also be made clear (who is funding and why).

Definition of the **time frame.** If the open research agenda setting workshop is part of a larger open science project, then defining the objectives of the project and providing an outline with project milestones, deadlines, expected results and impacts from the very beginning is also important.

Legislative and jurisdictional contexts (e.g. relevant connections to policy-making bodies). Legal issues depend on countries, jurisdictions, disciplines and even topics and need to be clarified beforehand, with legal expertise if needed.

Data quality. Another aspect is to define what quality means, and to give examples of good and bad quality data in relation to the specific project. It is the responsibility of researchers to ensure adequate quality and to providing relevant trainings and protocols to stakeholders. Assigning responsibilities to all people involved will lead to more identification and engagement with the project.

Data management and openness (copyright, intellectual property, personal data, data sharing agreements, confidentiality, attribution, etc.). Data management must be transparent and comply with legal requirements. It is important to agree at the very beginning of the project which data will be collected, who will have which rights relating to them and how they can be secured and made available in the long-term. In open science, particular care must be taken to make results available, in addition to the data/metadata and methods used, so that they are accessible and reusable for as many people as possible. When carrying out a workshop, it's often necessary to provide participants with the information about what data is being collected and recorded and to request their consent (typically with a signed form).

Reporting and evaluation. Evaluation is an ongoing and iterative process as the project needs to be assessed also while it is still running. In addition, self-assessment should be performed at the end: Were the aims of the project met? Were they exceeded? Considering the collective

dimension and the societal ambition of the approach, the evaluation must also take place at different levels: the quality of the scientific results themselves, the effective degree of commitment of the stakeholders, the educational outcomes (scientific literacy or environmental education for example) or the increased awareness of socially relevant issues should be monitored and assessed.

Environmental impacts. Particular attention should be paid to the environmental impact of the activities carried out, both in the short and long term. This impact should be anticipated and kept as low as possible.

Disseminating and moving forward

Working with multiple and diverse actors implies a constant search for **consensus**, about words, practices and interpretation of results. Communication between the different parties involved is crucial both during the project, and also when considering the production and dissemination of results. Some, though not all, ORAS processes will have a participatory dissemination component. Researchers wishing to embark on this path should be aware that a collaborative approach will require more time and effort when it comes to sharing the results, either from the research agenda setting workshop or from a broader open science approach. However, the level of ambition in sharing results will vary according to the aims of the workshop.

Stakeholders who have made efforts - in terms of time, energy and resources - in carrying out a project have good reason to expect to see these efforts recognized and to be involved in the sharing of the results. The content of the project and its realization are a collective work for which all participants should be credited. Stakeholder engagement also mean stakeholder **empowerment**.

But how can results be disseminated in a collective manner without some participants feeling excluded? The following are some tips and examples of initiatives that help to overcome this pitfall and extend the collaborative dimension of the projects concerned beyond ideation and realization to dissemination and sharing:

- Develop a communication strategy from the very beginning of the project, specifying the competences and responsibilities of each participant in terms of dissemination.
- Allow for discussion and open debate as soon as preliminary results are produced.
- Offer participants the opportunity to take part in training workshops on scientific communication that could give them the tools to share the knowledge they have helped to build.
- In the same spirit, write and share accessible abstracts that partners, depending on who they are, can disseminate in their own networks (policy makers, donors, private sponsors and public institution etc.).

- Give preference, as much as possible, to collective papers, published open access, and take care to mention, for each of them, all the individuals and structures that have participated in their development (in the acknowledgements or, even better, as co-authors).
- Organize public dissemination events (talks, educational programs, parties) involving everyone.
- Sending newsletters or creating blog posts with scientific results directly linked to the project can prolong the feeling of inclusion.

In a longer open science process, one danger is to end the stakeholder relationship at the project's conclusion. This can give stakeholders the impression that they were used as a tool and not as an equal partner. As mentioned above, the stakeholder relationship is based on trust: it is important to maintain this trust after the project ended. Future projects may also require the support and/or participation of these same stakeholders, and it is therefore essential that the researcher and his/her institution maintain a respectful relationship.

3. Organizing the workshop

A stakeholder engagement workshop is designed to generate concrete outcomes and conclusions. In this case, these workshop outcomes are meant to inform and influence research and innovation agenda setting. While there are many different ways to organize and run a successful stakeholder engagement workshop, there are some common steps and deliberations that need to be made as the workshop is planned and organized. This chapter reviews the key steps involved in planning, organizing, running and evaluating a fruitful workshop. This starts from clearly defining the workshop purpose and topic to identifying and recruiting relevant stakeholders, designing the workshop agenda, running the workshop and making sure that the proper documentation and workshop evaluation is in place. It ends with some special considerations for organizing online workshops.

Planning the workshop

The purpose of engagement and topic of the workshop

A stakeholder engagement workshop needs a clear purpose and topic in order to be successful. An important question to address early on in the planning process is: What is the desired outcome of the workshop? Examples of outcomes include a prioritized list of research questions, a map of people and resources affected by the research topic, or descriptive narratives of how a topic could potentially develop in the future (scenarios). Having a firm idea of the desired outcome will guide decisions about what types of stakeholders to engage and which workshop activities are most appropriate.

It is also important to consider which level of stakeholder engagement (see ch. 2) the workshop is aiming for. A workshop with the aim to inform or consult stakeholders will likely be quite different from a workshop which aims to engage stakeholders as partners in designing and co-deciding on the research agenda. Define the workshop purpose and topic at an early stage, and use that purpose to guide the rest of the planning process, including the recruitment of stakeholders, the choice of workshop methods and the arrangements for documentation.

Identifying and recruiting stakeholders

The aim of the workshop will help define the scope of what kind of stakeholders to invite. Common aspects to consider include stakeholders' education level, expertise in the topic, gender and age. Identifying stakeholders for the workshop is often a matter of identifying existing networks to tap into. Depending on the topic, NGOs, professional networks and volunteer groups can be a good place to start.

The composition of the stakeholder group is an important consideration. A group of stakeholders with diverse backgrounds and perspectives can lead to rich discussions, but if the workshop topic is controversial, it may require careful facilitation to avoid contentious arguments. Conversely, a group of similar stakeholders may allow for exploration of a single perspective in depth, though the discussion may illuminate fewer facets of the issue. Remember that stakeholders will also have perceptions of each other, which may affect their participation. For example, a “regular” person may be reluctant to share their views on stem cell research if placed in a group with stem cell researchers.

Keep in mind that different types of stakeholders may have different abilities to participate. For example, pensioners may be happy to participate in a three hour afternoon workshop, while a school teacher, though equally interested in participating, may have very limited time to participate. Similarly, scheduling a workshop during the workday may be easier for some stakeholders (if their employers support their participation), while an evening workshop may be easier for participants with less flexible jobs. The workshop should be scheduled in such a way that it’s most convenient for the target stakeholder groups.

Designing the workshop

The workshop methods should be aligned with the purpose of the workshop and the types of stakeholders that are involved. It is useful here to consider which outputs these methods will generate, and how these outputs can subsequently be used to inform/decide on the research agenda.

A good workshop plan keeps its purpose in mind and gives room to different types of stakeholders and personalities to contribute to the discussion. Often a mix of different types of activities (e.g. group work and plenary presentations/discussion) is useful. Switching between different types of activities also helps to create a good “pulse” throughout the workshop and keeps participants engaged and energized. Including an “ice breaker” exercise in the beginning often sets the stage for creative and constructive discussions later on.

When creating the detailed workshop plan, it is important to allocate realistic amounts of time to each step or activity. It is easy to be overly ambitious with regards to the number of different activities and exercises that can be included in a given amount of time. Remember that group discussions and sharing of results often take more time than anticipated, as do transitions between activities. When in doubt, allocate more time.

The workshop plan should also keep the participants’ energy in mind. Maintaining a good energy level throughout the workshop is key to a successful outcome. Many workshop exercises can be both challenging and intensive and can demand a lot of energy from the participants. Therefore, make sure to mix intensive group exercises with ones that demand less energy from the participants. When planning the schedule, also remember that participants need breaks. In

addition to giving the participants “time off”, breaks are often valuable and productive time for building social relationships, networking, etc.

Especially if using a new tool or working with new facilitators, having a “dress rehearsal” can help identify parts of the workshop plan that are unclear or require extra resources. In addition, it can help determine how much time to allocate to each section of the workshop.

Finally, make sure to have a Plan B ready in case something does not work as planned. This could be simple workshop exercises that participants can do in case the technology fails or a plan for which workshop activities to skip if time becomes short.

