water mining

Deliverable 2.1

Communities of Practice Roadmap and Facilitation Guidance

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Deliverable 2.1	Communities of Practice Roadmap and Facilitation Guidance
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[1] **R**=Document, report; **DEM**=Demonstrator, pilot, prototype; **DEC**=website, patent fillings, videos, etc.; **OTHER**=other

[2] **PU**=Public, **CO**=Confidential, only for members of the consortium (including the Commission Services), **CI**=Classified

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1. Community of Practice in research and innovation projects

Innovative solutions to the globe's most pressing issues will come about as a result of effective collaboration, communication and knowledge exchange. Research has shown that bringing people together from different backgrounds and interests can elevate the potential for relevant innovations to be effectively applied at the local level as well as up scaled and diffused. As such, Communities of Practice (CoPs) are a vital component to EU Projects to deliver solutions tailored and co-created by a diverse group of individuals who can ensure the long-term success of technologies and innovations developed and tested in project case studies.

Within the WATER-MINING H2020 project, we will help case study (CS) leaders to design and implement CoPs, to engage locally relevant stakeholders from various expertise and backgrounds, and to incorporate social values and concerns into the process of technological development. Each CoP will enable the participants to discuss, work together and outline the steps towards successful design and implementation of water-related technologies and innovations. Furthermore, participants to the CoPs will benefit from learning from each other and developing relationships with local partners on tangible technologies and innovations for a water-wise world.

At each step of the way, KWR, UAB and TUDELFT will support CSs. UAB will guide and support stakeholders' identification as well as the identification of social values, perceptions, concerns and expectations. TUDELFT will translate social values and perceptions into design propositions for the CSs to use in the design of their solutions. KWR will support CoP facilitators and moderators to deliver effective CoP meetings, both online and in person, with the latest tools and techniques. KWR researchers can also offer training to those who feel they need additional support with the engagement and moderation techniques outlined in this report.

This guidance is intended for the use by CS owners, and CoPs facilitators and moderators in WATER-MINING. It builds on previous work conducted in a number of EU projects where CoPs were implemented; BINGO (Freitas et al., 2018), STOP-IT (Koti, Hein, Frijns, Urioc, & Damman, 2017), NextGen (Brouwer, Bouziotas, & Frijns, 2018) as well as existing literature. The document is practical in application for CS owners and CoPs facilitators and moderators, as well as innovative with a multitude of approaches and avenues to convene a multidisciplinary CoP meeting.

1.1. Definition and characteristics of Communities of Practice

What is a Community of Practice?

"**Communities of practice** (CoPs) are defined as social learning systems that bring together people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner & Wenger-Trayner, 2015, in Fulgenzi et al., 2020).

The above definition of a CoP underpins the idea that CoP members share similar ideas and perspectives on a certain topic and that from that shared understanding they learn together knew knowledge about it. WATER-MINING has the ambition to be an inclusive project, where different, even contrasting, point of views are also included. For this reason, WATER-MINING CoPs are defined as "social learning systems that bring together people from different backgrounds and perspectives who share a concern for something they do and learn how to do it better as they interact regularly".

There are three fundamental elements to a CoP: the domain, the community and the practice. To cultivate a CoP, the combination of the three must be developed in parallel (Wenger-Trayner & Wenger-Trayner, 2015):

Three Fundamental Elements of a CoP

Domain:
A CoP distinguishes from other networks since its members identify themselves by a shared domain of interest. Membership involves a commitment to the domain and a shared competence.

Community:
While showing their interest in their domain, community members share information, help each other and join activities and discussions. In this form of interaction, members build relationships in order to learn from each other and to support each other.

Practice:
Members of a CoP do not only share a common interest, they are engaged in common practice, as an iterative social process, where they develop a shared repertoire of resources. These can be experiences, stories, tools or ways of addressing recurring problems. To develop this kind of a shared practice it takes time and continuous interaction.

As such, CoPs bring together relevant stakeholders to develop a common understanding of a given topic, to arrive at solutions that are co-developed, supported, and finally accepted by all parties. A CoP can evolve naturally due to the members' common interest in a specific field, or it can be created deliberately with the goal of gaining knowledge related to a particular domain. When applied intentionally as a learning concept, the overall goal of a CoP is to build on existing knowledge about a specific topic, by creating new knowledge, integrating different perspectives and create new ideas through an ongoing exchange of information (Koti et al., 2017). The interaction among different actors seems to improve the decision-making process at the individual, societal and institutional level mostly when there is a strong investment on working based on a shared vision (Freitas et al., 2018)

In ensuring the viability of CoPs, it will be important to remember that they are made up of *people.* As a result, people need to feel that the following elements are available within the CoP to motivate them to join, contribute, engage, share and learn. Key elements to bring into CoPs for their effective implementation include: enabling a sense of belonging, respect, diversity, flexibility, motivation, and trust. From the beginning, CoPs need to follow bottom-up approaches that enable each stakeholder to take part in the formulation of their safe space for knowledge sharing, learning and exchange.

2. CoPs roadmap in WATER-MINING

This section provides practical guidance on how to organise and structure the CoP Meeting Roadmap for each CS in the WATER-MINING project. It includes a general indication of the content of each of the CoP meetings to be held throughout the project duration, with tips, suggestions and also an infographic to be populated for ease of understanding by all project partners and work packages (WPs).

Templates are provided for CS Owners, CoP Facilitators and Moderators to fill out in order to start planning the CoP Meetings, to be later validated with the stakeholders of the CoP. While filling out the templates below, keep in mind the planning processes noted in Sections 3.1, 3.2 (CoP Facilitators and Moderators Roles and Responsibilities) and Section 5 (Prepare and Facilitate CoP Meetings) of this guidance document.

A CoP Roadmap includes:

- Definition of the scope of the CoP and focus group meetings
- Definition of the topic of each of the meetings
- Identification of the stakeholders to join the meetings
- Identification of type of meeting (entire community or a subset in focus groups)
- Timeline of the meetings

Tips and guidance:

The template tables below include the minimum information to include in your roadmap. You can expand them and add more rows as you need. For example, if you want to use this template

as starting point to prepare your CoP meetings, you can add a row including Methods to use in the meeting (moderation techniques, engagement tools, etc.), and so forth.

In general, at least 4 CoP meetings should be held throughout the duration of the WATER-MINING project (i.e. one per year), with participation from all identified CoP stakeholders (the entire community). You can plan for more CoP Meetings as needed, either with the entire community or with a subset of the community in "Focus groups" (FG) depending on the topic to be discussed in further detail. The CoP meetings should address cross-cutting issues, whereas a focus group could address a specific topic with a smaller group of interested individuals from the stakeholders.

Having a roadmap will help you plan your case study activities according to what needs to be shared/discussed with stakeholders as well as to allocate adequate time to plan the CoP meetings (do not underestimate the time needed to prepare a CoP meeting, especially on-line meetings).

Checklist for filling out CoP Roadmap Templates

1. First CS Owners and CoP Facilitators discuss internally and fill in as many of the template tables as needed.

    a. Discuss among CS partners the scope of your CoP: think of your stakeholders and their concerns and interests, think of cross-cutting issues to focus on for each meeting. Below are some examples of cross cutting issues:

        1. Legal aspects: legal/regulatory barriers and opportunities (EU and national regulations) e.g. for water reuse or recovered material use

        2. Social perception and barriers of use of recovered materials and water

        3. Requirements (e.g. quality) for the use/reuse of products (water, recovered material): e.g. water reuse technology: for what purpose? Depending on the purpose, what water quality is needed?

        4. Market for the products of the CS

2. Once you have identified the scope of the CoP, narrow it down to a number of specific topics. Topics are concrete items of discussion at a CoP or focus group meeting such as water quality requirements for reuse in agriculture, identification of end users of water for irrigation in our CS region, technical requirements for achieving a certain water quality in the WWTP, etc.

3. Depending on the topics: a) you decide whether they need to be discussed with the entire CoP (i.e. cross-cutting topics relevant to all stakeholders) or with a subset of individuals from the community (i.e. specific topics like technology aspects); b) you think of how many CoP and focus groups (FG) meetings you need to have throughout the project (min. 4 CoP meetings with the entire community, i.e. 1 per year to keep continuity of engagement).

4. Once you have completed a first draft of your roadmap tables, share the tables with WP leaders and Living Labs (LLs) coordinators to ask them to contribute with the related WP/LLs content to the different meetings. WPs and LLs certainly have issues they would like to discuss with CoP stakeholders. Some of these issues have already been identified in the project proposal (e.g. WP2 and WP9) but others may become clear now that WPs have started to work. It is important for both WPs and CSs to know what and when CoPs will engage with WPs so that to plan accordingly.

5. Fill in the infographic below once you have identified the number, tentative date of the meetings, topics and WPs content to be discussed with stakeholders.

6. You will validate the planning of the CoP roadmap with all stakeholders at the 1st CoP meeting. Fill in the templates below as much as possible prior to that meeting.

7. Place the finalised document with tables and infographic in the online shared space accessible to all case studies and partners (shared space still to be defined, you will be informed).

2.1 First CoP Meeting Template

CoP #1 (first)	***"Setting the Scene" (Or choose another title as you see fit for the first meeting)***
Planning:	*Month (tentative – indicate in project month number and actual month and year)*
Participants:	*All stakeholders identified in stakeholder mapping and involved in the CS*
Objective(s) of the meeting	1. *Validate with stakeholders pre-identified objectives, mission and scope of CoP* 2. *Validate with stakeholders the composition of the community and fill any gaps (are we missing any important stakeholder?)* 3. *Co-define with stakeholders short and long-term value and impact of CoP* 4. *Co-define with stakeholders the specific ways the CoP will operate: decision-making procedures, communication strategy in between meetings, activities for the community in between meetings, responsibilities of members, contact person(s), etc.* 5. *Other as needed* *See Section 5.1.1 for more details*
Related WP:	*Indicate which WPs/LLs will add content to this meeting. Also indicate what content the WPs/LLs will add*

2.2 Template for in-between CoP Meetings / Focus Group Meetings

CoP #X (in-between meetings)	***Topic (define the topics for the subsequent CoP meetings)***
Planning:	*Month (tentative – indicate in project month number and actual month and year)*
Participants:	*All stakeholders identified in stakeholder mapping and involved in the CS, and any new ones identified in the 1st CoP meeting* *Any invited guest as needed (e.g. stakeholders potentially interested in the products of the project, for transferability)*
Objective(s) of the meeting:	*Indicate to the best of your knowledge now the possible objectives for the subsequent CoP meetings* *See Section 5.1.2 for more details*
Related WP:	*Indicate which WPs/LLs will add content to this meeting. Also indicate what content the WP/LLs will add*

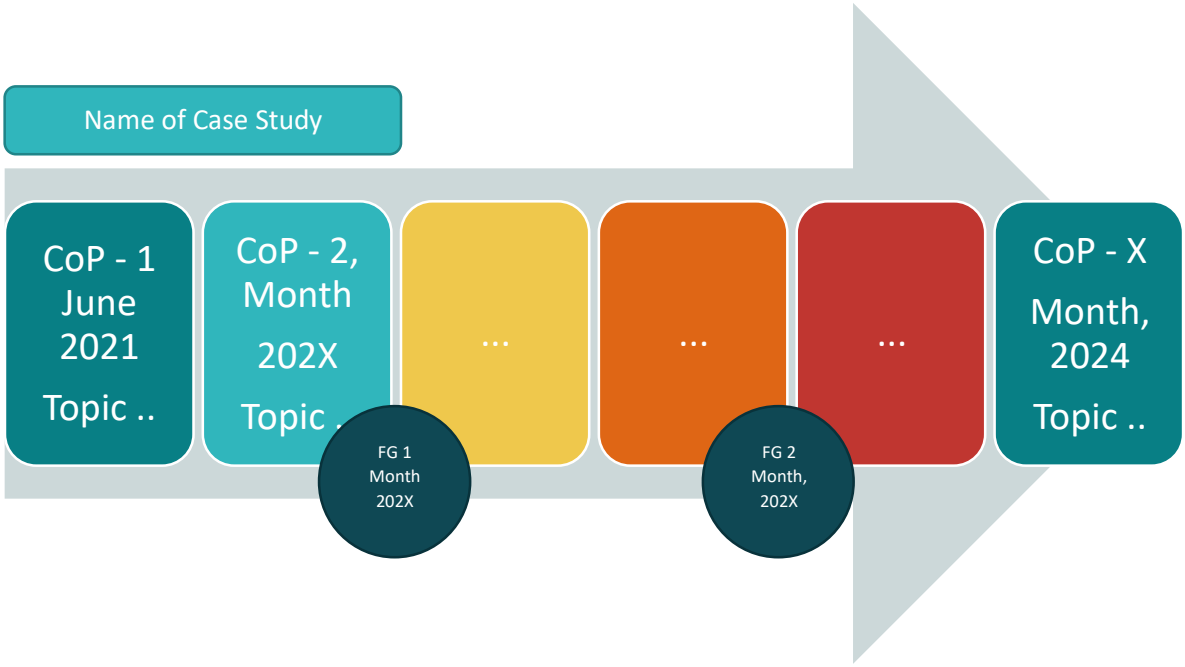
Focus Group (FG) Meetings (as needed / in between)	***Topic (define the topics for the subsequent FG meetings)***
Planning:	*Month (tentative – indicate in project month number and actual month and year)*
Participants:	*Subset of stakeholders from the CoP, as needed, based on the topic selected for the FG meeting. You may want to keep the meeting open to also the other CoP members even if it is not their topic of expertise* *Any invited guest as needed (e.g. stakeholders potentially interested in the products of the project, for transferability)*
Objective(s) of the meeting:	*Indicate to the best of your knowledge now the possible objectives for a focus group meeting* *See Section 5.1.2 for more details*
Related WP:	*Indicate which WPs/LLs will add content to this meeting. Also indicate what content the WP/LLs will add*

2.3 Last CoP Meeting Template

CoP #X (last)	*Final deliberations and next steps*
Planning:	*Month (tentative – indicate in project month number and actual month and year)*
Participants:	*All stakeholders identified in stakeholder mapping and involved in the CS, and any new ones identified in the 1st CoP meeting* *Any invited guest as needed (e.g. stakeholders potentially interested in the products of the project, for transferability)*
Objective(s) of the meeting:	1. *Last resolutions* 2. *Future of CoP/outputs – beyond the project* 3. *Other as needed* *See Section 5.1.3 for more details*
Related WP:	*Indicate which WPs/LLs will add content to this meeting. Please also indicate what content the WP/LLs will add*

2.4 CoP Meeting Roadmap Infographic

The below is just a suggested roadmap. Please adapt with as many CoP meetings and focus group meetings as needed for your CS.



3. Planning the Community

Each CS has an already identified **CS owner**. CS owners are responsible for initiating the process of establishing the CoP by engaging with all CS partners in the mapping of stakeholders and discussion of CoP scope under the guidance and coordination of UAB and TU Delft.

Before launching a CoP, the CoP facilitator, moderator and participants have to be selected by CS partners. The following sections explain each step in detail and chronological order.

3.1. Select CoP facilitator and CoP moderator

One of the most important roles in a CoP is the role of the **CoP facilitator**. The facilitator is in charge of establishing and managing the CoPs, including setting up the community, maintaining stakeholder engagement throughout the project to build relationships, helping the members focus on the domain and developing the practice. More specifically, the CoP facilitator is responsible for organising, preparing and facilitating the CoP meetings (Brouwer et al., 2018), as well as ensuring that information is trickling down from the project and case studies to the moderator and CoP stakeholders. This will be done with support by WP2. The CoP facilitator is the official contact person for the CoP and is responsible for selecting a CoP moderator and stakeholders together with the CS owners (section 3.2). It is important that the CoP facilitator remains the same person over the course of the project.

The **CoP moderator** also fulfils an important role within the CoP and is selected before the first CoP meeting. The role of CoP moderator is to support the CoP facilitator in delivering the CoP meetings. The CoP facilitator can fulfil both roles, but it is recommended to have both a facilitator and a moderator, and the roles and responsibilities for both should be clearly established before the first meeting. The CoP moderator is in charge of running the CoP meetings, moderating the meetings, and has to provide the structure (rules) to have a creative and safe environment for the CoP participants to collaborate and exchange knowledge (Brouwer et al., 2018). It is important that the CoP moderator remains the same person over the course of the project.

3.2. Identify CoP Participants: Stakeholder Mapping and Selection

As stated in the Grant Agreement (GA), the stakeholders' mapping will be based on a life-cycle thinking within the WATER-MINING (WM) process. The idea is to identify relevant stakeholders along the WM cycle: from the reception of the water to be treated to the delivery of improved water and recovered resources and materials, thus covering all phases of the process. This would also enable us to include social, economic and environmental impacts of the entire WM process.

It is important to highlight that the information generated in the stakeholders mapping will be used for different purposes:

- WP2, together with CS owners and CoP facilitators, would be able to define different degrees of engagement for different stakeholders (e.g. in-depth interviews or online questionnaires) and different roles within the CoPs.
- WP9 would be able to select and invite relevant stakeholders to the market mapping workshops
- WP10 would be able to select and interact with stakeholders relevant to policy analysis.

By **stakeholders** we refer to ***individuals and/or organizations related to, affected by or that can affect the activities and development of WM systems: favouring or hindering the operation of the WM systems***. These include workers, suppliers, operators, engineering companies, potential end-users, consultants, regulators, public administration, non-governmental organizations, other organized groups, and so on.

The task of stakeholder identification is responsibility of CS owners. CoP facilitators and WP leaders of the corresponding CS WPs can support CS owners in this task.

Who are the potential stakeholders of a CoP?

Organisations

- Linked sectors (construction, agriculture, transport, food industry, energy)
- Regulators
- End-Users
- Technology Providers
- Industry
- Municipalities
- Consultancies
- Waterboard or utility

Individuals

- Engineers
- Natural Scientists
- Social scientists
- Policy-Makers
- Leaders and heads of organisations
- Operational level
- Researchers
- Junior experts
- Data Scientists
- Local experts
- Living lab actors

The methodology proposes a progressive process of stakeholder identification. It starts with potential end-uses and -users, and then complementing the list with other types of stakeholders. The following sections present this process, proposing a set of stakeholder categories and some questions to guide the process of stakeholder identification.