Sample workshop time plan (3 hours)

Time (minutes)	Activity
15	Welcome from workshop convenor and introduction to workshop aims
15	Icebreaker activity
20	Presentation on topic
10	Break
40	Small group work activity
10	Small group summarizes their findings to present
10	Break
20	Representative from each small group presents their results in plenum
30	Facilitated plenary activity/discussion of small group work
10	Facilitator summarizes workshop results, informs on next steps, and thanks participants

3.1.4 Plan for documentation

When planning the workshop activities, always keep in mind what output this activity will generate and how these results will be recorded. Recording and documenting workshop output can be achieved in many different ways:

- Workshop participants can be asked to take notes (e.g. on flipchart papers) during group discussions and exercises. These notes can then be used for the workshop report. However, keep in mind that these types of notes will often be fragmented, contextual and can be hard to decipher by the facilitators.
- Workshop participants can be asked to present the key insights and conclusions from their discussions, which can be recorded by notetakers. These presentations often provide the highlights from the workshop exercises and can serve to contextualize and supplement the participants' own notes.
- A notetaker can be allocated to each of the workshop groups (see ch. 3.1.5).

- Filming or audio recording can provide a high level of detail, but keep in mind that it may also inhibit participation. Any filming or recording will likely require an additional consent form from participants.

Defining the workshop roles

Some activities require or benefit from having a team of facilitators to divide up responsibilities. Example roles include:

- **Facilitator:** facilitates discussion among participants, ensuring that everyone is heard and keeping the group and discussion focused on the relevant task.
- **Notetaker/recorder:** records what is said and collects data during the workshop
- **Timekeeper:** ensures the group stays within the agreed upon times in the agenda
- **Workshop convenor:** welcomes participants to the workshop and introduces them to the workshop goals. This can be someone who is trusted/respected by participants but is not involved with the actual running of the workshop.

Arranging the workshop venue

The venue can have a significant impact on the comfort of stakeholders and success of the workshop. Especially in cases of contentious topics, it's important that the venue be "neutral" (e.g., not in the conference room of a business that advocates for one side of an issue). Visit the workshop venue in advance to know where materials are located, how to connect to internet/projector, and how to access technical support if needed. If the venue doesn't offer coffee and snacks, then workshop organizers may need to find a way to provide this.

It is important to have a plan in place for how the workshop venue will be arranged. Make sure that the room is large enough and with proper ventilation for the group size that is convening. Room(s) should be set up in a way that's conducive to the workshop activities. If participants will be engaging with each other, make sure they will be able to easily make eye contact with and hear each other. Keep in mind that having many small groups working in one large room can make it difficult for participants to hear each other and stay focused. In such cases, moving groups into smaller breakout rooms may be a better option.

The role of the facilitator

Researchers are often used to engaging in processes as "experts" in their field. However, when they engage as facilitators, their role is quite different. The facilitator's role is to guide the group through the workshop exercises, and to ensure that the workshop activities lead to interesting and relevant output. As such, the facilitator is also a "learner" that needs to be open to listen and learn more about the workshop topic throughout the workshop. Conversely, the workshop facilitator does not need to be an expert in all the details of the topics that the workshop covers, but he/she should know enough to be able to guide the workshop activities in a fruitful way.

The facilitator's role is to stay neutral and balanced. The facilitator works on behalf of the group to ensure everyone is heard and treated fairly, and he/she should not advocate for a specific position or side with one part of an argument.

During the workshop

Introducing the workshop

The workshop introduction sets the stage for the workshop and makes sure that all workshop participants know enough about both the workshop topic and the practical details to be able to engage constructively throughout the workshop. Common themes to cover in the workshop introduction are:

- Welcome everyone
- Introduce the workshop topic, purpose and expected outcomes
- Present the workshop agenda at the start of the workshop so participants know what to expect, when they'll have breaks, etc.
- Introduce the facilitation/convenor team and the workshop participants
- Provide information about where to find the emergency exits, bathrooms, and coffee.

Facilitating the workshop activities

As the workshop participants move into the workshop exercises, the role of the facilitator is to make sure that everyone knows what to do, answer any questions, and support the group discussions:

- Make sure to introduce each workshop activity properly. It is helpful to make an oral presentation that walks the participants through the exercise and to provide written instructions to each group.
- Give the participants some minutes to get started.
- Check in with each group to make sure that everyone knows what to do, and to answer any questions.
- Respecting the agenda is a powerful way to show respect to participants. When feeling pressed for time, it can be tempting to cut breaks, but this can result in participants losing focus and motivation.
- Be ready to improvise, but always keep the workshop purpose and results in mind. It might be a better idea to cut a workshop activity in order to provide more time for an important discussion, as long as the workshop as a whole still generates the output (and possibly decisions) that is needed.

Concluding the workshop

At the conclusion of the workshop, it is useful to bring everyone together again. Common topics to cover at the end of the workshop are:

- Ask the participants to share their key insights and conclusions from the workshop.
- Leave a few minutes at the end of the workshop for debriefing and reflecting. This allows participants to share any final thoughts and give feedback on the workshop process and results. This evaluation helps in understanding the workshop from the participants' perspective and gives ideas for how to improve. There are many simple frameworks/activities for gathering feedback from participants. One simple activity (easily found with an internet search) is called "Start, Stop, Continue."
- Inform the participants about the next steps, e.g. how the workshop outputs will be used, when they can expect to hear from researchers/organizers, and how they can get in touch if needed.
- Thank all participants for their time and contributions.

After the workshop

If the result of the workshop is an unfinished product, then it's a courtesy to send the final product to participants when it is finished. It's important to evaluate the workshop soon after its conclusion, while details are still fresh in everyone's mind. Important topics for convenors/facilitators are:

- How effective was each workshop activity? What could be done to make them more effective?
- Were there any barriers to participation for any stakeholders? What could be done to overcome these barriers?
- Was there an appropriate amount of time allocated to each activity? Was there an appropriate number and length of breaks?
- Were there any dips in energy/engagement from stakeholders? If so, how could those be avoided in the future?
- Did the workshop produce the desired outputs? Why or why not?
- Lastly, it can be a courtesy to send a thank you to participants, along with any products or results from the workshop.

Special considerations for online workshops

Running workshops online requires adjustments to facilitation and activities. It can be more difficult to build rapport with participants and participants often experience a higher threshold for participating. Some specific challenges, and suggestions for overcoming them, are presented below.

Challenge	Suggestions
Familiarity with technology can introduce a power dynamic	Provide trainings before the workshop; local assistants when needed
Limited ability to “read the room”	Icebreakers increase comfort; frequent check in with participants
Participating online can feel awkward	Use more structured techniques (to elicit ideas, etc.) when needed
Distractions (as with any online meeting)	Provide frequent short breaks for checking email, etc. Build breaks into the schedule and honor them.

4. Tools for open research agenda setting

The tools included in this toolbox are selected to be used in different stages of Open Research Agenda Setting, from the identification of stakeholders to the joint exploration of key trends and issues and the identification of concrete topics for research and innovation.

Stakeholder mapping: The main goal of stakeholder mapping is to lay the groundwork for identifying stakeholders likely to be involved in open research agenda setting (ORAS). In addition, the tool aims to understand the relationships among stakeholders and their capacity and means to engage. This workshop should be considered a first step and is designed to be complementary to other tools being used in ORAS.

World café: The World Café Method is a consultation tool that allows for an informal and open discussion. It can be used for brainstorming, feedbacking and enriching research agendas. The World Café enables creativity and openness and can foster exchange and connection between stakeholder groups. It can also increase ownership of the topic/project for the participants.

The caravan: The core concept of the caravan is to meet stakeholders directly "at home". By travelling for a certain period of time and stopping for a few hours (between 2 to 4) in different places to meet various stakeholders and policy makers, the objective is to progressively enrich and deepen content and questions already developed.

Brainstorming: Brainstorming method is a way of generating ideas individually or in a group, that allows participants to come up with a wide range of options for solving a question or problem in a short period of time. Application of the brainstorming method is a great way to involve stakeholders in the definition of the project in the initial stages of its development, thus making the whole process more democratic and open.

Systems mapping (Group model building): In a group model building workshop, participants create maps of the causal relationships in the system that give rise to these problems and trends. Systems mapping is especially useful for creating a shared understanding of a complex problem. As such, it can aid in problem definition from an inter- or transdisciplinary perspective.

Real-time Delphi: The Real Time Delphi method can be used in Open Research Agenda Setting with a variety of groups that hold a level of expertise over an issue to receive input and feedback on specific issues and questions. It can be a way to engage stakeholders for researchers who are not experienced in in-person facilitation, and due to it being online, can reach a large number of people who are geographically spread out.

Four quadrant scenarios: Participatory scenarios allow participants to creatively examine how key trends might play out in the future. These insights are then used to "backcast" implications in the present. This can help broadening the range of issues considered when identifying themes and topics for research and innovation agenda setting.

Stakeholder mapping

Stakeholder mapping is a tool with two objectives: first, to bring researchers and stakeholders willing to engage in an ORAS process together by mapping the ecosystem linked to their field of scientific expertise and/or interest; second, to question the researcher's position and facilitate collaborations between academic and non-academic worlds. The main goal is to lay the groundwork for identifying stakeholders likely to be involved or add value to ORAS and (in some cases) to the research projects that follow. In addition, the tool aims to understand the relationships among stakeholders and their capacity and means to engage. This type of comprehensive analysis will aid researchers in understanding the stakeholder base and developing an effective engagement strategy. This workshop tool can also be used to develop sensitivity to these types of opening practices within the scientific community itself.

This workshop should be considered a first step and is designed to be complementary to other tools being used in ORAS.

Format:

[] Online or [] in person or [X] both

Duration:

From 3 to 5 hours, depending on the researcher's interest or need, the topic and the profiles (number, diversity) of the actors likely to be involved.

Specific goals of the tool:

- To make context and issues around stakeholder networks understandable.
- To raise awareness about the added value of including academic as well as non-academic participants
- To be able to place researchers in a position where they are in direct contact with civil society and social issues. At the same time, to reflect on the implications and difficulties of this position.
- To identify the different stakeholders having value to add in a participatory research project in general (from the ideation to the actual research) or in a specific project

Method description

This training session is divided into two sections. The first section is devoted to mapping the ecosystem and understanding each stakeholder's concerns and skills.

It is necessary to be aware of all the actors likely to be concerned, directly or indirectly, by a potential research project. Therefore, the facilitator leading the event starts by briefly presenting why identifying and mapping all stakeholders likely to be involve in ORAS is important and emphasizing the need to adopt a holistic approach. As a training exercise, he/she then

invites participants to work in pairs on a concrete case, either a fictional scenario or an actual problem encountered by one of the participants, in order to identify the parties involved, the way(s) they are connected, their respective positions, etc. A quick feedback, without sharing results of the cases themselves, is then carried out.

The next phase is the actual **stakeholder identification and analysis**. Typically, this starts with a brainstorming session for the whole group. The objective is to list all the people, organizations, entities etc. who may be affected by the topic before a possible project is developed, during the project, and after the project. Once the largest pool of stakeholders is identified, the task is to identify the relevance of potential engagement and the pros and the cons of involvement for each stakeholder.

Once this identification and analysis phase has been completed, the next step is to create a visual representation that illustrates the relationships between each stakeholder and the issues they reveal. To achieve this **stakeholder mapping**, stakeholders should be organized according to the criteria considered important in this particular case, for example, their interest, their relationship, their objectives, their expertise, or their emotional relation to the subject etc. The difference between those at the core, those in the periphery who are still important enough to be kept in the loop and those who can be left out should be made clear. This can be done on a grid, in a spreadsheet or with the help of dedicated tools like mappers or the Venn diagram.

Tip: Consider involving a professional specialist (sociologist) in stakeholder networks and/or mapping.

The second section of this workshop aims to raise awareness among stakeholders about what running a research project involves in practice.

From where you talk: the facilitator asks participants to share their experiences and background. Are research students fully involved in the team, in meetings, in collective actions, etc.? Does anyone have a previous experience in setting on open research agenda or in participating in a citizen science project? Is the interest in participating in ORAS personal or professional? Etc.

How you talk: the facilitator asks participants to discuss possible differences in the vocabulary, concepts and knowledge of different stakeholders. To do so, a list a few concepts/ideas related to the topic could be prepared beforehand. The facilitator asks everyone to give their own definition of them in writing and then share the results.

The researcher's positions and its requirements: The researcher and facilitator discusses the researcher's position in the key stages of a project. This will lead to a definition of the research values, ethics, constraints, etc. underpinning the project, as well as a review of the level of knowledge of the stakeholders and the gap between the academic and the societal aspirations and ambitions.

When applicable – i.e. when it appears that the stakeholders' interest goes beyond ORAS and is likely to lead to a participatory research project – the researcher should further discuss the unusual position of participatory research and increase awareness about how it actually works.

Relevance to research and innovation agenda setting

- This tool can mobilize a wide spectrum of stakeholders, giving researchers the possibility to receive requests/solicitations but also to challenge and stimulate them.
- One of the challenges of ORAS is to lead mobilized stakeholders to identify research issues AND to draw up “feasible” proposals that researchers (and other actors if the choice of participatory projects is made) will be able to act upon. To do this, it is necessary to help stakeholders understand the constraints of a research project - whether scientific, material, logistical or ethical. For example, a successful research agenda needs to ensure that enough financial resources are available to translate the agenda into research projects.

Group size:

15-20 participants

Facilitation needs:

3 facilitators (to be determined according to the number of sub-groups)

Level of stakeholder engagement:

informing: stakeholders are kept informed about the research agenda setting

consultation: stakeholders have an active role in providing input and shaping the research agenda, but final decision remains with facilitators/researchers

partnership: stakeholders have an active role both in shaping the research agenda and participate in taking decisions

control: stakeholders define the research agenda and come to facilitators/researchers for support and advice when needed

Equipment needed:

In-person workshop	Online workshop
Large room for working in plenary sessions and group thinking activities	Online communication platform for plenary discussion

Small (preferably round) tables and chairs	Online communication platform that allows separate “rooms”
Icebreakers tools for in-person activities: to be chosen beforehand by the facilitators	Icebreakers tools for online activities: to be chosen beforehand by the facilitator(s)
Equipment for creative thinking and ideation process (flip chart, post-it notes, slides...)	Digital visual collaboration application like “Mural” (https://www.mural.co/)

Digital tools and personal interactions are both important could be used in a complementary way. For example, an in-person workshop does not exclude the use of digital tools.

Workshop overview for a 3 hour event (in minutes)

10	Welcoming the participants and settling in
10	Presentation of the workshop purpose and explanation of the 2 objectives
15	Ice-breaker activity
Mapping the ecosystem	
5	Stakeholders mapping: what for?
15	Training based on a concrete case
40	Stakeholders identification and analysis
10	BREAK
30	Stakeholders mapping
Raising the awareness	
10	From where you talk?
10	How do you talk?
10	The researcher’s positions and its requirements
15	Final presentation and feedback
After the workshop	Snack – social event (optional)

Potential challenges and limitations

Potential challenge	Suggested solution
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In the case of a very broad ecosystem, the mapping – even without being exhaustive – can be difficult to carry out	Draw different "circles" of ecosystems concerned by the project, from the closest to the farthest
Some stakeholders (especially students) do not perceive themselves as researchers, do not feel legitimate and are reluctant to make proposals and suggestions	Give them opportunities to express their skills, knowledge and values, to make them understand they could have a valuable input thanks to their point of view and personal background/experiences
Debates and disagreements on the role of science and scientists	Anticipate and use the existence of disagreements or different cultures of the science-society relationship amongst the participants by proposing a framework and not a definitive debate on the theme

Resources

- Lelubre Marjorie (Doctoral student at Facultés Universitaires Saint-Louis, Brussels), La posture du chercheur, un engagement individuel et sociétal (The researcher's position, an individual and societal commitment): <https://docplayer.fr/18705053-La-posture-du-chercheur-un-engagement-individuel-et-societal.html>
- Ballon Justine, Le Dilosquer Pierre-Yves, Thorigny Maxime, La recherche en action : quelles postures de recherche ? (Research in action: what kinds of research approaches?) - Expériences croisées de jeunes chercheurs (cross-over studies of young researchers), Epure 2019.
- Science Shop from the Université de Lyon, Catalog of training courses for science shop project managers, 2021 (results from the UE funded project INSPIRES), pp.8-9.

World café

The World Café Method is a consultation tool that allows for an informal, personable setting and open discussion around pre-formulated questions. It can serve for brainstorming, feedbacking and enriching research agendas. The World Café method can be used to foster collaborative dialogue between different groups of stakeholders (policymakers, citizens, activists, researchers etc.), but can also be used with just one group. It is an engaging method meant to enable open exchange and connection. It can be conducted as a half-day or a full-day workshop and be carried out with small as well as very large groups.