There is no ideal size or number of stakeholders in a CoP. It is up to the CS owners, CoP facilitators and stakeholders to determine who needs to be in the room. Note however, that a large group will mean additional planning and coordination, and potential complexities. At the same time, larger and diverse groups will bring different viewpoints to the debate, thus increasing the understanding of a complex issue.

3.2.1. Process of stakeholders' identification

The following sections present the different steps in the process of stakeholder identification. Figure 1 presents the proposed process and corresponding deadlines for the stakeholder identification and mapping.

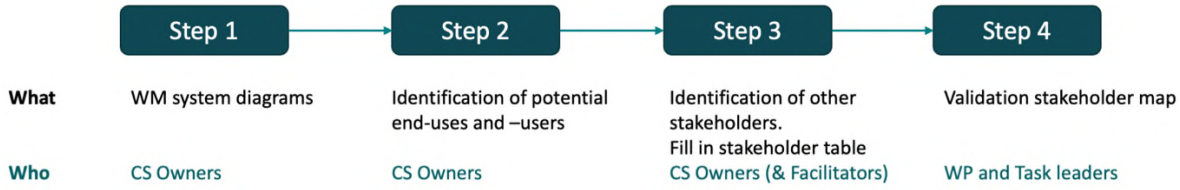


Figure 1. Steps of stakeholder identification and mapping.

3.2.1.1. Step 1. WATER-MINING system diagram

The first step to identify stakeholders is to update the WM systems diagrams included in the GA. These diagrams will serve to identify different stakeholders that are relevant in the phases of WATER-MINING processes (Figure 2).

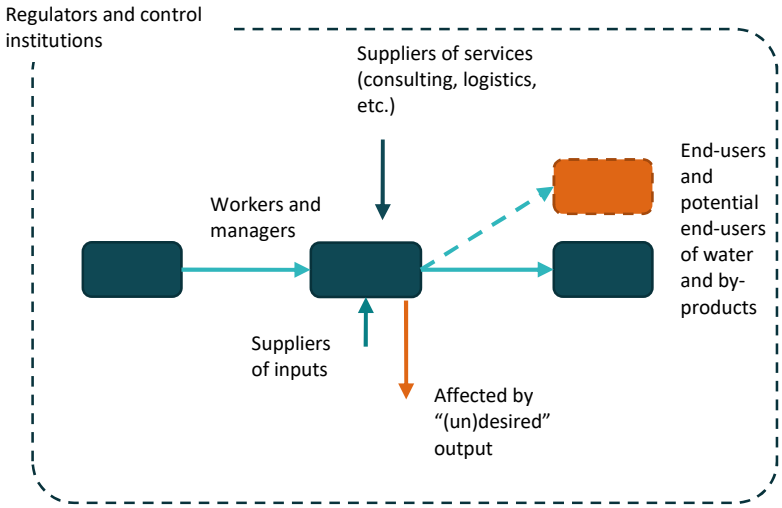


Figure 2. Diagram of water system and potential stakeholders

The development of these diagrams will be also useful to explain the different WM systems developed in each CS to stakeholders. A common knowledge base across stakeholders is fundamental in order to ask them about their perceptions, concerns and expectations concerning the technological developments.

3.2.1.2. Step 2. Identification of potential applications, end-uses and end-users

After WM system diagrams, CS Owners will identify potential uses of the technology and of the water and resources recovered in WM processes. Table 1 presents a preliminary list of potential applications identified during the first months of the project within T2.2 Value sensitive design.

Fields of the table are explained below:

Resource: The resource recovered with the WM technology. This can be water or any other material that can be used as a resource in industrial, agricultural or urban applications.

End-use: Potential end-use of water or resource recovered indicated in the previous field.

Potential end-users: Stakeholders that can take advantage of the potential end-use.

Market application: Potential businesses that can be developed from the use of recovered water and materials.

Policy gap: Any policy gap that can hinder the market development of the potential end-use.

CS Owners will complement this list and will identify additional potential end-users of technologies, water and recovered resources. Also, CS owners are requested to indicate the potential market applications and policy gaps to take advantage of the potential end-uses. This information is relevant for WP9 and 10 respectively.

Table 1. Potential end-uses and end-users of technologies developed in case studies

CS	Resource	End-use	Potential end-users	Market application	Policy gap
1	Desalinated water	Drinkable water	Residents Lampedusa		
	Magnesium (Mg)				
	Sodium Chloride (NaCl)				
	Other salts				

CS	Resource	End-use	Potential end-users	Market application	Policy gap
2	Desalinated water	Irrigation	Farmers		
	Magnesium (Mg)				
	Sodium Chloride (NaCl)				
	Other salts				

CS	Resource	End-use	Potential end-users	Market application	Policy gap
3	Recovered water	Ecosystem (river)	Nature		
	Kaumera gum	Raw material	…		

CS	Resource	End-use	Potential end-users	Market application	Policy gap
4	Chlorine				
	Phosphate	Fertilizer	Farmers		
	Vivianite	Agriculture	Farmers		
	Calcium				
	Magnesium (Mg)				

CS	Resource	End-use	Potential end-users	Market application	Policy gap
5	Recovered water	Aquifer recharge	La cubeta de la Llagosta		
		Ecosystem (river)	Besòs river		
		Industrial	Metal industry		
		Irrigation	Wineries		
		Streat cleaning	Municipality of la Llagosta		
	Phosphorous	Fertilizer	Farmers		
	Nitrogen	Fertilizer	Farmers		
	Biogas	Fuel	Internal use		
			Metal industry		

CS	Resource	End-use	Potential end-users	Market application	Policy gap
6	Recovered water	Ecosystem (river)	Maas river		
	Sodium Chloride (NaCl)	Industrial	Chlorine Rotterdam cluster		
			Nouryon		

3.2.1.3. Step 3. Identification of other relevant stakeholders

Even with the mapping of stakeholders through the WM systems diagrams, there may be other types of relevant stakeholders that do not fit into the category of potential end-users. These could include regulators and people affected by (un)desired outputs of the WM processes. As such, the aim of this step is to explain how to identify these other relevant stakeholders.

Start with identifying the organizations and **then the individual person** in the organization to approach. Start from the people in your network, but be aware the people you know may not be the right one to join the CoP. However, they may be able to point you to the right people. Furthermore, it is also important to clearly address whether the general public is involved in the CoP or it is engaged through different channels.

In order to build a solid member base, it is important to reach out to members that cover all aspects of the community of stakeholders. Diversity is needed both in background (ethnicity, gender, expertise) and intervention experiences levels (local, regional, national) (Freitas et al., 2018).

Data about identified stakeholders will be recorded in a stakeholder mapping table (Annex 6).

To carry out this identification, you can ask experts and other stakeholders already identified:

- **Identification by EXPERTS**. In this case, CS owners will identify key informants such as staff personnel, key agencies (such as non-governmental organizations) or academics that know the situation well enough to identify stakeholders.
- **Identification by OTHER STAKEHOLDERS**. From the preliminary list of stakeholders, CS owners can Identify one or two key stakeholders and ask them to suggest additional stakeholders to those already identified.

In both cases, it is advisable to use the WM system diagrams in the interviews to cover all phases of the WM processes.

Then, there are several categories of stakeholders that can be used to identify and classify concerned individuals and groups, related to the project development. We can differentiate between the following categories (Walker et al 2008):

- **Upstream stakeholders**: end-users and clients
- **Downstream stakeholders**: suppliers and subcontractors
- **Project stakeholders**: Investors, project sponsor, project team
- **External stakeholders**: affected communities, concerned groups, knowledge networks, regulators.

Table 2 presents a list of stakeholder types, classified according to the previous categories. This list is not comprehensive and is intended to help CS owners to identify additional stakeholders to those already identified as end-users. The list can also be used in the interviews with experts and key stakeholders.

Table 2. Stakeholder categories

Upstream		**Downstream**	**Project**	**External**
End-user	Institutional	Supplier	Investor	Regulator
	Agricultural	Manufacturer	Project team	Local authority
	Industrial	Engineering companies	Operator	Regional government
	Urban	Experts and Consultants		Central government
	Non-human	Industry		Health authorities
	Other	Urban		Environmental authorities
Environment (sink side)				EU
				Political player
				Academic /researcher
				NGOs
				Engineering companies
				Experts and Consultants
				Business community
				Industry
				Insurance company
				Financial company
				General public
				Local communities

3.2.1.4. Step 4. Validation of stakeholder map

After the stakeholder mapping table has been filled by CS owners, WP and Task leaders will review its content to check any missing stakeholder typology in the different case studies.

Once the stakeholder mapping table has been validated, a series of one-to-one meetings between CS owner and CoP facilitator will take place, with the leaders of Task 2.1, Deliverable 2.1 and Task 9.2. The aim of these meetings is to identify specificities of each CS: composition and roadmap of CoP, and scope of the CS.

3.2.2. Important considerations in the establishment of a CoP

3.2.2.1. Stakeholder involvement and engagement

It is advised that the stakeholders participating remain the same throughout the entire lifespan of the CoP (Brouwer et al., 2018). However, external experts may be invited on occasion to CoP meetings as desired by the stakeholders, supported by the CS owners, CoP facilitators and moderators.

Also, understand that different stakeholders **will speak different "languages"** (i.e. scientists vs. practitioners); accordingly, you need to ensure effective communication and knowledge understanding among the stakeholders in meetings.

Finally, note that different stakeholders within the CoP will have **different levels of involvement or degrees of participation** as in Figure 3. CoPs consist of three main levels of community participation: the core group, the active group and the peripheral group. The core group (usually 10 to max. 15 percent of all members) is the heart of the community, actively participating in discussions, taking on community projects, identifying topics for the community and moving the community along its learning agenda. This group takes on much of the community's leadership and becomes auxiliary to the facilitator. The level outside the core group is called the active group. It is also rather small and consists of 15 to 20 percent of the whole community. The active group members attend meetings regularly and participate occasionally in the community forums. The biggest group build the members of the peripheral level. They rarely participate. Instead, they remain peripheral and watch the interaction of the core and active members. Even though they seem to be passive their peripheral activities are an essential dimension of CoPs. Hence, make sure that the active group is consisting of a broad number of stakeholders (Koti et al., 2017).

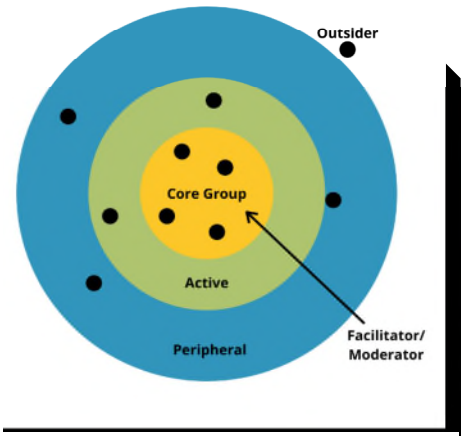


Figure 3: Degrees of Participation (Koti et al., 2017)

3.2.2.2. Highlighting the value of CoPs to stakeholders

Demonstrating the value-add of CoPs to stakeholders is a crucial step in inviting them to join and ensuring their active involvement in the CoP. There are several factors and specific CS elements that will attract stakeholders to a CoP. Consider mentioning in your invitation the following:

Another step to motivate the stakeholders to participate in the CoP can be done through the **Wow-How-Now elevator pitch approach**, which can be used in your initial email to the potential stakeholders, as well as through identifying the short and long-term values with the help of the value matrix table below (Table 3). The table below provides some examples of benefits for institutions and community members, but it is adaptable based on the CoP context and the stakeholders invited. This can be used to inform your Wow-How-Now elevator pitch.

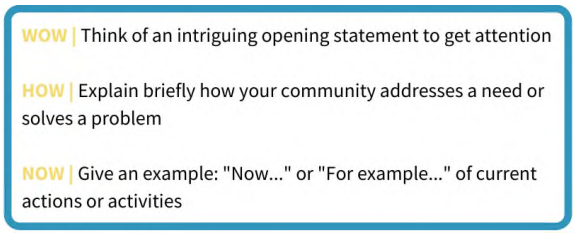


Table 3. Value Matrix - Benefits to institutions and community members (Wenger et al. 2002 in Koti et al., 2017)

	Short-term value	Long-term value
	Improve business outcomes	***Develop organizational capabilities***
Benefits to institutions	• Arena for problem solving • Quick answers to questions • Reduced time and costs • Improved quality of decisions • More perspectives on problems • Coordination, standardization and synergies across stakeholders • Resources for implementing strategies • Strengthened quality assurance • Ability to take risk with backing of the community • Standardized messages	• Ability to execute a strategic plan • Authority with clients • Increased retention of talent • Capacity for knowledge-development projects • Forum for “benchmarking” against rest of industry • Knowledge-based alliances • Emergence of unplanned capabilities • Capacity to develop new strategic options • Ability to foresee technological developments • Ability to take advantage of emerging market opportunities
	Improve experience of work	***Foster professional development***
Benefits to community members	• Help with challenges • Access to expertise • Better able to contribute to team • Confidence in one’s approach to problems • Fun of being with colleagues • More meaningful participation • Sense of belonging • Trust in technology	• Forum for expanding skills and expertise • Network for keeping abreast of a field • Enhanced professional reputation • Increased marketability and employability • Strong sense of professional identity

4. Identifying and integrating moral values and social perceptions in the design, implementation and evaluation of CE technologies

One of the main purposes of the CoPs is to identify and incorporate societal values in the process of design, development and implementation of new water mining systems. For this purpose, we have to consider that this entire process has to deal with three types of uncertainties: a) impact uncertainty, b) institutional uncertainty and c) moral uncertainty (Van de Poel, 2016). Impact uncertainty relates to the social, environmental and economic impacts of these novel circular WATER-MINING systems. This entails to answer questions such as the following: What will be the impact on sustainability? How much waste will be recovered from the water? What is the value of this waste? These questions will be answered in WP8 of WATER-MINING project.

Institutional uncertainty relates to the governance mechanisms needed to support the introduction of novel water mining systems. What regulations support these innovations? Which laws and regulations are a barrier? What market models are suitable for successful implementation of these innovations? These questions will be answered in WP9 and WP10 of the WATER-MINING project.

Moral uncertainty relates to the desirability of these water mining systems in relation the diverging values and worldviews of relevant stakeholders. For instance, stakeholders may have different perspectives on how to prioritize the values of environmental protection, human health and economic gain. Moral uncertainty can be related to the concept of social incommensurability, which refers to the absence of a common unit of measure across plural values (Martinez-Alier et al., 1998) and to the presence of conflicting and legitimate values and interests in society (Munda, 2004).

Moreover, Funtowicz and Ravetz (1992) state that any human production has internal and external components of quality. Internal quality refers to the different levels of skills required to perform an activity (dexterity, craftsmanship and/or creativity) or, in this case, to develop an emerging technology. The internal quality of a technological development is evaluated according to criteria that are relevant within the field of practice. External quality, on the other side, refers to the *fitness for purpose* of that human production. It is defined by relationship of the technological development with a broader community of users: the society, its reliability and economy (Funtowicz and Ravetz 1992).

Value Sensitive Design (VSD) is a design approach to proactively address and integrate stakeholder values in the design process of new technologies (Friedman et al., 2006). In the Water Mining project, VSD is aimed at reducing moral uncertainty and increasing social desirability and acceptance of Water Mining systems. As well, the process of stakeholder engagement and the incorporation of their perceptions and concerns into the technological development (through specific technical design propositions) aims at considering social incommensurability and increase the external quality in of Water Mining systems.

4.1. Identifying social values and concerns

The identification of social, values, concerns and expectations will be carried out in T2.1. First, CS owners will identify relevant stakeholders in each CS following the guidelines presented in the previous section. Task and WP leaders (WPs 2, 9, 10 and 11) will review the preliminary stakeholders' identification and give feedback to CS owners (e.g. identify missing stakeholder types). Then, key informants will be selected and interviewed by CoP facilitators and an online questionnaire will be sent to all identified stakeholders. In the following section, the steps necessary to identify social values and concerns are explained.

4.1.1. Explaining the WATER-MINING systems

Before contacting stakeholders and asking questions about their opinion, concerns and expectations of WATER-MINING technologies, it is of fundamental importance to explain the problem identified and the technological solution proposed by the project. In this way, we create a common knowledge base across a diversity of stakeholders.

In order to explain the different WATER-MINING systems developed in the project, WP2 will prepare a short presentation with the support of CS Owners, based on the following structure:

- Identified problem
- Proposed solution (system diagram and pictures)
- Expected obstacles and advantages compared with current situation

Presentations will be recorded in a 5-10-minute video, in local language or English with subtitles, which will be distributed to stakeholders prior to the interviews and the online questionnaire.

4.1.2. In-depth interviews with key informants

From the list of stakeholders, key informants will be selected by the CS owners and CoP facilitators, and supported by leaders of WPs 2, 9 and 10. These key informants will be interviewed to answer a number of questions (below a preliminary list of questions):

- Is the identified problem a relevant problem at local, regional, national or international scale?
- Is the technological solution provided adequate?
- What are the main concerns regarding the technological solution?
- What are the main advantages of the proposed solution?
- Does the technological solution require behavioral changes from societal perspective?
- Are there regulations that hinder the technological development?
- Are there market opportunities for the proposed solution?
- What are the alternatives to recover resources by means of the water mining systems to be developed?
- Who are the winners and the losers in developing the proposed solution?
- Is there any missing relevant stakeholder?