Format:

Online or in person or both

Duration:

Minimum of 4 hours, possible as an all-day workshop

Specific goals of the tool:

- Providing a comfortable, informal arena for exchange
- Collecting ideas and feedback in an open manner
- Fostering dialogue and connection between different stakeholder groups
- Getting input on specific questions in small discussion groups

Method description

The heart of this method is its café-like setting. This involves giving the Café its own name, e.g. “Knowledge Café” or “Science Café” or whatever fits to the research envisioned. The set-up for a World Café involves small tables with 4-6 chairs each, equipped with tablecloths, flowers, candles and writing material. The space should be hospitable and relaxed, and drinks and snacks should be available as well.

A facilitator, in a neutral role, leads the event. At the beginning of the workshop, the facilitator will explain the method and introduce the topic. This can involve presenting the questions, the possible research agenda(s) to give feedback on, the research project, etc. The nature of this presentation depends on what should be achieved in the participatory method.

Four or five participants will be seated at each table. The group composition can either be random or pre-determined, e.g. by color-coding chairs for each stakeholder group. Optionally, there is an additional table facilitator from the planning team for each group. Each table discusses one question, which should be formulated to “invite inquiry and discovery”. Part of this discussion is documenting their thoughts and conclusions on the flipchart paper and post-its provided. The table facilitator’s job is to encourage everyone to participate, to actively contribute their thinking and to remind people to keep track of the discussion on paper.

Discussion rounds can last from 20 to 60 minutes. After this time has elapsed, participants will move from one table to another, mixing freely. One person from each table will be chosen to remain behind as a table host, to inform newcomers (travelers) about the previous discussion. This change in tables allows for “cross fertilization” and allows participants to connect with more new people.

After at least three discussion rounds – and a break in between – where participants should have traveled between several tables and questions, there is a last phase called “harvest”. This involves bringing together the discussions from the tables and collecting and summarizing conclusions.

The World Café method is very flexible around its key tenets: the process can be simple or elaborate and the discussion rounds can be uniform or different each time. This allows for great freedom when planning and for the organizers and researchers to really reflect on what they want and need from this process.

The World Café method is originally conceived as an in-person event with a particular setting and atmosphere that seeks to engage exchange and foster connection. A variation of it could possibly be conducted online as well, with virtual break-out rooms instead of tables and online flip-chart functions. However, this would lose the café atmosphere that characterizes the in-person workshop and therefore may limit the unforced and dynamic discussion.

Relevance to research and innovation agenda setting

The World Café method is a very open and flexible tool that can be used for Open Research Agenda Setting in a variety of ways, whether as a brainstorming exercise or to discuss already formulated research agendas/scenarios. The benefits of the World Café are that it allows authentic conversation in an informal atmosphere, it enables creativity and openness and can foster exchange and connection between stakeholder groups. It can also increase ownership of the topic/project for the participants. It can be conducted in just a few hours to get input on a topic or as a full-day workshop to fully explore an issue.

Group size:

- The minimum size for a World Café is 12 people (3 tables of 4 people each)
- A useful group size for a World Café Open Research Agenda Setting workshops is 20-30 people
- A World Café can be easily scaled up by adding more tables (possibly discussing the same questions on some tables) – some World Cafés have been carried out with hundreds of participants.

Facilitation needs:

- 1 Main Café Facilitator/host
- Support Facilitator(s), depending on group size
- Optional: 1 Table Facilitator per table
- Optional: a graphic recorder for harvesting and presentation

Level of stakeholder engagement:

- informing: stakeholders are kept informed about the research agenda setting
- consultation: stakeholders have an active role in providing input and shaping the research agenda, but final decision remains with facilitators/researchers
- partnership: stakeholders have an active role both in shaping the research agenda and participate in taking decisions
- control: stakeholders define the research agenda and come to facilitators/researchers for support and advice when needed

Equipment needed:

The World Café requires considerable resources to set up, as it is important to strive for a comfortable café-like atmosphere, but this can be sourced second-hand or self-made. Additional needs can arise for large groups, such as microphones for the facilitators and hosts.

In-person workshop	Online workshop
Small (preferably round) tables and chairs	Online communication platform that allows separate “rooms”
Tablecloths (preferably patterned or colorful)	Collaborative flipchart software/Online tools
Table decorations (vase with flowers, candles etc.)	
Flipchart paper to cover the table	
Post-Its and/or Index-cards	
A mug or glass with markers to write with	
Refreshment and snacks (+ a table for these)	
Mural or flip chart paper for group results, and if not enough wall space, flip chart holders	
Artist tape or pins for wall-application	
Name tags and seat markers in any form	

Optional: overhead projector and/or screen for presentations of research topics	
Optional: Sound system and background music	
Optional: Basic office supplies (paper clips, staplers, pencils, pins etc.)	

Optional: Microphones/Headsets for facilitators (for larger groups/rooms)	
Optional: Plants or anything else to decorate the room in café fashion	

Workshop overview 4 hour event

15 minutes	Welcoming the participants and settling in
15	Presentation of the workshop purpose and explanation of the method
15	Ice-breaker activity
20	Presentation of topics/research agenda/etc.
10	Coffee/Bathroom break
35	Round 1
35	Round 2
20	Snack break
35	Round 3
20	“Harvest”: Summary of the results
15	Final presentation and feedback
After the workshop	Possibility for drinks/food

Potential challenges and limitations

Potential challenge	Suggested solution
Formulation of concise discussion questions	In-depth internal discussion beforehand, possible testing of the questions before the actual workshop, get feedback from colleagues or stakeholders
High facilitation demands	Start early, prepare for potential problems
Recruiting participants	Start early, make use of multipliers, find the right distribution channels, possibly offer some compensation or reward
Lack of participation during the event	It is part of the table facilitator’s role to encourage participation from stakeholders; if discussion dies, be flexible with time blocks, possibly take a break or do another ice-breaker activity to get people talking

Individual participants overpowering the group	(Table) facilitators should be aware of evenly distributed participation and actively engage other participants and remind the group to give everyone space to speak; if there are persistent problems with one participant, the facilitator could speak to them one on one in a break
Labels for participants (e.g. experts, citizens) can create hierarchies	Reflect beforehand on labels given; discuss the roles of the participants at the beginning of the workshops, pointing out that these are just labels for today and people are multi-faceted

Resources:

Brown, Juanita; Isaacs, David (2005) *The World Café: Shaping Our Futures Through Conversations That Matter*. Berrett-Koehler Publishers, San Francisco, CA.

Dagorne, Erwan; Gudowsky, Niklas (2018) *CIMULACT Inspiration Catalogue for consulting different groups*.

Slocum, Nikki (2003) *Participatory methods toolkit: a practitioner’s manual*. King Baudouin Foundation, Brussels.

The World Café Community Foundation (2015) *A Quick Reference Guide for Hosting World Café*. www.theworldcafe.com

The caravan

The core concept of the caravan is to meet stakeholders directly "at home". By travelling for a certain period of time and stopping for a few hours (between 2 to 4) in different places to meet various stakeholders and policy makers, the objective is to progressively enrich and deepen content and questions already developed. This incremental process allows stakeholders to reflect and build on ideas presented by others in the previous stops of the caravan.

Instead of a passive workshop waiting for potential stakeholders likely to be involved in the ORAS process, the caravan is an active opportunity to go directly to them thanks to a mobile unit.

Format:

Online or in person or both

Duration:

From one day (for at least one stop) to many days, depending on the number of places the caravan driver – facilitator and/or researcher – considers relevant stops.

Specific goals of the tool:

- To get more insight through immersion in a stakeholder's environment and develop a climate of trust that allows more serene and peaceful exchanges, free of any external pressure.
- To adopt an iterative perspective in order to go deeper and deeper into the issue by building on previous contributions.

Method description

The leader of the caravan – either the facilitator or the researcher – first should contact the institutions or people he considers to be relevant regarding the issue he wants to raise. This contact should be made at least a couple of weeks in advance. At that point, it is necessary to explain the purpose of the caravan and how the whole process will be conducted. It is up to these institutions or people to invite participants whom they think could be relevant. To help them to do so, one can send them communication materials to explain the approach and recruit as many people as needed. These documents should be personalized and demonstrate the benefit of taking part in such an exercise for each stakeholder. Keeping regular contact with stakeholders during the days leading up to the caravan stop is a must-do to ensure that enough participants will be present.

Following the first round of feedback, the caravan leader can start preparing the roadmap and the different stops. A minimum of 3 hours per stopover should be planned. Depending on the time available, the number of stakeholders who responded positively to the request and the number of stops that are deemed necessary, the caravan can last from one to several days. It is

generally recommended to limit yourself to one stop per day and two or three per week. It is also recognized that 6-8 stops involving 8 people each are sufficient to gather a significant number of views, questions and opinions. Considering the iterative dimension of the caravan, increasing the number of stops can also be a source of frustration for the last people visited who would have "nothing new to say".

Once the final itinerary has been decided, it may be useful to compare the initial expectations of the facilitator/researcher in terms of stakeholder profiles with the stakeholders actually involved to ensure that the participation is balanced. Researchers can add new stops along the way if necessary, in response to new needs or shortcomings identified.

The plan for the workshop will then be the same for each of the stops:

- Presentation by the facilitator/researcher of the project and the principle of the caravan, including on the added value of everyone's contributions and the iterative process.
- Presentation of the general problematic and reading of the 3 issues/questions to work on. At that point, participants split in subgroups (2 to 3), with each sub-group asked to deal with all three issues/questions.
- Reading of the contributions made at previous stops
- For each issue/question (30 minutes each), participants discuss and add ideas, either new ones or built on previous contributions. The participants are placed around a display consisting of six panels (see below): the starting point or issue to be discussed is on the central panel; on the other five panels, five questions are written. Each participant answers each question on a post-it, which he or she sticks on the relevant panel and marks clearly so that the stage at which the answer was given can be identified.
- For each issue/question, participants select the three group proposals they consider most relevant.
- Wrapping-up: the facilitator explains the next steps of the project and conclusion.

Representation of the board

QUESTION 1	QUESTION 2	ISSUE, QUESTION, STARTING POINTS	QUESTON 3	QUESTION 4	QUESTION 5
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Relevance to research and open research agenda setting

- By taking science and its production out of traditionally accepted places, the caravan opens up the research agenda setting both literally and figuratively. It disrupts the setting of the classic “knowledge place” (classroom, labs) and offers an original experience to all participants, including the facilitator and/or researcher leading the caravan and the stakeholders.
- The inclusive dimension of reaching out to stakeholders rather than waiting for them to come forward is fully in line with the objectives of ORAS.
- Inviting the hosts – individuals, organizations, policy makers, etc. – to actually plan “their” stopover of the caravan, may enrich the diversity of stakeholders by involving participants the facilitator(s) and/or researcher(s) may not have considered.

Group size

Between 6 and 10 people for each stop of the caravan.

Facilitation needs

At least one facilitator to lead the caravan.

Level of stakeholder engagement

informing: stakeholders are kept informed about the research agenda setting

consultation: stakeholders have an active role in providing input and shaping the research agenda, but final decision remains with facilitators/researchers

partnership: stakeholders have an active role both in shaping the research agenda and participate in taking decisions

control: stakeholders define the research agenda and come to facilitators/researchers for support and advice when needed

Equipment needed

In-person workshop	Online workshop
A “caravan” (could be a suitcase, big enough to carry all the necessary material)	Not applicable

3 boards made of 6 panels each (see above)
Post-it notes, pencils, etc.
Communication materials (leaflets, emails etc.) to send to stakeholders beforehand to explain the approach and help them to recruit as many people as needed

Workshop overview for one stop of 3 hours (in minutes)

10	Arriving at stakeholder's place and setting up
15	Introducing and explaining the project and the process to the participants
15	Presentation of the problem and reading of the 3 issue/question to work on
20	Discovering the contributions of the previous groups (this stage may be extended as the caravan progresses)
90 (3x30)	Creative thinking, discussion and addition of new ideas
15	Selection of the three group proposals considered most relevant
15	What's next: wrapping-up and explaining the following steps

Potential challenges and limitation

Potential challenge	Suggested solution
Difficulties to plan the actual itinerary as its logistics and planning are pretty complex and time consuming	Try to reduce the itinerary by making fewer stops
Lack of participants at a particular stakeholder	Overbook in advance to make sure that there will be enough participants to make the stopover valuable

Resources

Citizen and Multi-Actor Consultation on Horizon 2020 - CIMULACT,
[D5.1 Inspiration Catalogue for consulting different groups \(cimulact.eu\)](#), pp.123-
132.

Brainstorming

Brainstorming method is a way of generating ideas individually or in a group, that allows participants to come up with a wide range of options for solving a question or problem in a short period of time. It is based on principles of refraining from idea criticism and evaluation, focusing on quantity of ideas rather than their quality, without fear of expressing unconventional ideas, and building on each other's ideas in order to make them better.

Format:

Online or in person or both

Duration:

30 minutes or more

Specific goals of the tool:

- To generate a wide range of ideas, options, requirements quickly
- To find solutions to specific problems
- To find creative ideas or solutions
- To update old ideas or solutions
- To ensure participation of the whole group
- To foster collaboration

Method description

Brainstorming is a widely known creative idea generation and/or problem-solving method that can be used individually or in a group. Its goal is to create a relaxed, non-judgmental environment stimulating participants' creativity and encouraging everyone's participation in order to get another perspective on problems and bring to the table as many ideas as possible in a short period of time. Drawing on different experiences of participants, this method allows generation of a wide range of ideas, which can lead to finding innovative, unconventional or simply better solutions to the problems raised or become a basis for even more ideas to emerge.

In order to encourage participants' creativity and stimulate the process of generating ideas, also to avoid situations where some participants inhibit the activity of others, it is recommended to follow four basic rules of brainstorming:

1. **Quantity.** Strive to generate as many ideas as possible despite their quality as it is considered that the more ideas you have, the more options to choose from and the better chances that there are really valuable ones among them. Even bad ideas may become an inspiration for good solutions.
2. **No criticism.** Avoid any verbal or non-verbal (such as facial expressions) criticism during the brainstorming session as at this stage it has a negative effect on creativity and teamwork and

may set limits on finding possible solutions to the problem. It may also allow those participants, who are less influenced by the fear of criticism, to dominate the discussion.

3. Wild ideas are welcome. Encourage participants to think outside the box and not to be afraid to express unconventional and even unrealistic ideas. It is easier to tone such a wild idea down if needed, then to generate a new one. Unusual ideas, although they may not prompt you with a direct solution to the problem, can become a basis for other useful thoughts.

4. Combination and improvement. Let participants build on each other's ideas, combine, evolve and expand them to make them better and create new solutions. Thus, brainstorming method can be used not only to generate new ideas but to update old ones as well.

Usually brainstorming is **used in groups**, but it can also be **applied individually** or you can combine both – group and individual brainstorming. Group brainstorming is considered more suitable for solving complex problems, but it may inhibit some participants' creativity due to them being worried about opinions of other group members, being eager to support dominating ideas or simply forgetting ideas while they wait for their turn to speak (*production blocking*). Individual brainstorming may be most appropriate for people who can concentrate and think most productively when they are in a quiet place. It also gives an opportunity to research a topic concerned and to think, which may lead to better quality ideas. On the other hand, brainstorming alone prevents access to the wider experience of other participants, which can help with expanding and improving ideas.

There is a number of brainstorming techniques to choose from, such as brainwriting, mind mapping, rapid ideation, starbursting, etc. Each of them has its own advantages and can be chosen according to specific needs and composition of the group.

The brainstorming method can also be **applied virtually**, especially as remote working and remote meetings are becoming increasingly popular. Virtual brainstorming allows a large number of people to be involved in generating ideas and may help to avoid the usual brainstorming challenges such as fear of others' opinions or production blocking. It can be implemented with the help of online documents (e.g. Google Docs), virtual communication tools (e.g. Microsoft Teams, Zoom, Skype or other), social media platforms or dedicated brainstorming apps and tools, that enable more visual brainstorming. Virtual brainstorming session can last much longer than the live meeting, giving time to reflect on the ideas already posted.

Relevance to research and innovation agenda setting

Application of the brainstorming method is a great way to involve stakeholders in the definition of the project in the initial stages of its development, thus making the whole process more democratic and open. Brainstorming is really useful in cases where the possibilities and project

development paths are not entirely clear, as it helps to look at a specific topic or problem from different angles, to define it and to identify different solutions to the problem. It also can be difficult for a researcher to generate new ideas after working on the same subject for a long time, and brainstorming allows fresh and, most importantly, outside point of view, thus opening the way for a collaboration with different stakeholders and bringing interdisciplinary perspective. Although brainstorming is particularly suitable for the project design phase, it can be used whenever there is a need to breathe new life into the project or find alternative ways of working.

Level of stakeholder engagement:

informing: stakeholders are kept informed about the research agenda setting

consultation: stakeholders have an active role in providing input and shaping the research agenda, but final decision remains with facilitators/researchers

partnership: stakeholders have an active role both in shaping the research agenda and participate in taking decisions

control: stakeholders define the research agenda and come to facilitators/researchers for support and advice when needed

Group size:

From 3 to 10 participants.