4.1.3. Online questionnaire

In parallel to the in-depth interviews, an online questionnaire will be sent to all identified stakeholders. The questionnaire will have the following sections:

1. Identification of the stakeholders: Name, email, organization, role in the organization, type of organization, role of the organization (end-user, regulator, technological developer, supplier, other)
2. Concerns and perception of the technological solution proposed. This section will have close and open-ended questions about a number of issues, including:
    a. Relevance of the problem
    b. Main concerns regarding the technological solution
    c. Main advantages of proposed solution

4.1.4. Data treatment and analysis

The aims of this step are to identify narratives about the development of WATER-MINING technologies in each CS and the identification of main issues contained in these narratives. This is done following Gamboa et al (2016, 2020).

Narratives refer to stories that identify the relations of causality used to structure the perception of the observed system (Magrini 1995, Allen and Giampietro 2006; Kovacic and Giampietro 2015). Narratives encapsulate socio-economic, environmental, and technical and policy aspects used by stakeholders when perceiving and describing, in this case, WATER-MINING systems developed in this project. Narratives express social values, concerns and expectations hold by stakeholders.

This information will be used for two purposes. On one side, narratives are the basis to define attributes and multi-dimensional indicators to evaluate the performance of WATER-MINING systems (WP8). On the other side, social values, concerns and expectations will be translated into design propositions to be included in the process of design and/or optimisation of WATER-MINING systems through value sensitive design (VSD).

Before analysing the information generated by the in-depth interviews and questionnaires, stakeholders' responses will be translated to English. Answers will be subject to lexicometric analysis using Iramuteq software[3], which generates different narratives contained in the analysed text[4]. The

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

[4] Lexicometry is the measurement of the frequency of co-occurrence of words in a text. Iramuteq uses a dictionary to transform verbal tenses into the infinitive form, plural into singular, and makes adjectives masculine in order to count words with similar roots as the same word. The software divides the body of the text into segments, within which words are counted. It then performs a hierarchical clustering of text segments according to the frequency of the words within the selected segments. The resulting clusters group text segments containing specific words that are used together when articulating a narrative.

software selects characteristic sentences of each narrative, which are used to represent the different narratives about WATER-MINING systems. These sentences (i.e. quotes of the analysed texts) contain the issues and attributes prioritized by stakeholders when perceiving, describing and representing WATER-MINING.

It should be noted that, in the real world, narratives are not clearly defined. Often their limits are fuzzy and overlap with each other. We assume that stakeholders don't have a unique narrative. Instead, people combine arguments and attributes from different ideal narratives to construct their own discourses. Therefore, narratives would prioritize or endow some attributes with greater importance, describe and represent WATER-MINING systems, and neglect others. Therefore, we will use "pure" narratives as a simplification of narratives found in the real world. Narratives that will be used here as an analytical tool to represent different points of view when evaluating the sustainability of WATER-MINING systems.

4.2. Defining attributes and indicators to evaluate the performance of WM systems

Attributes and indicators can be defined based on expert knowledge and/or according to different perceptions and/or narratives that are relevant for different social actors (Gamboa et al 2016, Gamboa et al 2020).

Within WATER-MINING, the first approach based on expert knowledge will be implemented in WP8. The aim of WP2 is to make attributes and indicators representative of stakeholders' perceptions, concerns and expectations.

As mentioned before, a set of attributes can be associated with each narrative. Attributes are the elements used within the specific narrative to describe a system: a description of an observable relevant quality. For example, the assertion that "water desalination technologies are highly energy intensive" contains a value judgment, which is used to identify "energy consumption" as an attribute within it. To perform a quantitative characterisation of the system under study, it is necessary to define the formal categories to measure and monitor the state of the system according to each attribute: indicators. Indicators are a means of representing an attribute of the system. They can be defined as the image of an attribute, formalised in terms of a specific measurement (Galopin, 1997). For example, the amount of Mega Joules used as energy input to desalinate water can be used as the indicator for the attribute "energy consumption". The value of the indicator (i.e., the state of the variable) provides information about the condition and/or the trend of the attribute of the system.

In order to define and quantify indicators, we used the accounting framework of the Multi-Scale Integrated Assessment of Societal and Ecosystem Metabolism (MuSIASEM) approach (Giampietro et al., 2009). The MuSIASEM approach uses the flow-fund model (Georgescu-Roegen, 1971), which distinguishes between *fund* elements as structural components of a system (e.g. human activity, Ricardian land, power capacity), and *flow* elements that are processed by the system and exchanged with its context (e.g. marine water, desalinated water, brine, energy, phosphorus). In the time scale

of the representation, fund categories transform inflows into outflows, and flows are either consumed or generated in order to reproduce the funds.

Fund and flow categories can be combined in order to characterise the system in quantitative terms, using either extensive or intensive variables. Extensive indicators can be added and characterise the size of the system in terms of either fund or flow categories. When using fund categories, we represent *what the system is* (e.g., surface of land use, amount of human activity, MW of installed capacity). Extensive indicators based on flow categories represent *what the system does* (e.g., amount of production, use of fossil fuels, added value generated).

Intensive indicators are constructed as a ratio "per unit" of system size, providing qualitative information of the analysed system. They describe *how the system does what it does*. A flow/fund ratio can be used to represent the speed and intensity of the system's metabolic processes: *i.e.*, the speed at which flows are consumed or produced per unit of fund category at level (e.g. flow of solar energy consumed per square meter of land use in a water desalination process, measured in kWh/m^2 · year, flow of treated water per hour of human activity, measured in l/h). Intensive indicators are thus useful for characterising the performance of a system.

4.3. Value sensitive design (VSD)

The conceptual designs of the Water Mining systems and resource recovery technologies will follow the Value Sensitive Design (VSD) based approach, recently proposed by Palmeros-Parada et al. (2018). In Water Mining, VSD is aimed at incorporating the stakeholders' values, concerns and expectations into the early-stage design, development and implementation of novel circular Water Mining systems.

VSD is a suite of Design for Values approaches that have been developed to consciously incorporate societal aspects into emerging technologies (Hoven et al., 2015), which are often developed in processes that are blind to the context and the stakeholders' realities (Palmeros-Parada et al., 2017).

In this sense, attributes and issues (identified in the previous steps) can be also used to incorporate stakeholders' perceptions and concerns into the process of technological development. To do so, three phases are identified within the VSD process: (i) setting the scene (M1-M10); (ii) exploring opportunities and barriers (M11-M35); (iii) future outlook (M36-M48).

4.3.1. Setting the scene

In this phase technical and societal aspects of the Water Mining systems to be developed in the project are identified to support later stages of VSD. Technical aspects to identify are the design scope and main design variables of the different technical systems, which are investigated internally through participant observation of WP 3 to 6 (case studies) kick-off meetings, and separate meetings for each Case Study with relevant project partners (mostly Case Study owners, facilitators and/or Work Package Leaders).

Societal aspects are stakeholders and societal values relevant to the Water Mining systems, which are preliminary identified through a literature review. This is an initial exploration of the main issues and constructs that will form part of later stages of VSD, and which are empirically investigated through stakeholder engagements as part of T2.1 (sections 4.1 and 4.2). In line with recommended VSD practice (Friedman et al. 2017), project values are explicitly identified from project documents, and a definition of the Designers' Stance is prepared to make visible the background and perspectives of the individuals who are working on the VSD.

This information is combined with the inputs from T2.1 (values, concerns and expectations identified by means of interviews and questionnaires) and translated into specific design propositions. Design propositions are context-specific design principles aimed at supporting the integration of the investigated stakeholder values in the design of the Water Mining systems, derived for each Case Study. These propositions are intended to: (a) set flexible boundaries to the design space, and (b) prompt reflection, focusing the designing activities on alternatives that proactively accommodate stakeholder values (Palmeros Parada et al. 2018; and Palmeros Parada et al. 2020). The development and inclusion of design propositions into the early-stage design of circular WATER-MINING systems (WP3 – WP6) will be done as much as possible with participation of project partners related to the Case Studies (meetings and other communications with Case Study owners, facilitators and/or Work Package Leaders), and considering the scope and advances in the design of the Water Mining systems.

4.3.2. Exploring opportunities and barriers

In this 2nd phase the iterative aspect of VSD starts with a process of value sensitive optimization based on stakeholders' values and expectations. The feedback on stakeholder values and design propositions from the 1st round of workshops for the different Case Studies will be used as input to re-define the design propositions intended to shape the development of the Water Mining systems.

Considering the advances in the design of the pilot systems, the opportunities to have an impact the design of the pilot systems will be reduced. Therefore, it is expected that these propositions can also focus on operation of the pilot systems and on the design of full-scale systems. These propositions will be presented and discussed in the 2nd round of CoP workshops with the support of augmented reality tools developed in WP7. Feedback from stakeholders will give the research team the opportunity to validate and refine parameters for development and implementation of Water Mining systems. The emerging ideas from this second round of CoP workshops will be an input for phase 3, the full-scale implementation study.

4.3.3. Full-scale implementation study

Here, the research team will perform an analysis of real scale implementation of Water Mining systems. For this, the implications of the full-scale implementation of the systems will be investigated, to derive recommendations for their development considering the identified stakeholder values and the feedback from the previous rounds of workshops. Aspects that can be relevant at this stage include the existence and dominance of infrastructures (e.g. a particular type of processing plant, distribution

pipelines), integration with energy systems and climate targets, as well as end-user culture and behavior (see 4.3.4).

The outcomes of the real scale implementation study will be presented and discussed with stakeholders in a third round of CoP workshops. The understanding of the stakeholders' values and the derived design propositions are expected to increase the acceptability of the novel systems and technologies of Water Mining and resource recovery.

4.3.4. Behavioural studies

These studies will be carried out across case studies to increase end-user adoption of water mining technologies and the potential embedding of new business models in current process chains. The factors that impact usefulness and ease of use of innovative technologies by consumers and other water users will be explored. In-depth interviews with end-users will be conducted for this purpose. The behaviour and attitude change from the public will be explored alongside the VSD process, where the focus will be on understanding how individuals (consumers and other water users) in communities affected accept the technologies. Furthermore, the factors that can lead to successful behaviour and attitude change in water usage will be explored, as well as public attitudes regarding trust in the implementing institutions. The latter will be studied through factors such as communication with stakeholders and transparency and fairness.

4.3.5. Supporting material for VSD

For the first two phases, 6 maquettes of the demo case studies will be developed by TUDELFT and used to enhance the experience of the participants. These will be combined in the second phase with the augmented reality (WP7) to increase understanding of the WATER-MINING systems and their implications. The results on the "future outlook" will be used for transfer and dissemination (WP9, WP10, WP11).

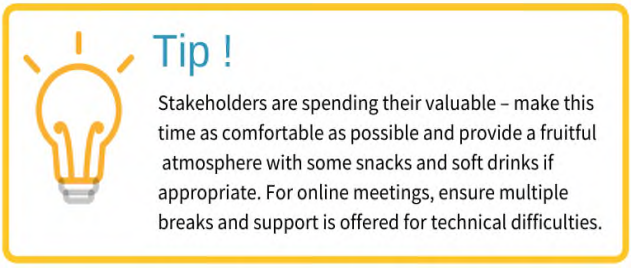
5. Prepare and facilitate the CoP meetings

CoP meetings should be designed in such way that participants are willing to collaborate, learn together and exchange knowledge. To create such conditions aimed at social learning, Medema et al. (2014) emphasize the importance of building trust and mutual understanding, facilitating ongoing reflection by embracing an intentional learning approach, and creating an enabling environment for informal and open discourse and dialogue (Brouwer et al., 2018).

5.1. How to plan the meeting(s)

Below are the steps you should follow to plan your CoP meetings.

1. CS owner, CoP Facilitator and/or Moderator to **pre-define the objectives and goals** of each meeting together with relevant project partners
2. **Logistics** (In-person or online)
    a. Decide on the venue and facilities (location/online tool)
    b. Organise the set-up (IT resources, etc.)
    c. Invite the participants
    d. Define a budget (if applicable)



3. Define the **timing and an agenda** for the meeting
    a. Email all defined stakeholders to define a date using a polling tool (e.g. Doodle Poll).
    b. Outline the agenda and timing for each activity within the meeting
4. **If the meeting is online**, the duration of the meeting should not be too long (i.e. not exceeding a 2-3 hours) and allow for breaks to allow the participants to refresh. Interaction in online meetings is especially important, considering the differences in attention of the participants as compared to an in-person meeting (*see Annexes 1 and 2 on Moderation Techniques and Engagement Tools*). If the meeting is in person, it can be for slightly longer than an online meeting, also with breaks and interaction.
5. Prepare and **provide any important information** for the stakeholders to prepare for the meeting (i.e. information about the project, a consent form (Annex 5), rights to withdraw and anonymization procedures).
6. Select **moderation techniques and engagement tools**: The following items are important considerations for each and every meeting. Specific moderation techniques and engagement tools are explained in detail in Annexes 1 and 2. Following this section are subsections on specific activities and elements to include in the 1st CoP meeting and subsequent meetings.
    1. Deliver and transfer knowledge
    2. Share experiences and co-produce knowledge

3. Co-create new ideas and innovations
4. Promote the long-term value of the CoP
5. Enable socialising and relationship building (informal or formal)

5.1.1. First Meeting with CoP Stakeholders

Below are key elements and activities that the first CoP meeting should consider in the agenda of the meeting. The first meeting is vital to build from the bottom-up, to meet the stakeholders and to co-define the objectives and ambitions of the CoP for the duration of the project.

Before the first CoP meeting, the CS owner, CoP facilitator and/or moderator needs to **pre-define the objectives and goals** which will then be validated by the participants during the meeting. Consider the following questions in defining the meeting goal and objectives:

- What is the ambition and goal of the CoP?
- What is the primary scope? (learning, support, communication)
- What is the value (benefits) it brings to its members? To the sector?
- What are the focus areas, key issues?

Below is some guidance on activities and elements to include in the first meeting to set up the CoP for success. The elements and activities are organised in chronological order are vital for the effective set-up and long-term planning of the CoP.

Beginning
Greeting and Introduction Explanation of meeting logistics and agenda (online or in-person) Ask the participants to sign the consent form In case of online meetings, ask the participants for consent to record the meeting Round of introductions with stakeholders and CoP facilitator and moderator
Middle
Validate with stakeholders pre-identified objectives, mission and ambition (or vision) of CoP, issues concerning WM technologies – refine together to ensure that these are aligned with the stakeholders' expectations. Working towards a shared objective/vision is critical to community development. Questions to be answered by the stakeholders are: • What topics and issues do we really care about? • What are the development challenges we want to address? • What outcomes do we want to focus on? • What is out of scope?

- How is this domain connected to the organisation's strategy?
- What is in it for us?
- What kind of influence do we want to have?
- How will we communicate the community's goals and achievements, and to whom?

Some of these questions can be answered before the first meeting by means of the online questionnaire proposed in section 4.1.3.

The answers to these questions will help a community to develop a shared understanding of its objective, find its legitimacy in the organisation and engage the passion of its members (Brouwer et al., 2018).

TIP! Go to Annex 2 and use CoP point of departure moderation technique

Co-define the specific ways the community will operate, build relationships and grow. Establish the operating practice and knowledge system, as seen with example questions below (Brouwer et al., 2018):

Goals: Find the community's specific way to operate, build relationships, and grow.

- How will the community be organised and run?
- Is membership open, closed or something in between?
- What roles are members going to play?
- How will decisions be made?
- How often will the community meet?
- What kind of activities will generate energy and develop trust?
- What kind of behaviours can we expect from each other (respect, honest feedback, etc.)?
- How can the community balance the needs of various segments of members?

TIP! Go to Annex 2 and use Team purpose and culture moderation technique

Co-define the short and long-term value for the organisations and attending stakeholders, in connection with the identified needs and desired outcomes of the CoP. This can be done with reflection and/or a survey during the meeting. The Value Matrix in Table 1 above can be used to identify shared values of the CoP (Koti et al., 2017).

Co-design the community in a way that it becomes an **effective knowledge resource** to its members. Consider addressing the following questions in your first meeting.

- How will community actions result in outcomes?
- What knowledge to share, develop, document?
- What kinds of learning activities to organise?
- How should we use collective learning, versus expert-apprentice, versus external research/expertise?

• What potential work groups could be created? • Where are the sources of knowledge and benchmarks outside the community? • How should we support members as both experts and learners? • What are the benefits for members?
Map out the most important stakeholders and to fill any gaps in terms of involvement of a particular organisation or person. Also discuss and consider the interest and power relations of stakeholders openly in a constructive and respectful manner, discussing the in a way that enables everyone to share their perspective and willingness to contribute. Should any stakeholders not wish to take part as a result of disagreement or lack of interest, find a mutually beneficial way to uphold the relationship even with minor or no involvement in the CoP (i.e. through period email correspondence, one-on-one discussions with some of the partners, etc.).
End
Summarise the discussions into a **Community Charter**, which will be agreed upon by all stakeholders involved in the CoP during this first meeting. Once it has been drafted and finalised, send around to all CoP Members, which will finalise the long-term design and accountability to the CoP (Koti et al., 2017). Share any relevant documents or links to meeting evaluation – reserve time during the meeting for this and send after in a summary email. Summarise meeting and define next steps together as a group.

5.1.2. In-Between CoP meetings

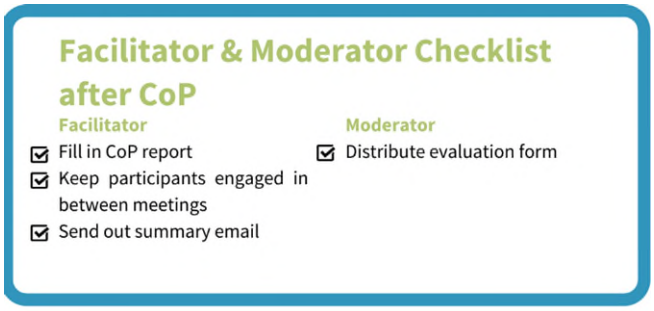
Beginning
Greeting and Introduction Checking-in or Warm-up activity with all stakeholders (See Moderation techniques Annex 2)
Middle
Discussion on relevant topics as set-up in the project roadmap through moderation and engagement activities that enable co-creation, learning and knowledge exchange.
End
Summarise meeting and define next steps together as a group. Share any relevant documents or links to a meeting evaluation – reserve time during the meeting for this and send after in a summary email. Communicate any reminders.