Facilitation needs:

A group can gather and share ideas without following strict rules or having a facilitator – it is referred to as *unstructured brainstorming*, but in order to avoid factors that are detrimental to the process of generating ideas and to gain more out of brainstorming activity, it is recommended to follow the path of the so-called *structured brainstorming*. Structured brainstorming requires facilitation, so that the process goes smoothly and according to the guidelines, and participation of a trained and experienced facilitator increases productivity of the brainstorming group.

The facilitator is responsible for the completion of certain tasks before, during, and after the brainstorming session. His/her role includes:

1. Preparing the group – ensuring that participants are familiar with the task ahead of them, the topic of the meeting, and are well acquainted with the rules of brainstorming;

2. **Preparing the task** - making sure that the task, topic and expected outcomes are defined clearly and understandable to participants;
3. **Creating the environment** – ensuring creativity-friendly meeting climate and behavior of group members;
4. **Facilitating the process** – using generating and focusing tools depending on how the interaction and ideation is going, in order to motivate participants and to maintain their energy, ensure the flow of ideas and capture them accurately. The facilitator should be able to ensure participation of the whole group and prevent anyone from dominating the brainstorming session.

Equipment needed:

In-person workshop	Online workshop
<ul style="list-style-type: none"> • Pens or markers • Whiteboard, flipchart, a computer with projector or sticky notes to write ideas • A wall or other surface to attach and display written ideas • Timer or time-keeping system 	<ul style="list-style-type: none"> • Computer • Virtual communication tools, platforms • Brainstorming app

Workshop overview

PREPARATION FOR BRAINSTORMING SESSION

1. **Define the problem.** Clearly define the topic or challenge and the aim of brainstorming session – make it as simple and specific as possible. It may be wise to break down complex problems into separate parts and deal with these independently from each other or introduce them gradually during the course of the brainstorming session. Define any criteria that must be met and set boundaries for suggested solutions, if needed (e.g. you may ask for solutions that are possible to implement in a certain period of time).
2. **Prepare the group.** Give time to prepare for the workshop by introducing the topic or problem in advance – send it by email at least two days before the meeting. Provide any information that may be relevant, define key terms so that all the participants understand the problem in the same way. Explain the concept and the rules of brainstorming method and inform about the expected duration of the workshop. Tell how you will use the generated ideas in order to stress the value of the brainstorming session.

3. **Appoint notetaker.** Appoint a person (or a few of them) to write down the ideas that will be expressed during the brainstorming meeting. If several note takers participate, it is wise to decide on who writes what, e.g. to choose which participants' ideas each of them captures. Ideally the notetaker should have knowledge in the relevant field and be able to write or type quickly.

CONDUCTING BRAINSTORMING SESSION

1. **Introductions (1 minute per participant).** Introduce yourself and invite all group members to introduce themselves if they do not know each other.

2. **Explain the task (up to 20 minutes).** Start the meeting with reminding participants of the topic and task. Once more review the principles and rules of brainstorming. In fact, it is a good idea to have the topic and rules written in some place where they are visible to everyone. It may help to keep participants focused on the problem and do not forget the rules that are key to the successful brainstorming. Explain that you will make a comment, in case someone violates the rules. Allow some time for possible questions and answers.

2. **Warm-up (up to 10 minutes).** To practice, set a creative mood and encourage everyone to relax a bit, consider trying some warm-up exercises. One of possible icebreaker games is picking a certain object, e.g. a jar, and brainstorming how else this object could be used – as a candleholder, aquarium, flower pot, etc.

3. **Diverging (30-45 minutes for a topic or part of the problem).** Idea generation process is often referred to as *diverging*, as its aim is to create as many choices as possible. Participants should come prepared. Therefore it is a good idea to start your meeting with some time for individual brainstorming and invite everybody to write down a few of their best ideas. Afterwards share these ideas with the group and encourage expanding and building on each other's ideas. Capture all the ideas, e.g. on post-its, and make sure they are visible to everyone. Each idea should be understood correctly, so you may ask short, clarifying questions. In order to stimulate group members, it is possible to set the goal you want to achieve, i.e. a specific number of ideas to be generated. It is important not to lose the purpose and topic of the meeting, so allow it to develop one conversation at a time and try to refocus the participants if you feel them losing their attention or following irrelevant trains of thought. As a facilitator you can also share your ideas, but try to keep them for those moments of silence when additional stimulation of thoughts might be needed. Include short breaks (5-10 minutes) between the different topics or parts of the problem that you want to cover, or if you have planned a long brainstorming session.

4. **Converging (up to 20 minutes, but it can also be held as a separate session).** After you have had plenty of ideas generated, there comes time to sort, discuss and evaluate them in order to single out the best ones. This stage of narrowing down the choices is often called *converging*. First, you should review the ideas together and merge the duplicates. Next, you may want to

sort the ideas according to their theme or direction. Lastly, you need to pick the most valuable suggestions. One way to do this is to let participants vote on their favorite ideas by putting a mark next to them. What you end up with is a list of presumably the best ideas, but it is also worth highlighting the most novel ones.

5. Wrap-up (up to 10 minutes). Explain what will happen to the ideas generated, what will be the next steps, and what actions will be taken.

Special considerations

- If possible and if it meets the goals of your planned brainstorming session, it is advisable to form groups with members with different backgrounds, culture and knowledge of the issue, as a group of like-minded people is unlikely to be as creative and generate as many ideas as a more diverse team.
- The notetaker should avoid rephrasing ideas. If needed, the author of the idea may be asked to rephrase it, as he/she needs to approve of what is written down.
- Refrain from praising specific ideas, as praise also means evaluation and may unintentionally imply that other ideas are not that good.
- If colleagues with different status are involved in the group (e.g., managers and their subordinates), the productivity of persons with lower status may be negatively affected by the authority of superiors. Therefore it is advisable not to invite someone that other group members may fear.

Resources:

Brown, V.R., Paulus, P.B. *Making Group Brainstorming More Effective: Recommendations From an Associative Memory Perspective*. *Current Directions in Psychological Science* 11(6), 2002, 208-212. <https://doi.org/10.1111/1467-8721.00202>

Hansen, B. 7 Techniques for More Effective Brainstorming. 2018. Available from: <https://www.wrike.com/blog/techniques-effective-brainstorming/> [Accessed: August 16, 2021].

Isaksen, S.G., Gaulin, J.P. *A reexamination of brainstorming research: Implications for research and practice*. *Gifted Child Quarterly* 49(4), 2005, 315-329. <https://doi.org/10.1177/001698620504900405>

Jackson, J. *How to brainstorm: 4 ways to get the creative juices flowing*. Available from: <https://www.lucidchart.com/blog/how-to-brainstorm>. [Accessed: August 16, 2021].

Lucidchart. *When inspiration strikes: 12 effective brainstorming techniques*. Available from: <https://www.lucidchart.com/blog/effective-brainstorming-techniques>. [Accessed: August 16, 2021].

Lucidspark. *4 group brainstorming techniques for winning teams*. Available from: <https://lucidspark.com/blog/4-group-brainstorming-techniques>. [Accessed: August 16, 2021].

MindTools.com. *Brainstorming*. Available from: <https://www.mindtools.com/brainstm.html>. [Accessed: August 16, 2021].

Wikipedia. *Brainstorming*. Available from: <https://en.wikipedia.org/wiki/Brainstorming>. [Accessed: August 16, 2021].

Wilson, C. *Brainstorming and Beyond: A User-Centered Design Method*. Elsevier Morgan Kaufmann, 2013.

Wilson, J. *10 effective brainstorming techniques for teams*. Available from: <https://www.wework.com/ideas/professional-development/creativity-culture/effective-brainstorming-techniques>. [Accessed: August 16, 2021].

Systems mapping (Group model building)

In a group model building workshop, participants engage in a series of activities that help them develop a shared understanding of a particular problem or trend and create maps of

- *the causal relationships in the system that give rise to these problems and trends,*
- *the connections and feedbacks underlying these problems and trends, and*
- *the concerns of stakeholders in the system*

The system map provides an overview of how these problems and trends cut across disciplines and other boundaries and can aid in problem definition.

Format:

Online or in person or both

Duration:

2–4 hours

Specific goals of the tool:

- Creating a shared understanding of an issue from multiple perspectives
- Identifying problems and/or intervention points within a larger system
- Creating a communication tool where participants can see “their” issue in a larger, integrated perspective

Method description

Systems mapping, also called group model building, is often considered a tool for implementing systems thinking. Systems mapping’s particular strengths include eliciting a shared, visual understanding of a problem and its interconnections across disciplinary and sectoral boundaries. Through that process, the systems mapping also creates a forum for discussion that can formalize understanding of a complex problem. The resulting systems map typically has a focus on feedback within the system and on developing an adequate system boundary. It makes causal relationships explicit and can function as a reference point and boundary object for further discussions of leverage points and interventions in the system. In systems mapping, emphasis is not on the individual’s experience but on the aggregated structure of a complex issue. Systems mapping takes an aggregated perspective and can provide a “helicopter view” of a problem.

Relevance to research and innovation agenda setting

Systems mapping is especially useful for creating a shared understanding of a complex problem. As such, it can aid in problem definition from an inter- or transdisciplinary perspective. The mapping process helps identify the boundaries of an issue and intervention points in the system, which can be used to shape research agendas. The resulting system map can be used as a

touchstone in further agenda setting work and can even be used to identify how work packages in a larger research project relate to and influence each other.

Level of stakeholder engagement:

informing: stakeholders are kept informed about the research agenda setting

consultation: stakeholders have an active role in providing input and shaping the research agenda, but final decision remains with facilitators/researchers

partnership: stakeholders have an active role both in shaping the research agenda and participate in taking decisions

control: stakeholders define the research agenda and come to facilitators/researchers for support and advice when needed

Group size:

4–15 participants per facilitator

Facilitation needs:

Group model building requires successfully managing multiple roles, including starting a session, facilitating an exercise, and documenting the process. While a session can be completed by just one experienced facilitator, the results may be compromised as the facilitator has to balance the group process with the need to produce outputs using a series of structured exercises. Consequently, group model building workshops are typically done in teams with one or more roles assigned to each team member, including modeler, facilitator, and note taker.

Having a trained facilitator quite important in group model building exercises, and often determines the quality of the outcome. There are several training resources, facilitation manuals, and templates freely available; please see the section on resources.

Equipment needed:

In-person workshop	Online workshop
- Markers - Post it-notes (one color is enough)	- The Miro board template for online workshops (see the further reading section)

<ul style="list-style-type: none"> - A whiteboard, whiteboard film or flipchart papers - Computer and projector for introducing the workshop (if you use a presentation software) 	
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Workshop overview (with example times for a two hour workshop)

*Select a key indicator/variable and identify trends in these phenomena:
 Duration 20 minutes*

- Participants together decide to focus on a particular indicator, and draw on information on *social, environmental and economic* trends in this indicator.
- Participants discuss these trends, their direction, and what they indicate.

Mapping connections and feedbacks: Duration 70 minutes

- Based on the observed trend, participants together map the causal relationships in connected systems that affect the key variable
- Participants ‘move back’ from the key variable to find immediate causal factors, and then further back to find the causes of those immediate causes, and so on. This means identifying dimensions in the map, and positive or negative causal links between dimensions.
- Moving in this stepwise manner, participants identify feedback loops that connect the interlinked social and natural systems from which the key variable emerges.
- Time permitting, the systems map is ‘cleaned up’

(If time): Identifying leverage points for intervening in the system: Duration 20 minutes

- Participants study the map to identify points where interventions could be made

Preparing a short presentation of their map: Duration 10 minutes

- Groups prepare their map for presentation and outline some key points to discuss in a 5 minute presentation.

Special considerations

- It's rare that a group can create a comprehensive map in a brief workshop. With this in mind, make sure you set realistic expectations for the workshop. In a typical two hour workshop, a group can complete 2-4 key feedback loops. This can either be a stand-alone result of the workshop or the basis for further work in mapping an issue.
- If you have to facilitate the workshop alone (instead of as a team), it can be useful to delegate some responsibilities to participants – for example, managing time and making sure everyone has a chance to speak.
- If a group is quiet/reserved, one strategy can be to give them 5 minutes to brainstorm relevant variables on their own (writing them down on post-its). You can then group the post-it notes according to theme (with approval from the group) before moving on to mapping. This modification can be especially useful in larger groups.

Resources:

Online systems mapping templates and facilitation manuals: <https://onlinesd.w.uib.no/>

In-person systems mapping facilitation manuals: <https://en.wikibooks.org/wiki/Scriptapedia>

Research note on facilitation systems mapping online:
<https://onlinelibrary.wiley.com/doi/10.1002/sdr.1662>

Real-time Delphi

Real Time Delphi is an advanced online form of a conventional paper-and-pencil-Delphi study. At the heart of either Delphi variant is a quantitative and qualitative questionnaire based on a specific issue/topic that is sent to experts in a given field. Therefore, this tool is especially dedicated to stakeholders with deeper knowledge in the research topic. Thus, the Real Time Delphi method is not a workshop, but a particular form of iterative survey. Using specific software, the Real Time Delphi method provides a structured group communication platform that allows the participants to evaluate and change their answers in real-time. This online process usually lasts 2-8 weeks, depending on the scope of the survey. The main purpose of a Real-Time Delphi is forecasting and scenario development, but it can also be used for idea aggregation, consensus-building or decision-making.

Format:

Online or in person or both

Duration:

The survey should be available online for 2-8 weeks

Specific goals of the tool:

- Receiving expert input on specific questions
- Forecasting and scenario development
- Enabling anonymized exchange of ideas
- Reaching a consensus and/or decisions through an iterative questionnaire

Method description

In a conventional Delphi study, selected experts are asked about possible (future) events and necessary actions relating to a specific issue. The answers are evaluated and the results from this evaluation are anonymized and in turn sent back to the participants. Then the questionnaire is repeated a second time. The aim is that the experts reconsider, if necessary, their initial answers through the collected feedback from the first round.

In contrast, a real-time-Delphi is software-supported and "round-less". The invited experts can view and re-answer the questionnaire as many times as they wish. The answers entered are partially evaluated by the software and anonymously reported back to the other participants in real time (once a certain threshold of participants is reached, to avoid very skewed results). Through this feedback of other's answers, participants can re-evaluate their own answers and adapt them if they want to, constantly shifting the median answers. The results of the questionnaire are therefore moving until the Delphi study is closed.

Advantages of the online version compared to a conventional Delphi-Study are that geographical borders are irrelevant and it can be used for an international pool of participants. There is partially software-supported evaluation, which allows the "round-less" nature of the method.

In addition, it can be much more iterative, allowing for real time evaluation and response. Real Time Delphi also allows faster implementation and reduces cost significantly.

Michael Häder (2009) has identified four types/purposes of (Real Time) Delphi, which determine the nature of the questionnaire and the process.

- Type 1: Aggregation of ideas
- Type 2: Determination of a future issue
- Type 3: Identification of expert opinions
- Type 4: Consensus building

While usually conducted with (academic) experts of their field, the method can be adapted for Open Research Agenda Setting to include other participants as well, following a Social Sciences understanding of experts which includes stakeholders who have significant knowledge about a specific issue.

Relevance to research and innovation agenda setting

The Real Time Delphi method can be used in Open Research Agenda Setting with a variety of groups that hold a level of expertise over an issue to receive input and feedback on specific issues and questions. The iterative process can show an evolving discussion on the issues, thereby disclosing the broadness of expert perception and subsequently distilling the prevailing valuations. Each of the four types of Delphi listed above can be useful for informing the creation or evaluation of a research agenda. Due to its virtual and anonymous nature, Real Time Delphi can be a good way to get people to focus on an issue, especially when it concerns a heated or controversial topic. It also eliminates ad hominem conflicts and face-to-face confrontations. It can be a way to engage stakeholders for researchers who are not experienced in in-person facilitation, and due to it being online, can reach a large number of people who are geographically spread out. It is, however, not useful to foster connection between stakeholders.

Group size:

The advised group size highly depends on the topic and the scope of the survey, the purpose of the agenda-setting. It should reach a level of representativeness and robustness; thus the sample should not be too small. Possibly 20+ participants can be a guideline.

Level of stakeholder engagement:

[] informing: stakeholders are kept informed about the research agenda setting

[x] consultation: stakeholders have an active role in providing input and shaping the research agenda, but final decision remains with facilitators/researchers

[] partnership: stakeholders have an active role both in shaping the research agenda and participate in taking decisions

[] control: stakeholders define the research agenda and come to facilitators/researchers for support and advice when needed

Facilitation needs:

The Real Time Delphi Method is virtually facilitation-free, as it runs for a longer time and does not involve moderating a group discussion. However, the organizer of the Delphi will have to remind stakeholders to participate and re-evaluate their answers, as well as monitor the online discussion board for ethical considerations. This monitoring also includes possibly deleting very extreme or duplicate answers, and making sure the feedback will represent the given heterogeneity of answers. The moderation for a Real Time Delphi thus focuses on data, not on people.