5.1.3. Last CoP meeting

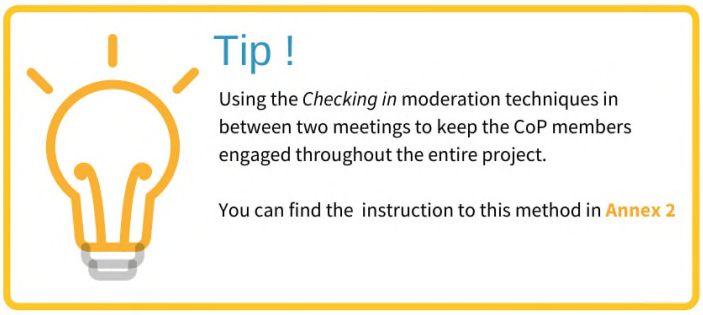
Beginning
Greeting and Introduction Checking-in or Warm-up activity with all stakeholders (See Moderation techniques Annex 2)
Middle
Discussion on: • Final resolutions/decisions • Next steps for the community – future
End
Summarise meeting and define next steps together as a group. Share any relevant documents or links to a meeting evaluation – reserve time during the meeting for this and send after in a summary email. Communicate any reminders and final decisions.

6. After each CoP meeting and yearly

6.1. Responsibilities of the Moderators / Facilitators



When the CoP meeting has ended, the CoP moderator continues. To make sure that the CoP brings added value to the project and its members, the outcomes of the CoP meetings have to be collected, recorded and monitored. Therefore, it is important that the CoP participants fill in the evaluation form (See Annex 3). In the case of a face-to-face CoP, it is advised that the participants are asked to fill in the paper form during the meeting, to ensure a high response rate. In the case of online CoPs, the CoP moderator will share a link to the online evaluation form directly at the end and after the meeting. The CoP moderator is also responsible for filling in the meeting report (See Annex 4 for report template), which provides an overview of the goals, agenda, participants and main outcomes. The evaluation form, CoP report, together with the minutes of the CoP are crucial input for the work of WP2 in the project.



6.1.1 How to maintain stakeholder interest in between meetings?

To create and maintain the community feeling between CoP meetings, it is important to keep the members engaged and interacting between the different meetings (Brouwer et al., 2018). This can be done by setting up activities at the end of the CoP, in which the participants can act on their lessons learned in the previous CoP. Another option would be to use the *Checking in* moderation technique (see Annex 2). By setting up an online channel for the CoP members (e.g. in Microsoft teams, SharePoint or WhatsApp), the CoP moderator can regularly check in on the members by inquiring about their project goals and but also current successes. Focusing on the successes of the CoP is important to keep the members enthusiastic. CoP's are often long-term focused, meaning that the main success is expected at the end of the project. However, by paying attention and celebrating small victories throughout the duration of the CoP, participants stay motivated as these wins show the short-term benefits and added value of the CoP.

6.1.2 Information sharing: online platform

All documents (static or living document) related to CoPs will be available in an online platform that will be shared with CSs. CSs will be informed of the selected approach when available. It is the responsibility of the CoP facilitator to make the documents available and keep them up to date. The CoP facilitator can send a notification to the CS leader when a new version of the document is available. Making CoPs documents available and keeping the up to date is an important form of sharing knowledge, in particular: 1) Lessons learned and best practices to implement for organisers, and 2) New ideas, innovations and updates based on the specific CoP case studies.

6.2. Evaluation of CoPs: rationale and approach

Evaluating the CoP is not only necessary to measure its success in terms of output, but also to measure its functioning over time in terms of process. In particular, it allows for continuous learning and improvement of the CoP throughout the project, with the overall goal to identify best practices for CoPs at the end of the project. The evaluation approach adopted in WATER-MINING is based on the framework of (Fulgenzi, Brouwer, Baker, & Frijns, 2020). The adopted method measures the CoP's **maturity, structures** and **processes** that support the CoP's success. Fulgenzi et al. (2020) have based their evaluation of CoPs on the three key CoP elements: community, domain, and practice, and have combined them with the goal of CoPs: social learning.

Social learning occurs through social interaction, within social networks and ultimately leads to a change in the individuals perspective (Fulgenzi, 2019). By combining these social learning elements together with the key elements of CoPs, three CoP social learning outcomes (CoP-SLO) dimensions can be defined: 1) interaction and engagement of stakeholders, 2) changes in stakeholder issue frames and 3) stakeholder's awareness of their own role and those of others. A well-functioning CoP is expected to score high on these three CoP-SLO dimensions. The CoP-SLO elements are abstract and therefore difficult to measure. However, Fulgenzi et al. (2020) have identified key success factors that, if sufficiently present, should foster the CoP-SLO dimensions. Per CoP-SLO dimension, 6 key success factors are identified:

1. Organisational aspects, tools, artifacts
2. Adequate meeting atmosphere
3. Stakeholder inclusion and engagement
4. Convergence on a shared perspective
5. Identification of opportunities and challenges
6. Generation of useful knowledge

These key success factors are in turn operationalised through indicators and translated into questions in the evaluation form (Annex 3). Evaluating the CoPs based on the approach of Fulgenzi et al. (2020) enables the identification of which success factors are sufficiently present in the CoP and which aspects deserve more attention. This allows to implement changes to the CoP meetings to improve their effectiveness as well as draw overall lessons to successful co-creation in CoPs.

7. Checklist for Facilitators and Moderators for Successful Meetings

Before the meeting

☑ 1. Define roles and responsibilities of the CoP facilitator, moderator and stakeholders early on before the meeting; i.e. who will manage the meeting logistics, who will facilitate the meeting, what roles do the stakeholders have, if any? Also define a reporter and take notes within the template provided in Annex 4.

☑ 2. Before the meeting, send out an email with:

- ☑ a. A survey to better understand your stakeholders and their expectations so you can match them and adjust the meeting as necessary.
- ☑ b. An invitation letter to motivate stakeholders to participate with an agenda invitation for their email calendar
- ☑ c. The meeting agenda, and any other important documents to prepare for the meeting, as well as outlining the desired outcomes

During the meeting

☑ 3. During the meeting, ensure everyone feels welcomed, able to share, in a safe space to engage (consider languages, backgrounds, culture, personalities) – ensure balanced opportunities for all to engage in their own preferred way through the different meeting activities and moderation techniques (e.g. individual reflection vs. group discussions).

☑ 4. Ask the participants to fill in the consent form. In case of and online meeting, ask the participants for consent to record the meeting.

☑ 5. Plan activities (See Moderation Techniques Annex 2) that enable trust, maximize transparency, mutual understanding, and facilitating ongoing reflection by embracing an intentional learning approach, and creating an enabling environment for informal and open discourse and dialogue (Koti et al., 2017).

☑ 6. Think out of the box – engage people in new ways with activities and engagement tools – this will enable more interaction, participation, attention, and recall of the meeting and objectives to carry the CoP forward and its activities.

☑ 7. Design all your meetings and activities with the user in mind, i.e. **following a user-centric design approach**. This means knowing your stakeholders well and planning activities and discussions of relevance.

End of the Meeting

☑ 8. Set actions at the end of the meeting(s). Consider that actions are taken in between meetings.

☑ 9. Right before the end of the meeting, whether in-person or online, move through the following elements:

- ☑ a. **Reflect** with the group for 5-10 minutes on how they perceived the meeting (positive, negative, neutral, etc.) – The moderator and participants take part.
- ☑ b. **Evaluation forms** – Reserve time at the end of the meeting to make sure that everyone fills the form online/in-person to get the highest response rates.
- ☑ c. Further information on the topic, and
- ☑ d. Contact information as needed.

*This information (9a-d) can be shared via the PowerPoint slides or via the chat if during an online meeting.

After the meeting

☑ 10. Fill out meeting minutes in the CoP Reporting template in Annex 4 so that it is still fresh in your mind

☑ 11. Send out summary email with:

- ☑ a. The evaluation form to participants in case they did not fill it in during the meeting
- ☑ b. Meeting Minutes (on shared drive or as an attachment)
- ☑ c. Next steps and action Items
- ☑ d. Other relevant information on the project, contact info, etc.

8. Cross-Fertilisation CoPs

To enhance and re-enforce mutual learning between the CoP organisers and stakeholders, cross-fertilisation or cross-learning meetings should take place at least 2-3 times throughout the project duration (Brouwer et al., 2018). The cross-learning can be between:

> **Facilitators and moderators** on **engagement and moderation** and overall progress of the CoPs, sharing best practices and lessons learned for facilitator and community management;
>
> **Stakeholders** on the different **topics** of the CoPs and enabling further ideation and co-creation to achieve the project objectives and sharing across locations, and innovation.

Having these meetings will strengthen and improve overall learning from best practices and lessons learned between the organisers, and new ideas and concepts on science and technologies for the stakeholders. These meetings will add value to the overall CoPs in bridging the gaps across the topics, networking and innovation potential (Brouwer et al., 2018).

KWR together with the WP2 leader will coordinate the design and implementation of these cross-fertilisation meetings in WATER-MINING.

In Annex 4, there is a template for reporting the minutes of the CoP meetings. It is used for providing info to the evaluation of CoPs, sharing with participants the results of the meeting and keep track of what has been discussed. These reports are essential input to the cross-fertilisation and learning between the different CoPs and are used also for reporting the cross-fertilisation meetings.

In summary, cross-fertilisation between CoPs can occur between moderators and facilitators, as well as between the stakeholders. This can happen by making CoP materials and documents available online in an openly accessible way, as well as through specific cross-fertilisation meetings where knowledge exchange and transfer can occur between CS and also WPs.

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Annex 1 – Engagement tools for on-line meetings

The below tools for engagement can be used for a variety of on-line engagement and moderation opportunities. We have highlighted a selection of the most effective and tested tools based on the intended use for CoPs.

We recommend the following in choosing the best online tool for your CoP:

1) **Use the tool that you are most comfortable or familiar with**. For example, if you or your company have experience with using Microsoft Teams internally and externally to your company, then we recommend to go with that tool as it will reduce the planning and effort needed to coordinate a meeting.
2) If you are not already familiar with any of the tools below, the **following shortlist is recommended** based on the online tool's ease of use and use experience (noted with a star in the table below):
    a. **Webinar Meeting Platform: Zoom Meetings** - Zoom is easy to use and tried and tested by a wide online community. Zoom is superior to competitors with its built-in polling functionality, connection stability, breakout-rooms and ease of logging into a meeting for external partners. Their security issues have been largely resolved, however, some companies have still banned its use. There are costs associated with its use, so please look into these as well as the free limited version.
    b. **Collaboration Tools: GroupMap** – GroupMap is a great tool for mapping, vision setting and online collaboration on priorities, SWOT analyses and more. It is user-friendly and enables engagement during online meetings, with multiple templates already created for all types of meeting objectives. Furthermore, you can easily access the PDFs of the worksheets after the meeting. There are costs associated with its use, so please look into these as well as the free limited version.
    c. **Polling or Surveying: Mentimeter or Slido** – If the online meeting tool you are using does not have a built-in polling system, then Mentimeter or Slido are great alternatives. Both platforms enable visually pleasing and simple online engagement through polling, quizzes with visual data analytics through graphs, barcharts and wordclouds. This can help to make a decision, highlight current knowledge levels, and enable your participants to give their opinions to shape your meeting. There are costs associated with its use, so please look into these as well as the free limited version.

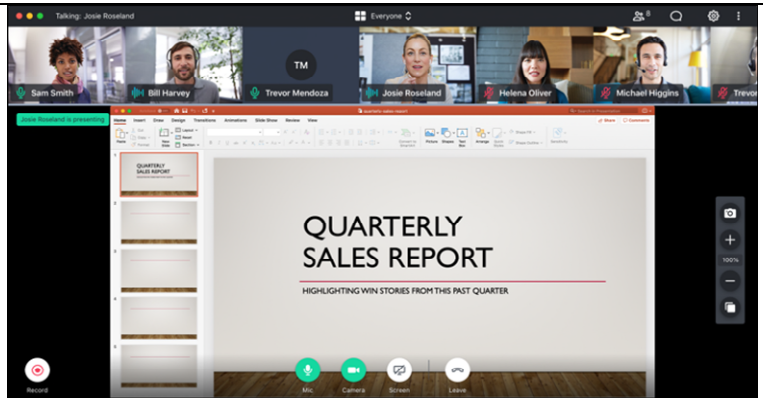
***Please Note:** All tools below have outline data and privacy issues on their websites. If your company or institution is concerned with privacy, data and security in using these tools, we advise to verify your specific needs by visiting the website of any of the tools recommended below.*

**Also be sure to ask participants in advance if they agree to share any data from the meetings, such as: recordings, screenshots, notes, etc.*

Legend

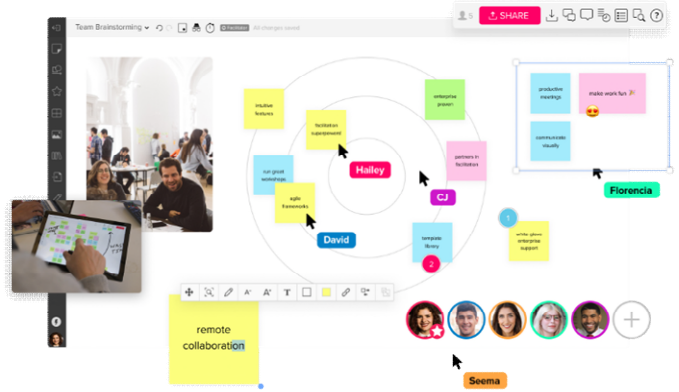
Used by KWR	Not yet explored /used to a full extent

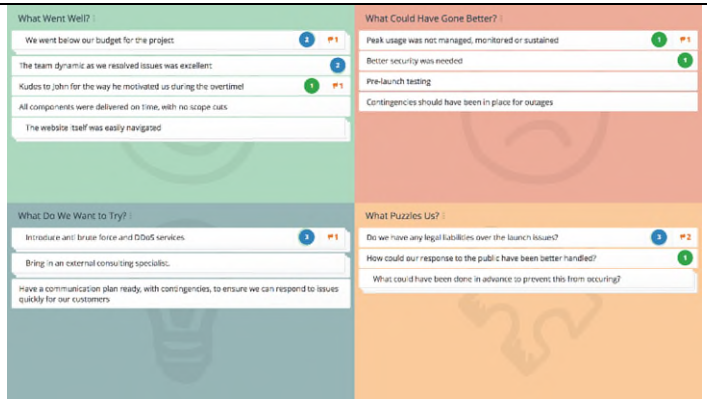
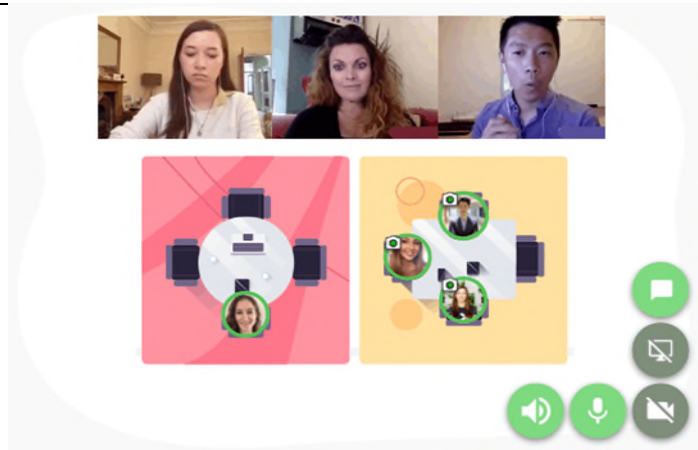
Tool	Pros & Cons	Features	Reference Photo
Webinar/Meeting Platforms			
Zoom	Pros: • Most user friendly for meetings and webinars (no limits in speakers, moderators, attendees) • Simple to-use Breakout rooms • Raise hand function • Quick and easy to get into the meeting with a link • Can collect data on attendance and participation, recording downloads automatically to cloud or computer • Can record to computer or cloud • Meeting encryption • High quality video • Pricing and free trial exceeds other platforms • Up to 1000 participants Cons: • Some organisations do not allow use due to security issues, but these have largely been resolved by	• Built in polling options • Breakout rooms for smaller group discussions • Webinar and meeting functions • Join from anywhere on any device • Access robust security solutions throughout • Built-in tools for screen sharing • HD video and audio calls • Support for up to 1,000 video participants and 49 videos • Meet securely with role-based user permissions • Streamlined calendaring services with Outlook and Google • Team chat both for groups and one-on-one messaging Source	 Photo Source

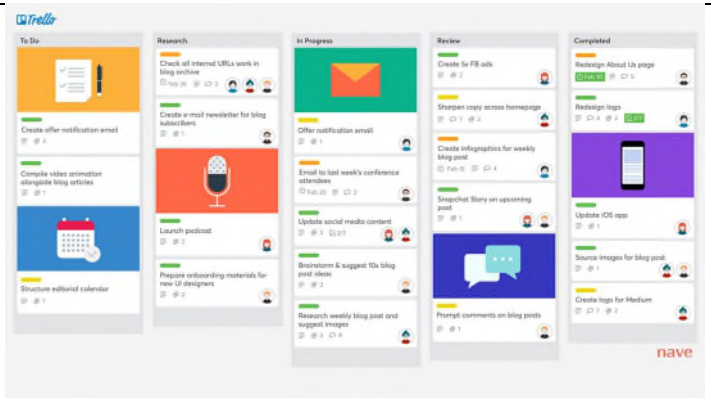
	Zoom. • Basic features account: only up to 100 participants		
GoToMeetings	Pros: • Can offer recordings afterwards with a link • On-Demand meetings with a simple URL • Integrated into email platforms • Up to 250 participants Cons: • Control panel/portal not user-friendly • No raise hand function • No breakout rooms • Unstable connection compared to other tools • Limit to camera/video visibility More information	• Application Sharing • Audio conferencing via phone and computer • Drawing tools • Full desktop sharing • Instant Messaging • Instant meetings with a single click • Integrated scheduling with Microsoft Outlook® • Join from Mac, PC, iPad®, iPhone® or Android • One-click high-definition HDFaces™ video • One-time scheduled meetings • Recording • Recurring meetings Source	 Photo Source