Equipment needed:

In-person workshop	Online workshop
–	Software [e.g. Calibrum, eDelphi]

Method overview

The center piece of the Real Time Delphi method is an online questionnaire that includes closed as well as open items, asking participants for their estimations on certain issues, as well as their reasoning or arguments for their decisions. These estimations can be about the probability or importance of certain issues or events, or numerical (e.g. when something will happen). The development of this questionnaire is a major task for the researchers, and has to keep in mind the purpose and scope of the project.

When participants go to answer the online survey, they are presented with information on the previous responses, the status quo of the Real Time Delphi, including:

- The average (or median) response of the group so far (and possibly the distribution of responses)

- The number of responses made so far
- A button that opens a window showing reasons that others have given for their responses.
- A window that allows the respondent to type in justifications for their own answer.
- And finally, a space for the new respondent’s numerical estimate, answering the question. (realtimedelphi.info)

The software evaluates a new average or median for the items in question and updates the “catalogue” of responses for other participants to consult. The moderator/initiator of the Real Time Delphi will have the task to ensure a heterogeneous presentation of results to the participants to reduce distortions and biases, as well as monitor language for ethical concerns.

Special considerations

Real Time Delphi is an online tool that requires a complex questionnaire that is fit for the intended purpose. With a runtime of several weeks, it also needs more time than many stakeholder engagement methods, especially compared to one-day workshops.

Potential challenges and limitations:

Potential challenge	Suggested solution
Finding enough experts who want to participate	Contact many experts; highlight relevance and benefit by participating; be clear and concise in describing the issue
Validity of the questionnaire	Deep exploration of scientific literature; internal discussions; preliminary feedback from colleagues or members of the target group; pre-tests
Skewed results due to small number of participants	Reach many potential experts; remind stakeholders to participate; possibly offer incentives or rewards
Cognitive biases influence answers	Aim for a heterogeneous sample; randomizing the order of questions in the survey; pre-tests

Resources:

Aengenheyster, Stefan (2017): Real-Time Delphi in practice – A comparative analysis of existing software-based tools. In: Technological Forecasting & Social Change 118 (15-27).

Cech, Florian; Tellioglu, Hilda (2019): Impact of the Digital Transformation: An Online Real-Time Delphi Study. TU Wien

Geist, Monica R. (2009): Using the Delphi method to engage stakeholders: A comparison of two studies. In: Evaluation and Program Planning 33 (147-154).

Gordon, Theodore; Pease, Adam (2006): RT Delphi: An efficient, “round-less” almost real time Delphi method. In: Technological Forecasting and Social Change 74 (321-333).

Häder, Michael (2009). Delphi Befragungen. Ein Arbeitsbuch. Wiesbaden: Springer VS.

www.realtimedelphi.info

Four quadrant scenarios: exploring alternative futures

In this workshop, participants will use to a simple, well-established qualitative scenario method to map and plan for key future uncertainties. Using the four quadrant-scenario method - also known as "Shell scenarios" - participants will identify important and uncertain future trends and then create four different scenarios that explore how the future might play out depending on these trends. They will then use these scenarios to "backcast" relevant themes for research and innovation agenda setting in the present.

Format:

[] Online or [] in person or [X] both

Duration:

2–5 hours

Specific goals of the tool:

- Discuss potential trends and challenges that a local community is facing
- Examine uncertainties in the future and how they could be addressed
- Creatively explore normative dimensions of decision making
- Generate research questions that relate to long term trends and uncertainties

Method description

Participatory scenarios allow participants to examine how key trends might play out in the future. These insights are then used to "backcast" implications in the present, for instance themes for open research agenda setting. The workshop has four main stages, described in more detail in the workshop overview:

- Brainstorming trends in the present: what important is happening now?
- Identify critical uncertainties
- Develop scenario narratives
- Discuss the implications of these different scenarios for present research and innovation agendas.

Relevance to research and innovation agenda setting

Four quadrant scenarios allow participants to creatively explore key uncertainties multiple future outcomes of different trends. This provides constraints that allow for participants to explore the broader implications of current trends and discuss normative issues. This can help broaden the range of issues considered when identifying themes and topics for research and innovation agenda setting.

Workshop overview (with example times for a three-hour workshop)

Before the workshop, the facilitators need to define a "case" for the workshop. The case is the "question" that we ask for the scenario work, which helps us focus and delimit the scenario, for instance: "How can our community build resilience to respond to future climate change?" While the scenarios that we create will focus on the "external" environment, we will at times get back to this case in order to generate tangible insights from our scenario work. The instructions in this overview uses the 2035 as the target year, but feel free to use another time horizon depending on your needs and purpose.

All worksheets and detailed instructions can be found in the Miro board template for online workshops (see the further reading section), which can be printed or adapted for an in-person workshop.

Introduction to the workshop and case: Duration 15 minutes

- Introduce the methodology and purpose of the workshop
- Introduce the case that will be explored

Step 1: Brainstorm trends: What important is happening now? Duration 25 minutes

The first step of the workshop is to identify different trends and driving forces that might shape the case (geographical area or organization) that you are examining. The worksheets for this workshop use the STEEP (society, technology, environment, economy and politics) framework but feel free to use another framework. *Instructions to participants:*

- Brainstorm individually: which trends do you think might shape your case area in 2035?
- Brainstorm together: Use virtual post it notes to brainstorm trends and driving forces that might shape your case area in 2035. The STEEP framework helps you look for trends in social, technological, environmental, economic and political domains. Try to get as many ideas on the board as possible.
- Cluster trends: Take a step back and reflect together: are some of the trends connected or overlapping? Can they be clustered somehow? You might consider merging overlapping trends to a single post-it. 3-4 trends in each STEEP dimension is a good number to aim for in a 2 hour workshop.

Step 2: Identify critical uncertainties: Duration 20 minutes

In this step, participants will rank each trend by importance and uncertainty and place the post it-notes accordingly in the worksheet. Some trends, such as demographics, are generally seen to be quite determined and predictable. Others, such as political polarization, can be highly uncertain. Similarly, some trends can be expected to have higher impact on the future than

others, and can hence be ranked as more important. We will use these to create the 2x2 scenario matrix in the next step. The trends that are ranked as both highly important and highly uncertain are your "critical uncertainties". *Instructions to participants:*

- Copy or move the trend post it-notes from step (a) to the worksheet for step (b).
- Rank each trend by importance and uncertainty and place the post it-notes accordingly in the worksheet. The trends that are ranked as both highly important and highly uncertain are your "critical uncertainties".
- Select two trends from your critical uncertainties to use as the axes for your 2x2 scenario matrix. Make sure that these trends are from different STEEP dimensions. (While you will only use two trends to create your 2x2 matrix, does not mean that the other trends are less important, and you will still relate to your other trends when you create your scenario narratives.)

Break (10 minutes)

Step 3: Develop the four scenario narratives: duration 60 minutes

Instructions to participants:

- Create the 2x2 matrix by placing one critical uncertainty at each of the axes. Define the poles of each axis (for instance, if your axis is "economic power", the poles might be "concentrated economic power" and "distributed economic power").
- Each quadrant now represents a different scenario "world". Identify the key characteristics for each of these four worlds with 3-5 bullet points for each one.
- Choose the one or two scenario worlds that you find the most interesting. Starting with the bullet points, spend some time describing these worlds in detail (feel free to modify these bullet points if needed). What happens in these scenarios? How would some of the trends you identified in step (a) play out in this world? How are people affected by our chosen trends? What other trends are in play? How will different actors act in relation to these trends? Who are the winners and losers?
- Provide a title and short description (funny is good) for each of the world of the four future scenarios.

Note to facilitators: The first step - creating the 2x2 matrix - is both important and quite difficult. It is important that the axes have clear polarities to create sufficient contrast between the scenario narratives. Depending on the group dynamics, you may need to support the participants in this step.

Break (10 minutes)

Step 4: Discuss what is needed in the world of 2035. Duration 40 minutes.

- Participants will "backcast" from the four different scenario "worlds" to discuss what is needed to deal with that world in 2035.
- Participants identify themes and questions for research and innovation agenda setting that are relevant in order to build resilience towards the multiple possible worlds of 2035.

Equipment needed:

In-person workshop	Online workshop
<ul style="list-style-type: none"> • Markers • Post it-notes • A whiteboard, whiteboard film or flipchart papers 	<ul style="list-style-type: none"> • The Miro board template for online workshops (see the further reading section)

Resources:

Detailed worksheets and instructions, which can be adapted for an in-person workshop, can be found here: https://miro.com/app/board/o9J_lt0UnWw=/

Rhydderch, Scenario Building: The 2x2 Matrix Technique, Futuribles international. Available here: <https://www.futuribles.com/viewer/pdf/8556>