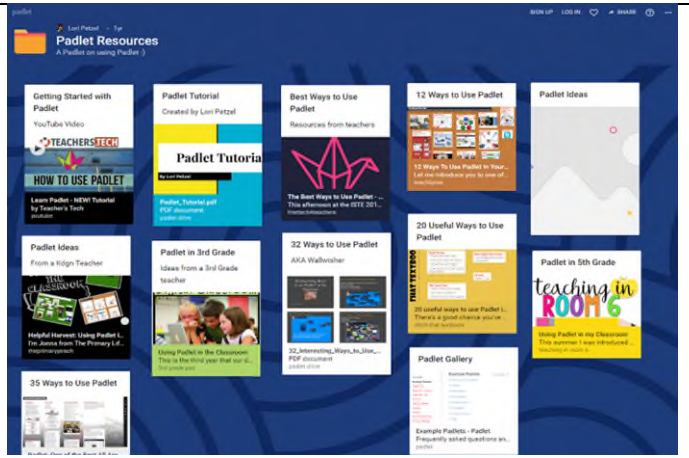
Webex	Pros: • Meeting encryption • Basic features: up to 500 participants • Raise hand function • Collaboration and annotation tools • Breakout/interactive sessions • Easy to use Cons: • Webex requires a lengthier registration and check in • No meeting registration reports • The menu system is not intuitive • Some issues with non-Webex users to connect via audio • Complicated to navigate compare to competition • Extra fee for "call-me" feature • Interface could be modernized • Expensive compared to competitors More information here and More Information	• "Call me" Feature • Recording • Polling • Whiteboard • Transcription (only in English) Source	 Photo Source

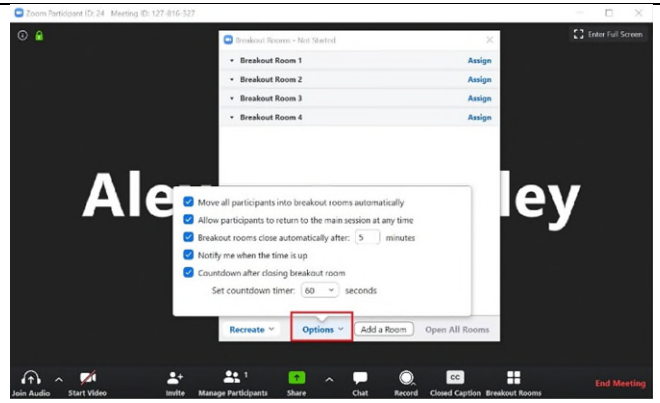
Microsoft Teams (for meetings and webinars)	Pros: • Useful chat options (can send documents) • In sync with Microsoft Office suite • Raise hand function • Great for internal communication and meetings • Built-in possibility during a meeting to go into breakout rooms for company account Cons: • Not as good as competitors for external meetings • Not-so-simple login to a Teams meeting (additional steps) • No built in polling for meetings, so need to use external app or program	Latest features 2020 • Enable spell check • Channel notification is simple using … notification • Consult > transfer the call • Focus option on slides shares • Meeting notes • Meet now and schedule into channel top right corner • Channel setting, updates, and notification at the top right corner Some of the great updates coming soon; • Speaker attribution for live captions • Live transcript for the meeting which can be used for review after the meeting • Increase to 1000 participants Interactive meetings from 300 • Whiteboard - faster load, sticky notes, and drag and drop capabilities • Reflect - new polling apps in MS Teams	 Photo Source

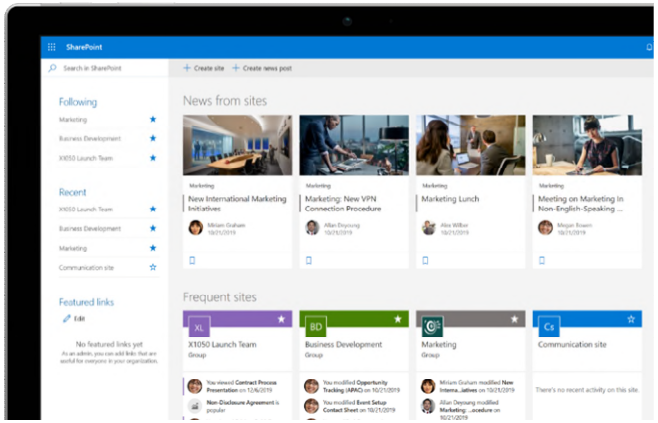
		channels • Virtual breakout rooms Source	
Collaboration Tools / Project Ideation and Management			
Mural	Pros: • Great for real time and any time online collaboration and co-creation • Visually attractive for brainstorming • Hosts a variety of templates for collaboration and engagement for projects / project management • Integration into existing workflows Cons: • Need to attend a training prior to use (for effective use, it is best to attend one of the free webinars and to test it out) • Needs a trial run for participants to get used to the interface	• Free trial (30 days) • Sticky notes and text • Shapes and connectors • Icons • Frameworks • Images and gifs • Drawing • Meeting timer • Summon group members to location on mural • Outline your meeting with templates • Lock items on the mural board • Private mode • Sharing, commenting, chat, quick talk Source	 Photo Source

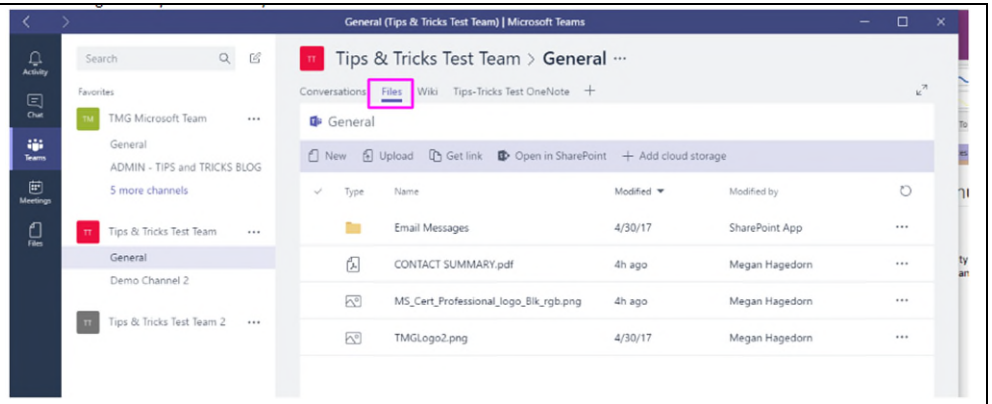
GroupMap	Pros: • Very easy to use and intuitive • Templates pre-defined to enable individual and group reflection, voting, assigning tasks, etc. • Easy to comment • Grouping ideas • Project planning • Simple for the user to login and start using Cons: • Expensive compared to competitor More information	• Free trial • Web-based, Cloud, SaaS • Webinars, Live online, documentation • Brainstorming • Discussion boards • Project Management • Real time editing • News feed • Collaboration • Ideation and mind mapping • Whiteboard • Voting • Assigning tasks and timelines Source	 Photo source
Remo	Pros: • Great tool for collaboration and interaction for online meetings • Exciting/visual and looks great for fostering more dynamism in online/virtual meetings • Enables connections between attendees • Ability to have numerous different conversations throughout a room	• Host Controls • Alerts/Notifications • Auto Framing • Automatic Transcription • Branding • Chat Export • Communication Tools • Customizable Branding • Electronic Hand Raising • File Sharing • HD Audio • Host Controls • Polls/Voting • Presentation Streaming	

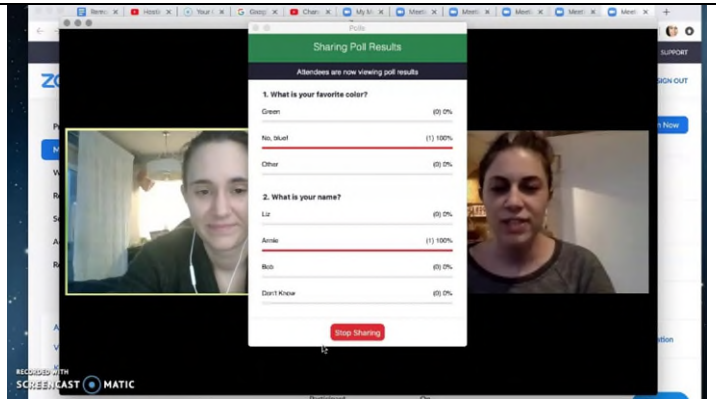
	Cons: • Expensive • Registration page not intuitive More information More information	• Presentation Tools • Private Chat • Q&A Sessions • Real-Time Chat • Record & Playback Ability • Reporting/Analytics • Screen Sharing • Two-Way Audio & Video • User Profiles • Video Conferencing • Webcasting Source Updated features 2020	Photo source
Trello	Pros: • Good for coordinating projects, topics, content planning • Easy to add content and tag colleagues • Can consolidate information on a specific task and project • Project checklist • Easy upload feature • Keep track of to-do lists • Share files with your team members • Ability to collaborate • Flexible	• Task scheduler and prioritisation • Shared team calendar • Time tracking • Attachment options • Communication • File sharing • Team dashboards Source	 Photo Source

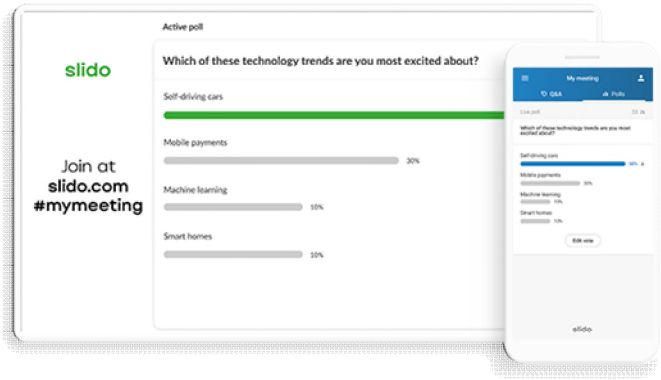
	Cons: • Need to define an approach that works for your team, or could get messy • Lacking integration with other software • Difficult for big projects More information		
Padlet	Pros: • Good for mind-mapping and brainstorming ideas • Easy to set up and use • Design thinking • Users can collaborate and share media easily • Good for virtual group-work • Online "bulletin board" Cons: • None of relevance More information	• Available in 29 languages, with more being added • Collaborate on padlets from around the globe • Working towards greater accessibility every day • Add posts with one click, copy-paste, or drag and drop • Works the way your mind works - with sight, sound, and touch • Changes are autosaved • Simple link sharing allows for quick collaboration • Invite others to contribute - signup not required • Work with unlimited contributors • Give read-only, writing,	 Photo Source

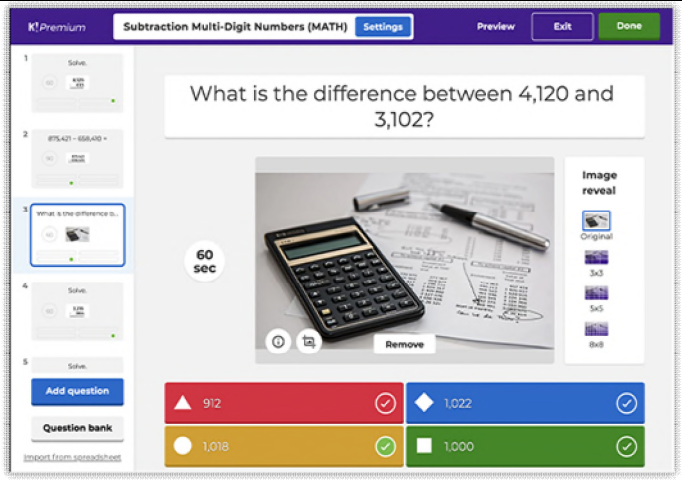
		moderator, or admin access; revoke at any time • Watch updates appear instantly across devices • Privacy and security options • Compatible with most file types and devices • Good customer support Source and more information	
Zoom Breakout Rooms	Pros: • Built into Zoom • Great for breaking out into smaller groups for discussions Cons: • If recording, need to click record again when into breakout rooms • Needs moderate training to apply effectively and in a timely manner	*See Zoom features above*	 Photo source

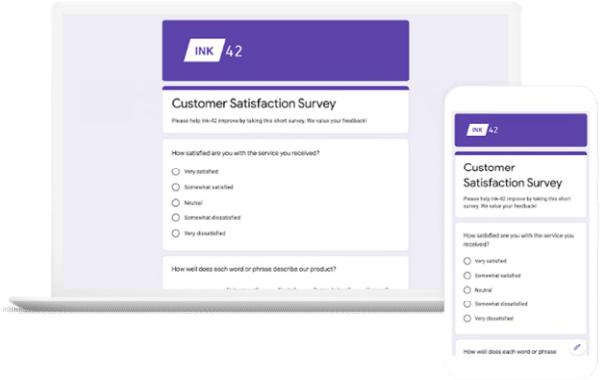
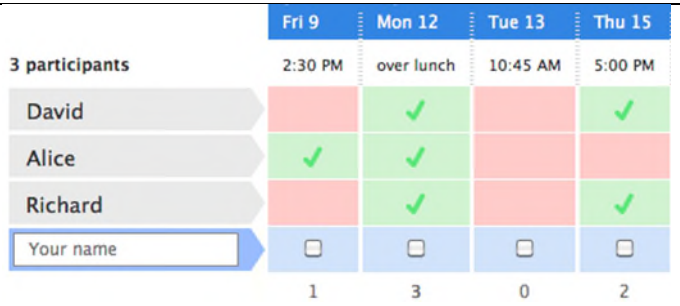
SharePoint	Pros: • Good for file storing and sharing for collaborative projects • Connected to Microsoft Office • Permission management • Contact groups • Version history • Can lock documents upon final revision Cons: • Need to be invited • Not so user-friendly • If files are used and edited from here, need to upload new files, so could create confusion • Advanced configurations – administration not straightforward • Unappealing aesthetically More information	• File sharing • Synchronise with OneDrive • Integration with PowerApps and BI • File storage and organisation • Multiple device and/or browsers More information	 Photo Source

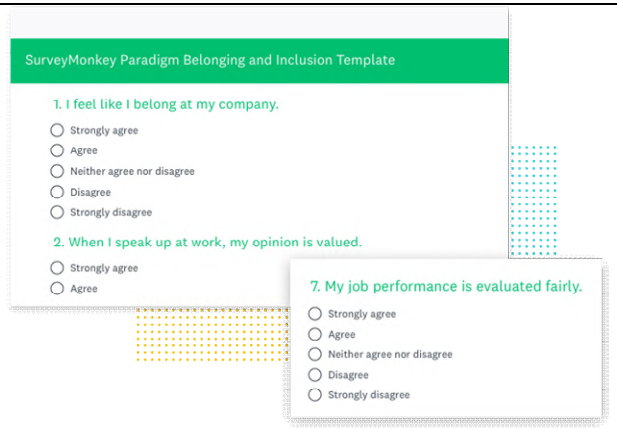
Microsoft Teams (for collaboration)	Pros: • Great for storing and collaborating on documents • Easy to edit and collaborate on Word Documents • Can share a collaborative document in a Teams meeting and having people work on / add information • Can make different channels for different projects • Include other apps all in one spot (e.g. Trello) Cons: • Not so easy to track changes and see what has been done • Not great for working on multiple documents at once • Some formatting is lost when uploaded to Teams	• Communication driven by instant messaging and audio/video chat • Live meetings and on-demand recordings • Integrations with Office 365 apps such as Planner as well as third-party services • Mobile app for on-the-go teamwork – access across all devices Source • File sharing and viewing for editing • Collaborate live in real time • Tagging colleagues in chat and in Teams channels (reduces emails) • Collaborate internally and externally Source	 Photo Source
Polling/Survey Tools			

Polling built into Zoom	Pros: • Easy to use • Built in • Simple interface Cons: • Is not visible in recording of meeting or webinar, only to the live viewers	• Single choice or multiple choice polling • Launch one poll at a time or multiple • Sharing results with the audience Source	 Photo Source
Mentimeter	Pros: • Good for polling word clouds, bar graphs • Easy to set up • Data visualisation • Live results • Easy to connect and vote Cons: • Limited to 3 questions for free version	• Interactive presentations • 13 interactive question types including word clouds and quiz • Your audience uses their smartphones or a separate tab on their web browser to connect to the presentation where they can answer questions • Visualize responses in real-time • Share and export your results • Translate • Compare data over time with trends	 Photo source

		• Profanity filters Source	
Slido ★	Pros: • Good for polling • Live results • Can change answers later on during meeting if in a discussion or debate and watch the responses change Cons: • Limitations in free trial	• Q&A sessions • Live polling & quizzes • Data and analytics • Collect and curate the best ideas from your participants • Integrations with (PowerPoint, Google Slides, Teams, Zoom, Youtube, etc.) • Question moderation • Privacy • Multiple rooms • Feedback surveys • Themes and branding • Event collaborators Source	 Photo source

Kahoot	Pros: • Good for polling, quizzes, live results • Gamified interface • Colorful, vibrant • Easy interface • Adaptable for various age levels • Good for educational purposes • Multiple users in mobile app Cons: • Tailored for younger crowd of students • Some additional barriers to connect and poll (need to put name, enter a code, then poll) • Interface is cluttered and overwhelming • Nicknames so difficult to track • Not able to integrate into presentations ahead of time More information	• Minutes to create a game from scratch • Question bank • Templates • Live via video • Paced challenges • Timer • Assign and review • Create and share outside of live interface, i.e. before or after a meeting Source	 Photo source

Google Forms	Pros: • Easy and user friendly set up • Can generate excel sheet of responses • Data visualisation • Free • Can customise response routes (i.e. if yes, go to Question 2) • Versions automatically saved to Google Drive Cons: • None of relevance • Limited templates More information	• Free • Manage event registrations, quick polling, collect information • Use your own photo or logo • Create or respond on the go • Organised data analytics and visualisation • Add collaborators Source	 Photo source
Doodle Poll	Pros: • Recognised method of finding a date for large groups • Easy to use and send out • Free • Convenient • Calendar integration • Avoid scheduling mistakes • Skip many emails to schedule	• Visibility • Time zones • Scheduling collaborative • Simplify updates • Manage reminders • Doodle Pro • Integrations with Zoom Source	 Photo Source

	Cons: • None of relevance • If you have many dates, scrolling feature gets too long and hard to view More information		
Survey Monkey	Pros: • Templates built-it • Affordable • Tools to configure and customise • Several languages available • Simple links for use Cons: • Costs money • Limited integration of apps More information	• Multiple question types • Trend tracking • Automatic reminders • Customizable • Document storage • Integrations with email and social media and more • Email response tracking • Permission management • Real-time feedback • Recurring surveys • Data export • Daily email updates • Customizable survey links • Password-protected surveys • Collaborative survey editing More information	 Photo source

Annex 2 – Moderation techniques

This Annex aims to support CoP facilitators and moderators with explanations of various moderation techniques for CoP meetings over the course of the project. Each meeting will require a different set of activities to engage the stakeholders present and will require different activities as the project progresses. As such, the moderation techniques have been categorised per meeting element and/or activity in sequential order (i.e. introduction, setting the scene, defining scope and direction, brainstorming, making knowledge explicit, and decision making) to make it easier for the CoP facilitator/moderator to select a suitable moderation technique. Further explanation will be given for each moderation technique with online or in-person specifics. This overview draws upon KWR's work in the STOP-IT (Koti et al., 2017) and BINGO (Freitas et al., 2018) projects, and a literature scan (Dirkse-Hulscher & Talen, 2007; Dosière & Wilems, 2016; UNICEF, 2015).

Moderation Techniques for:

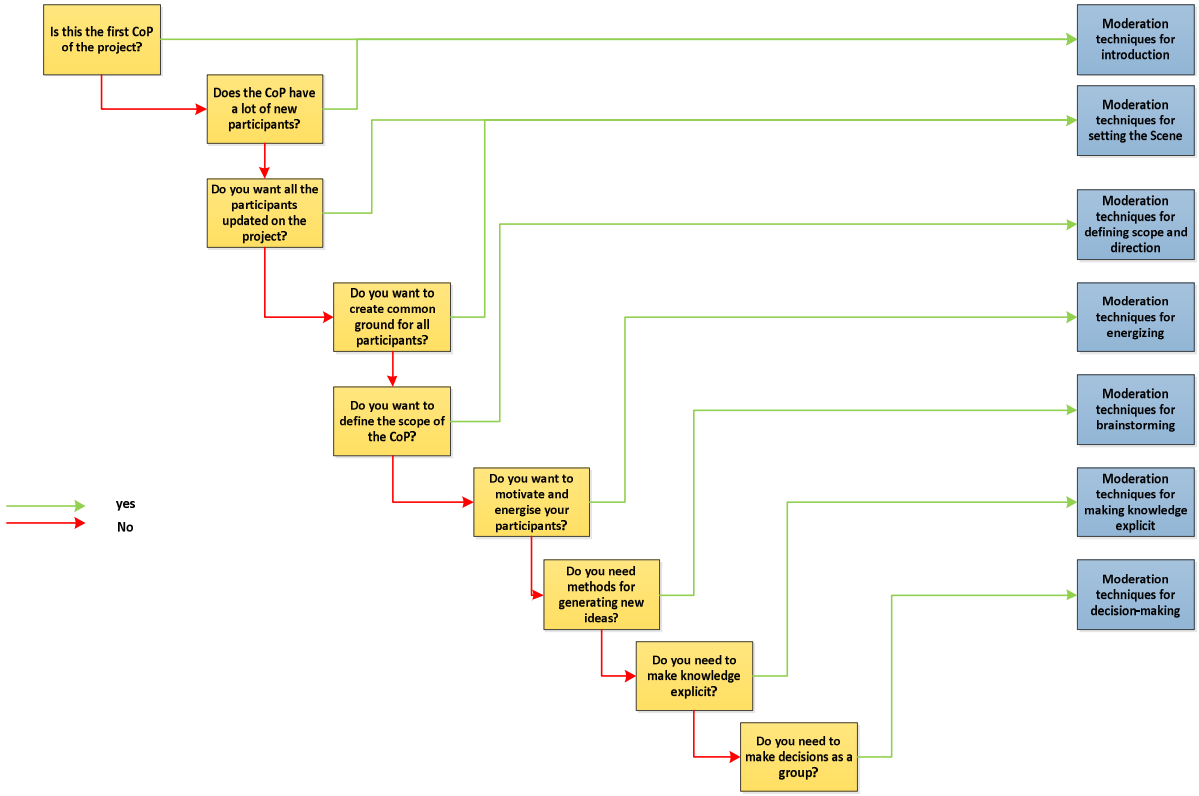


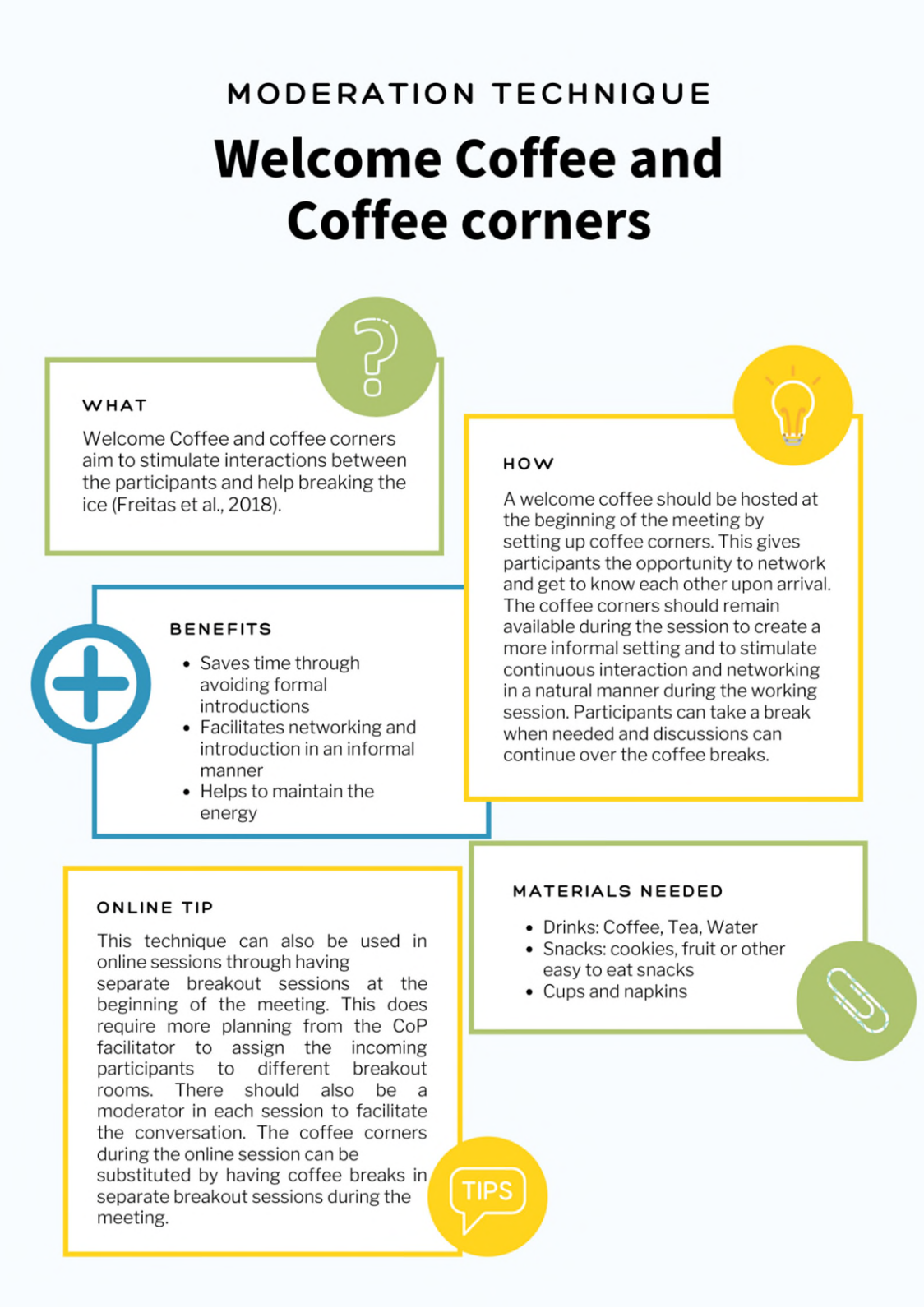
Figure 4 Decision tree for moderation techniques

Moderation techniques for introduction

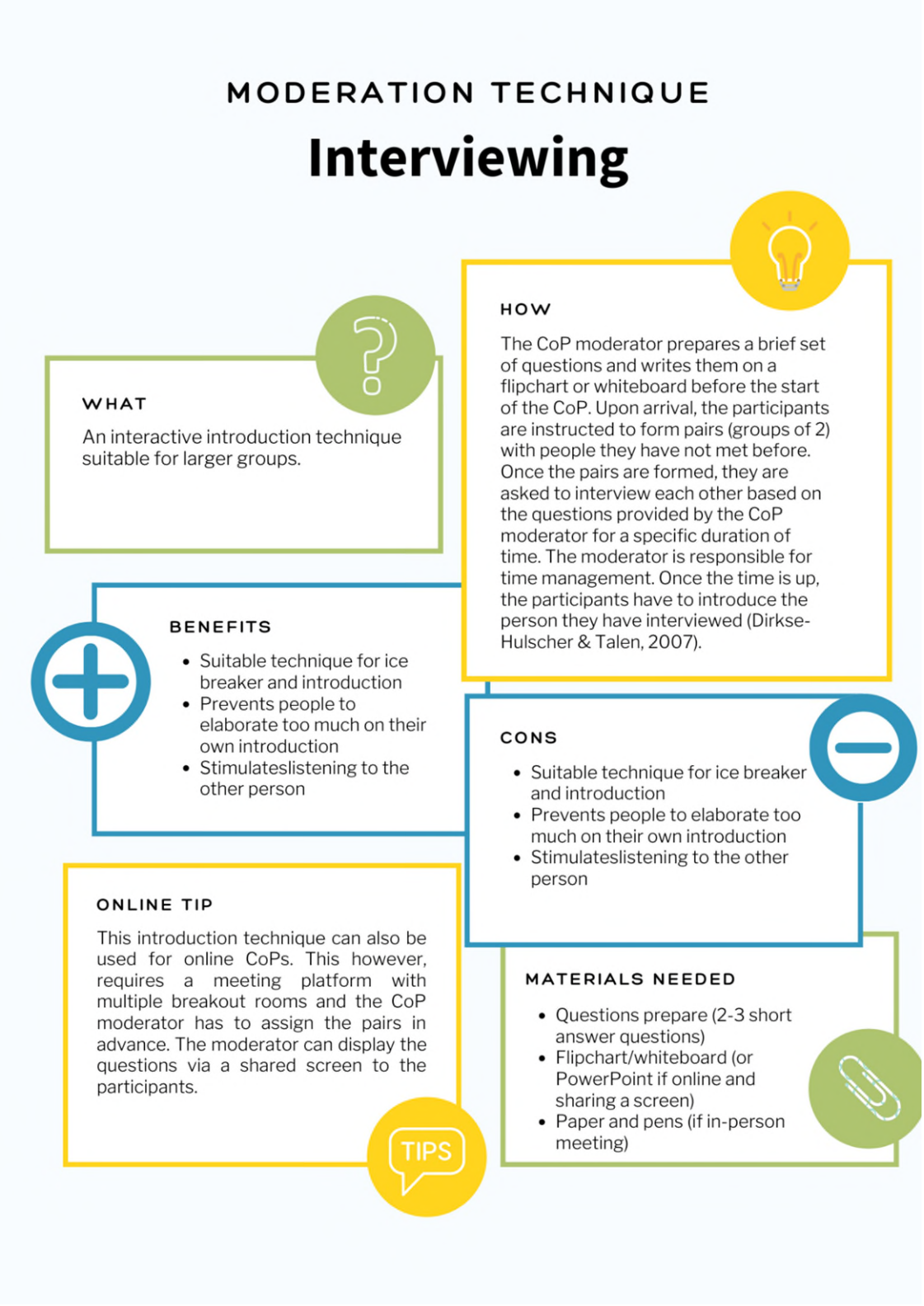
Introduction techniques and “ice-breakers” are most suitable for the first round of CoP meetings or meetings which have many new participants. Successful CoPs require an open environment where the participants feel safe and can build trust among each other. Therefore, it is important that the participants get to know each other in formal and informal methods. The following moderation techniques can facilitate such introductions:

Overview

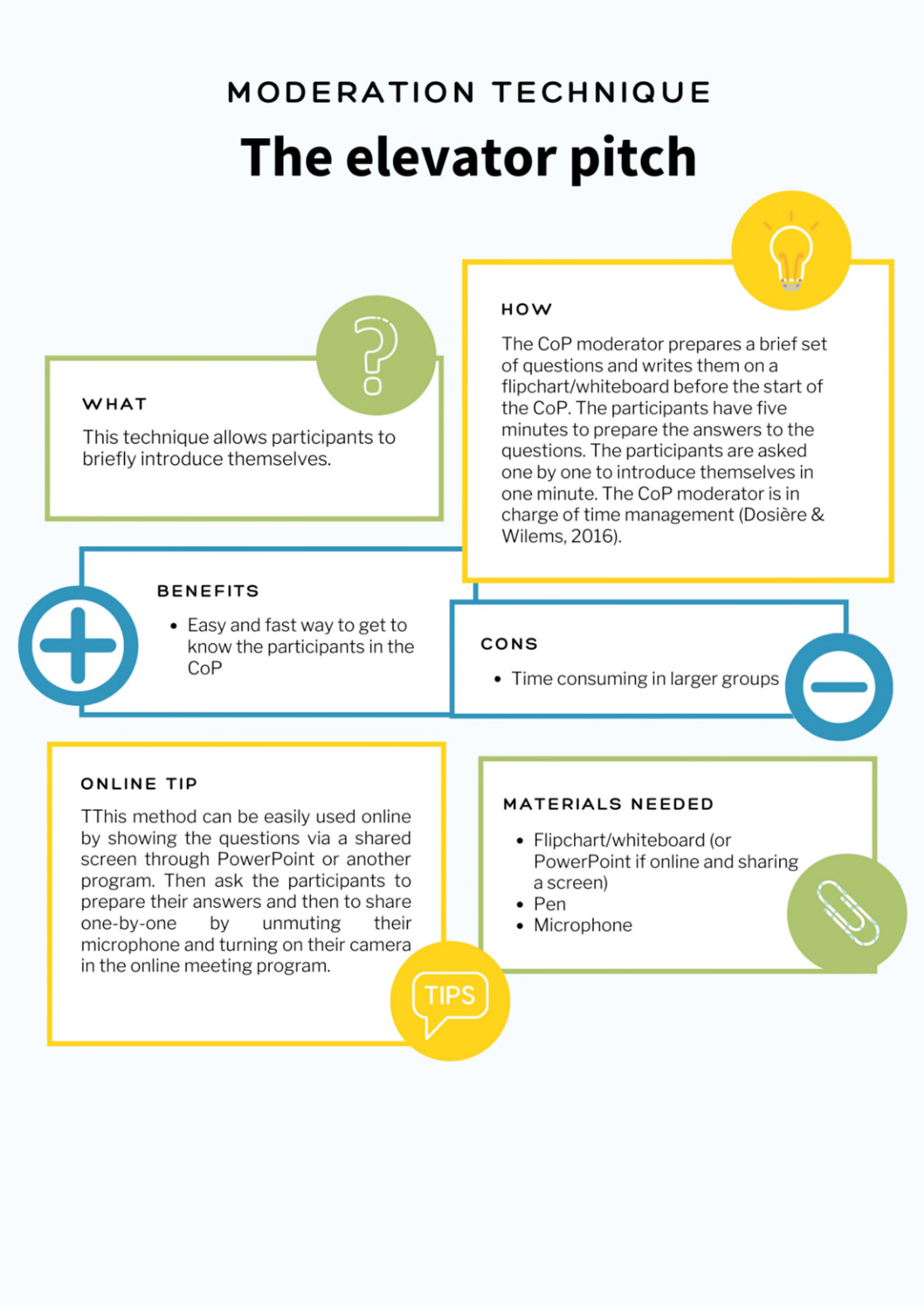
Welcome Coffee and Coffee corners



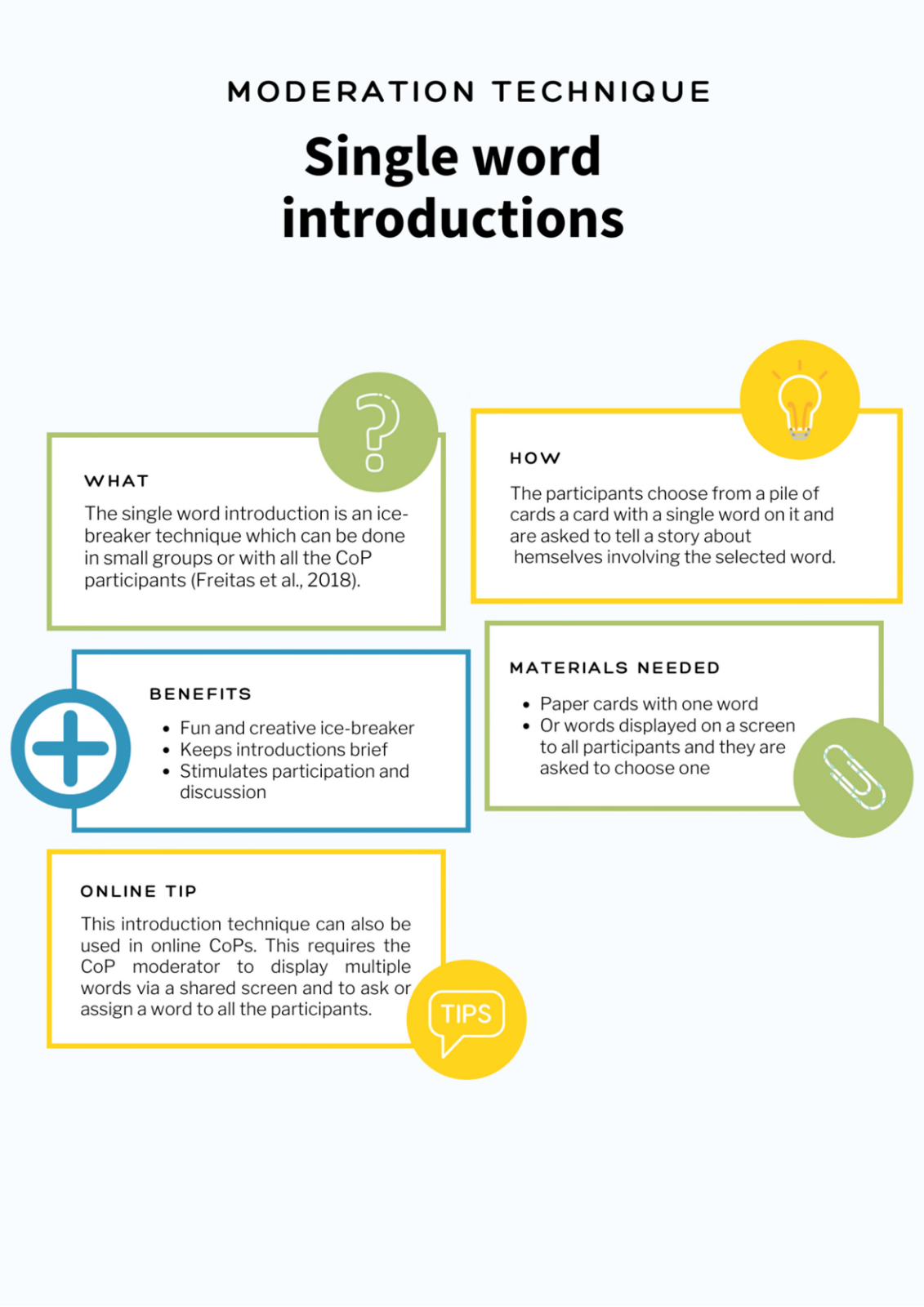
Interviewing



The Elevator Pitch



Single word introductions



Picture introductions

Checking-in

MODERATION TECHNIQUE

Checking-in

WHAT

This method makes the participants feel present in the group and raise group commitment.

HOW

The goal is to check-in with participants at the beginning of a meeting, and to do so at each subsequent meeting through the duration of the project. By checking-in, the CoP moderator poses questions that keep people engaged and develop a sense of openness among the participants. Examples of checking-in questions are:

- What are you planning to do today
- How are you feeling today?
- Would you like to share something that made you happy in the last week?

The moderator can start by answering the question and giving an example to make people feel comfortable.

BENEFITS

- Helps facilitating a sense of community in between the meetings
- Fun and engaging way to break up the working day
- Facilitates
- communication between the members of a CoP

ONLINE TIP

This method has been designed for ease of use during online meetings. Simply display the questions via a shared screen and ask participants to unmute and turn on their camera when it is their turn to speak. The moderator can facilitate and ensure everyone has answered.

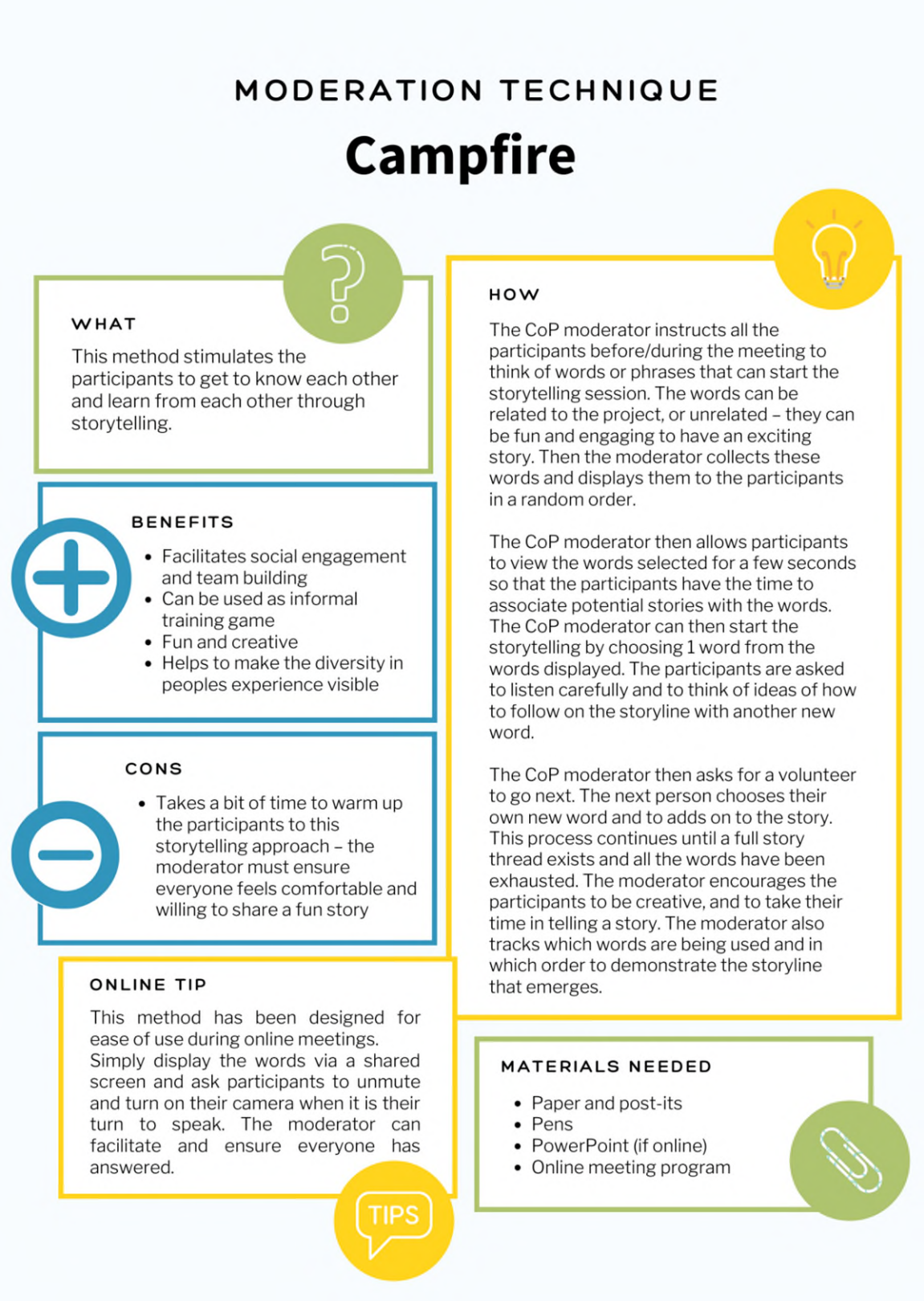
In case this method is used in between meetings, people can answer by writing in the channel chat.

TIPS

MATERIALS NEEDED

- To prepare the questions and display them on a flipchart or on screen
- Create a channel on an online meeting platform

Campfire


MODERATION TECHNIQUE
Campfire
WHAT
This method stimulates the participants to get to know each other and learn from each other through storytelling.
BENEFITS
• Facilitates social engagement and team building
• Can be used as informal training game
• Fun and creative
• Helps to make the diversity in peoples experience visible
CONS
• Takes a bit of time to warm up the participants to this storytelling approach – the moderator must ensure everyone feels comfortable and willing to share a fun story
ONLINE TIP
This method has been designed for ease of use during online meetings. Simply display the words via a shared screen and ask participants to unmute and turn on their camera when it is their turn to speak. The moderator can facilitate and ensure everyone has answered.
TIPS
HOW
The CoP moderator instructs all the participants before/during the meeting to think of words or phrases that can start the storytelling session. The words can be related to the project, or unrelated – they can be fun and engaging to have an exciting story. Then the moderator collects these words and displays them to the participants in a random order.
The CoP moderator then allows participants to view the words selected for a few seconds so that the participants have the time to associate potential stories with the words. The CoP moderator can then start the storytelling by choosing 1 word from the words displayed. The participants are asked to listen carefully and to think of ideas of how to follow on the storyline with another new word.
The CoP moderator then asks for a volunteer to go next. The next person chooses their own new word and to adds on to the story. This process continues until a full story thread exists and all the words have been exhausted. The moderator encourages the participants to be creative, and to take their time in telling a story. The moderator also tracks which words are being used and in which order to demonstrate the storyline that emerges.
MATERIALS NEEDED
• Paper and post-its
• Pens
• PowerPoint (if online)
• Online meeting program

Moderation techniques to energise

These techniques help to restore the energy during long meetings and to keep everybody engaged and active.

Overview

- Picture sharing
- Meme theme

Picture sharing

Meme theme


MODERATION TECHNIQUE
Meme theme
WHAT
A brief break in the meeting to re energise again and have fun with your colleagues.
HOW
The CoP moderator nominates one person who picks a theme (cute animals, grumpy cats, water, excitement, or another favourite meme). All the other team members are instructed to share a picture or meme related to the theme on the meeting platform.
BENEFITS
• Provides short break which restores the attention capacity of the participants.
• Makes for a fun meeting by sharing funny pictures and reducing any tension
MATERIALS NEEDED
• Online meeting platform
• Internet
ONLINE TIP
This method is meant for online meetings.
TIPS

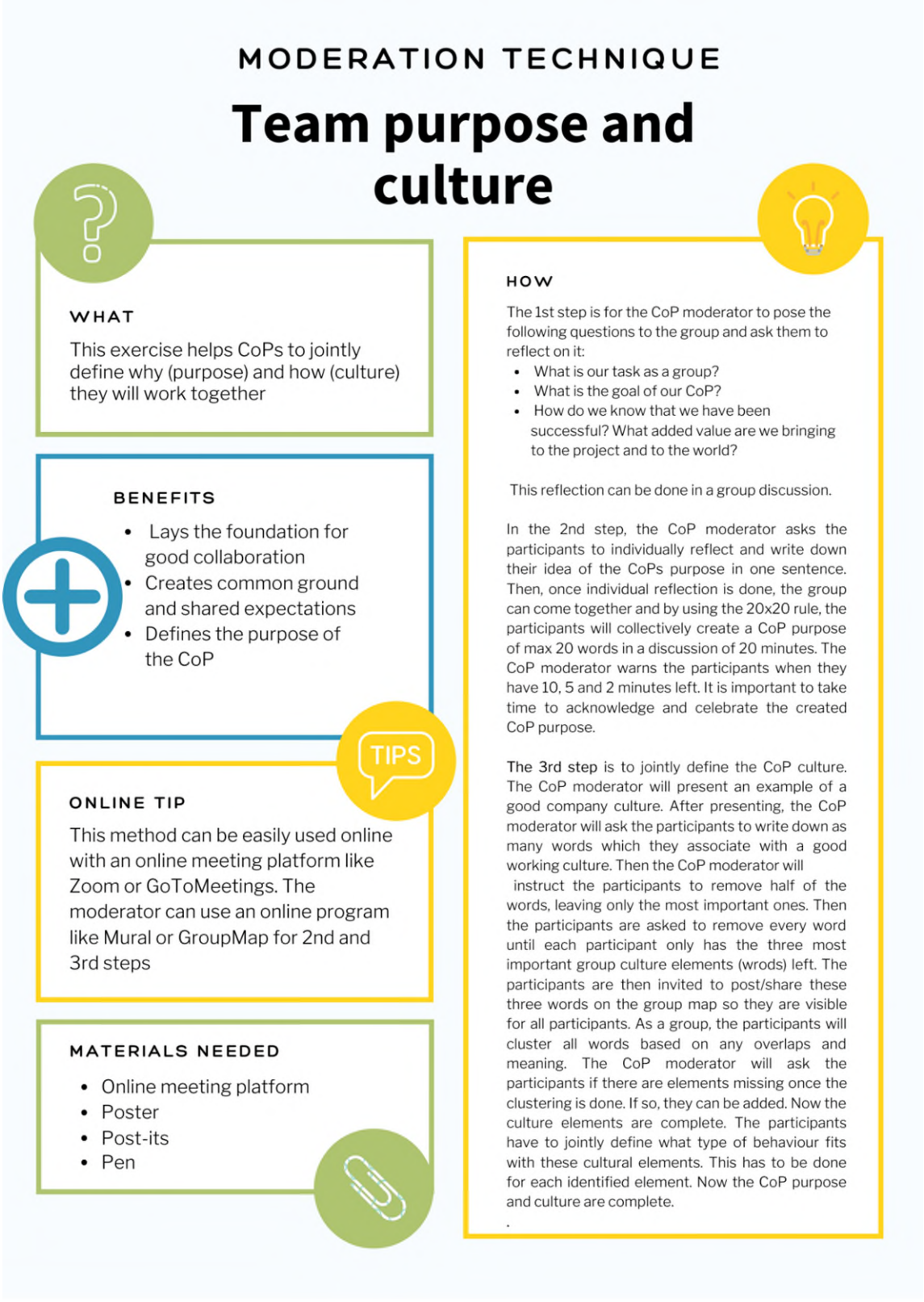
Moderation techniques for setting the scene

These methods are good to use at the beginning of a CoP (i.e. the first CoP meeting). Some of the techniques as seen in the overview below are suitable for the first CoP meetings, others can be used throughout the project at the start of any CoP meeting. These techniques help creating common ground and understanding between the participants.

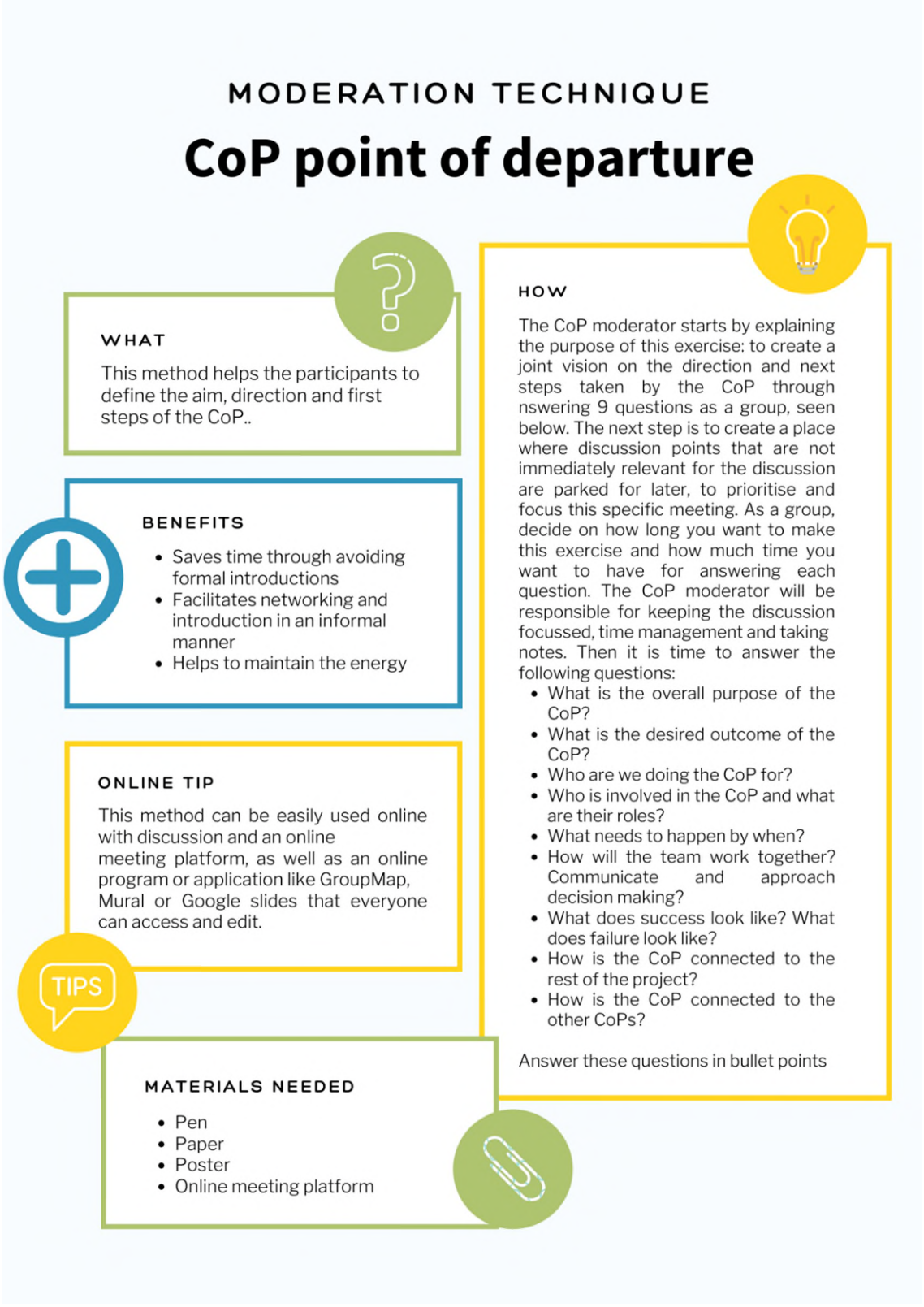
Overview

- Team purpose and culture
- CoP point of departure
- Project news so far/ News
- Asking the right questions
- LEGO PIECES with PESTLE bias
- Mapping spots
- SWOT world café
- Influence and motivation matrix
- "Futuribles" storytelling role play

Team purpose and culture



CoP point of departure



Project so far / News

MODERATION TECHNIQUE

Project news so far

WHAT

A brief update to keep all the CoP participants informed about the progress of the rest of the project (Freitas et al., 2018).

BENEFITS

- Keep the CoP and participants connected and aware
- Allows for continuous synthesis
- Stimulates researchers to reflect on the progress and developments in the project
- Supports knowledge sharing across the project

ONLINE TIP

This method can be easily used online with discussion and an online meeting platform.

TIPS

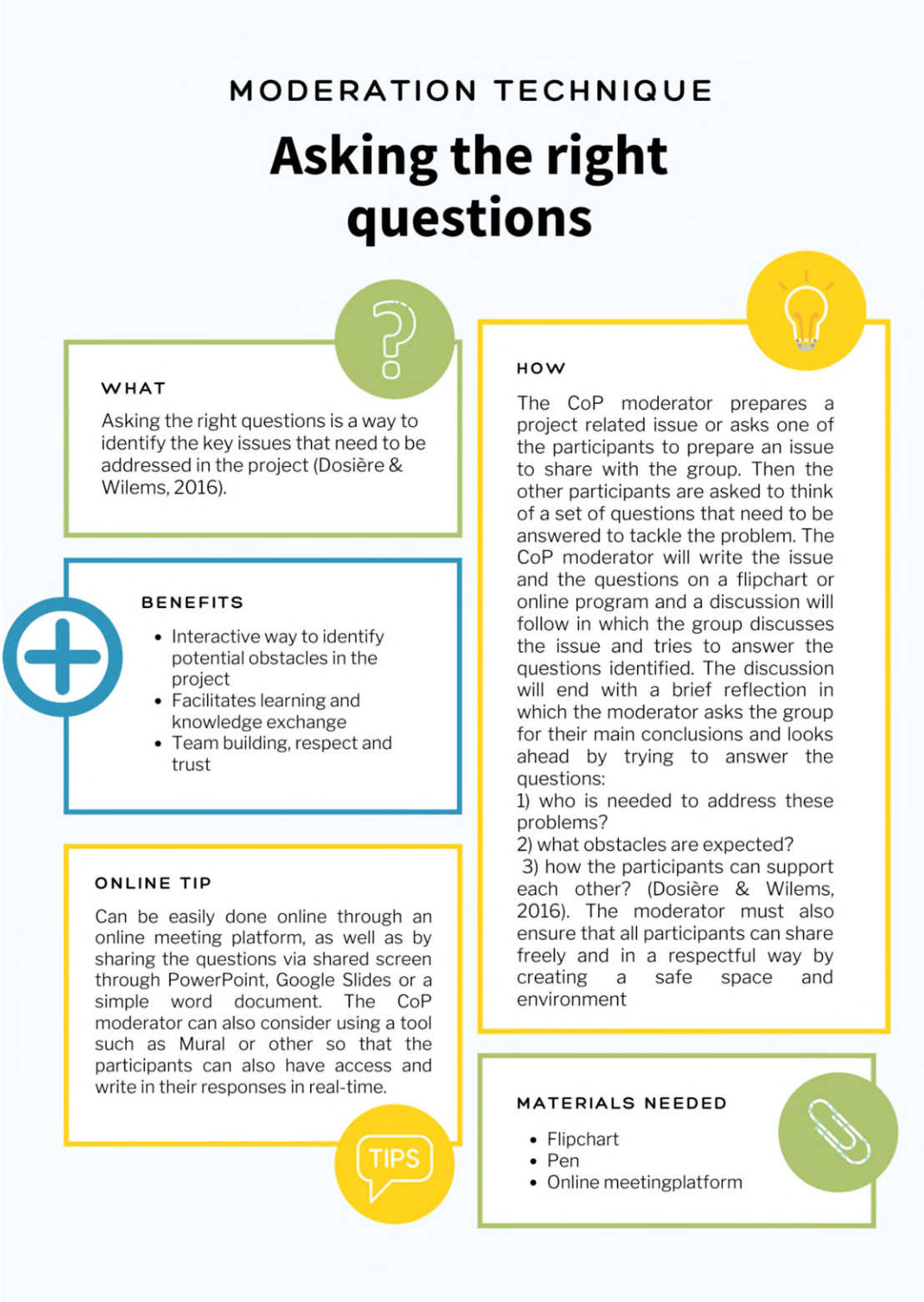
HOW

At the beginning of a CoP, the researchers of the project share the most important developments of the project. This could be done per work package. The updates should be short and not methodological or technical in depth, but provide a general overview. The updates could be presented in a "news updates" style in PowerPoint or solely an oral presentation. The CoP moderator should ask each participant to have maximum 10 words per slide for a maximum of 3-5 slides and 1 slide per minute of talking (i.e. 5 slides = 5 minutes presentation) and to use more pictures or illustrations. After the brief update there is time for a short discussion on the developments. It should be noted that this method is just to keep the participants updated on the progress of the projects and should not take too much time of the meeting.

MATERIALS NEEDED

- PowerPoint
- Information on the project

Asking the right questions



LEGO with PESTLE bias

MODERATION TECHNIQUE

Lego with Pestle bias

WHAT

This method aims to sort the challenges, risks and solutions into two categories that can be categorised even further. This method is the first step to do so.

BENEFITS

- Method supports active participation of all participants
- Find solutions/ideas for tackling the issues
- Supports out of the box thinking
- Fun method
- Helps visualising challenges and potential solutions
- Facilitates uncovering assumptions and positions
- Supports
- discussion and learning from other perspectives.

TIPS

ONLINE TIP

This method could be converted online, whereby the CoP moderator can set up via an online program such as Mural or Google Slides a virtual lego table (i.e. draw it or design it with elements within these online tools), where participants can click, drag and type on online post-its/text boxes. The discussion can be carried out within the online meeting platform and also via the chat function and notes and outcomes can be taken simultaneously, and screenshots saved of the outcome.

HOW

The CoP moderator prepares a table with Lego blocks and in the centre of the table a piece of paper with a statement, question or topic of relevance within the case study. The CoP participants are asked to write down the risks and the solutions to manage these risks on post-its in two different colours. The post-its should be attached to the Lego pieces (Freitas et al.,2018).

As a second step, the CoP moderator will instruct the participants to take a look at everyone's contributions and group them into different categories: Political, Economic, Social, Technological, Legal, and Environmental (PESTLE). Participants are likely to have different opinions on the categories to which the challenges and solutions belong. Therefore they are encouraged to discuss the categories, different approaches to the challenges, coming up with new criteria, or to come to a joint agreement about the criteria. Once the clustering is completed, the CoP moderator will ask the participants to share their insights of the discussion with the group (Freitas et al.,2018).

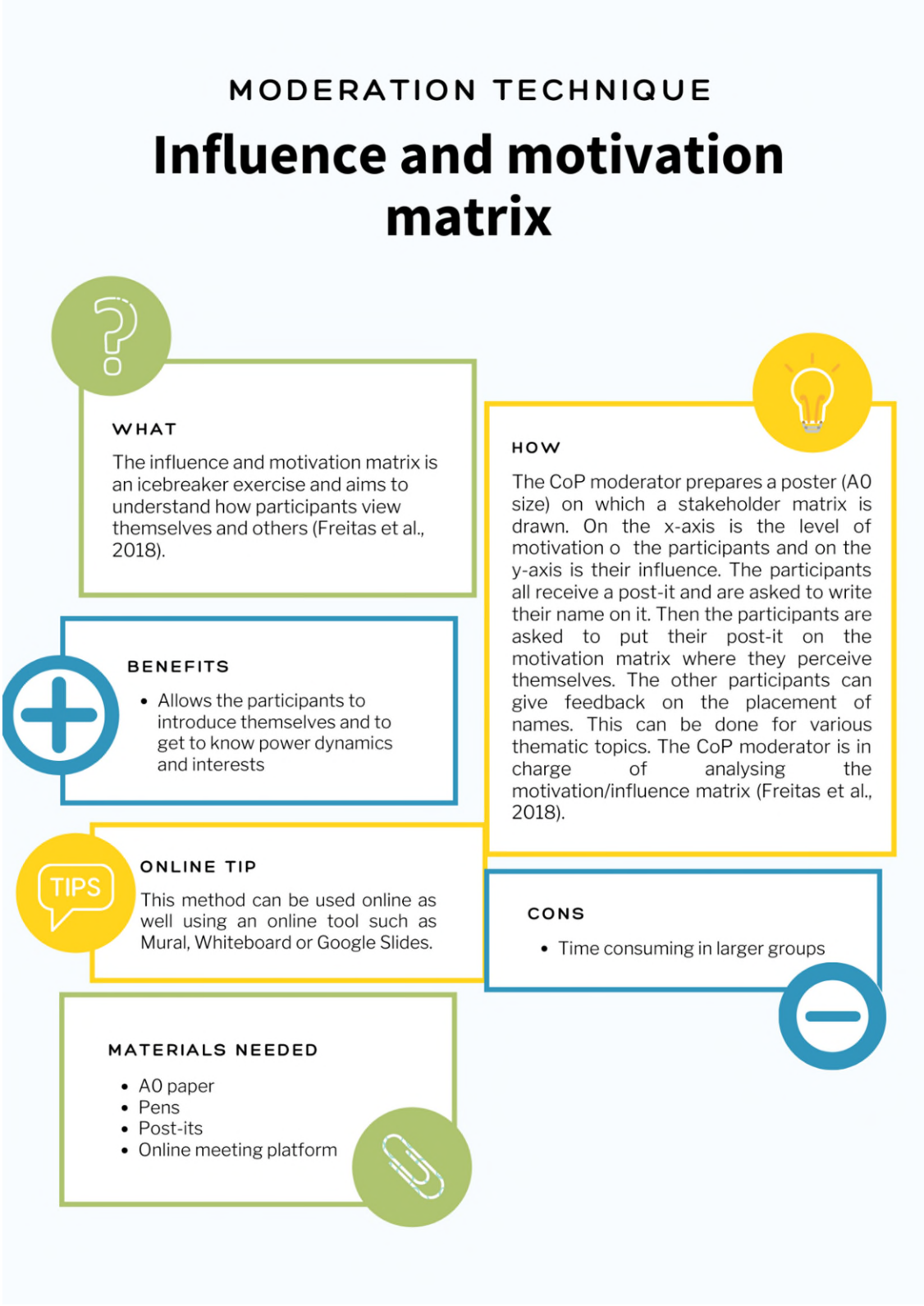
MATERIALS NEEDED

- Flipchart
- Pen
- Online meetingplatform

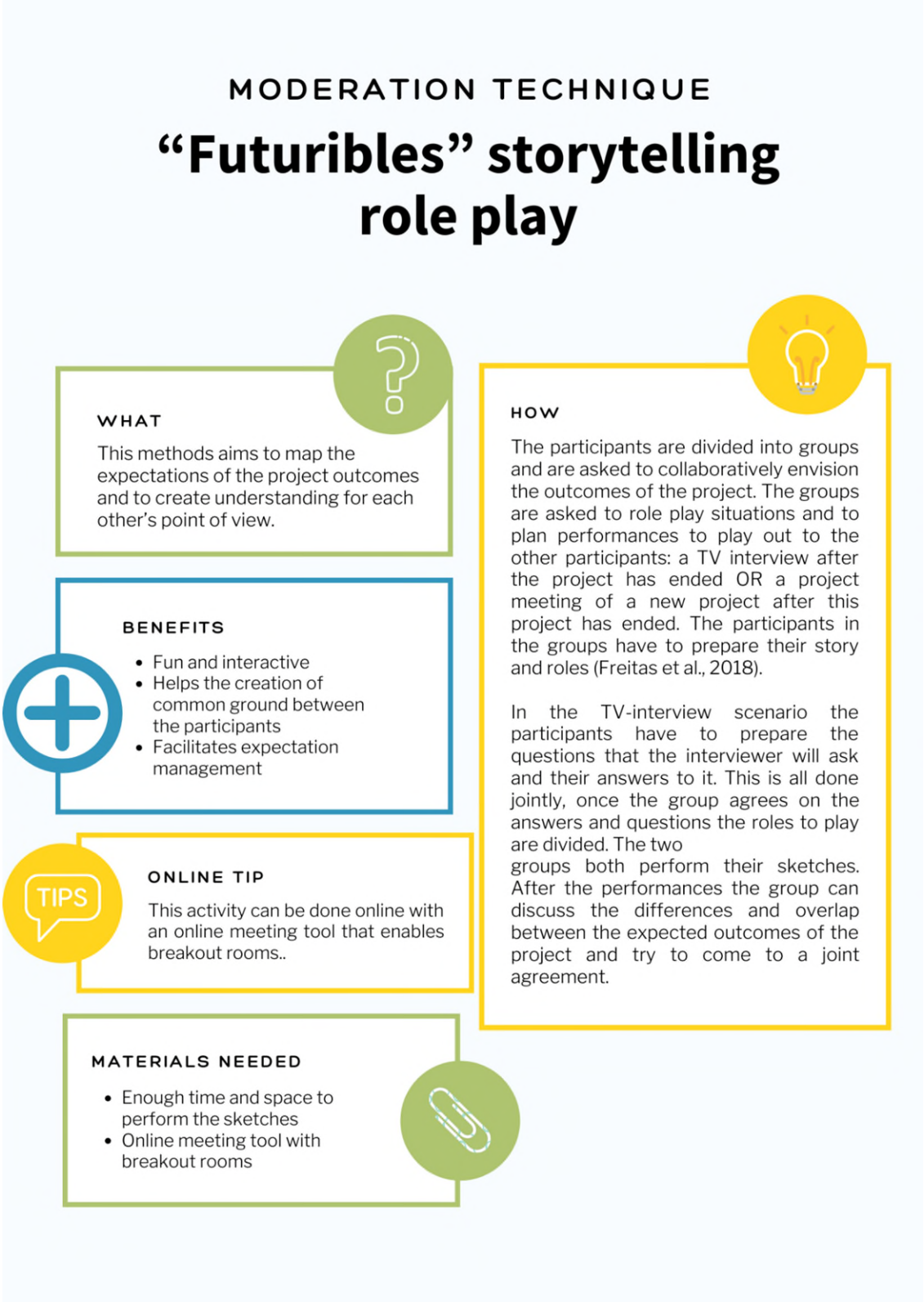
Mapping spots

SWOT world café

Influence and motivation matrix



“Futuribles” storytelling role play



Moderation techniques for defining the scope and direction

These moderation techniques help the participants plan and define their course of action.

Overview

- Backcasting
- Roadmap design

Backcasting


MODERATION TECHNIQUE
Roadmap design
WHAT
This method is suitable to come up with solutions and possibilities for implementation.
HOW
The CoP participants are divided into groups and are asked to design a roadmap with concrete actions that would lead to implementation and success for the project. This can be implementation in the project, in the case study site or in the political agenda.
Once the groups have finished their roadmaps they are put on a wall and the group as a whole can discuss the various solutions and actions. The CoP moderator ends the discussion by providing an overview of the common identified issues and easiest ways to take action (Freitas et al., 2018).
BENEFITS
• Enables the formulation of concrete ideas and action
• Interactive method for planning
ONLINE TIP
This method can also be used online, but requires a meeting platform that offers breakout sessions such as Zoom. Note-taking and brainstorming can be done via an online tool such as Mural, GroupMap or Google Slides.
TIPS
MATERIALS NEEDED
• Posters
• Pens
• Post-its

Moderation techniques for brainstorming

These techniques facilitate discussion and brainstorming sessions.

Overview

- Roundtables
- The other way around
- Quick scan ideas rope
- The wold café setting

Roundtable


MODERATION TECHNIQUE
Roundtable
WHAT
This method is suitable for collecting ideas, discussions on specific topics and coming up with solutions or ways forward.
HOW
In a room with tables, the moderator assigns a different topic to each table with several questions prepared per topic. A table moderator is assigned to take notes.
The CoP participants are divided in equal groups around the tables. At each table, the group has 10-15 minutes to discuss the topic at hand and then move to the next table. The table moderator summarises the main discussion points of the previous groups. Then the new group has time to discuss and at the end of the 15 minutes. When every group has visited each table the table moderators publicly give a synthesis of what has been discussed at their table followed by a brief discussion (Freitas et al., 2018).
BENEFITS
• Supports active participation on all the issues.
• Supports building on ideas of others
• Allows input from all participants
• Facilitates knowledge exchange
ONLINE TIP
This method can also be used online. A meeting platform that has breakout rooms/sessions should be used, such as Zoom.
TIPS
MATERIALS NEEDED
• Tables
• A0 paper
• Pens
• Post-its

The other way around

Quick-scan ideas rope

The world café setting

MODERATION TECHNIQUE

The world café setting

WHAT

This method can be used to discuss complex issues in larger groups (UNICEF, 2015), and can be adapted so it can be used for multiple purposes: e.g. SWOT.

BENEFITS

- Allows for discussing complex issues in larger groups
- Allows for all participants to participate even in bigger groups
- Facilitates knowledge exchange in an informal atmosphere
- Facilitates fast collection of knowledge
- Multiple issues/ topics can be discussed in the same session (UNICEF, 2015)

ONLINE TIP

This method can be used online using a platform that offers breakout sessions such as Zoom, and with an online note-taking tool.

TIPS

HOW

Before the CoP meeting, the CoP moderator selects a topic and designs 3-5 discussion topics/questions and selects a table host and a table reporter per topic. In the meeting room, a table per topic will be set up accompanied by a flipchart. During the session, the CoP participants are divided evenly over the various tables. The table hosts and reporters remain at their table the whole session of the world café. Each round starts with a brief explanation on the topic by the table host and a brief summary of the discussion of the previous group at that table.

After the introduction and the recap, the discussion of 20 minutes can begin in which the participants write down their ideas. Only the ideas that they shared with the group should be written down. When the 20 minutes are over, the groups switch tables. Once all groups have visited all tables, there will be a plenary reflection in which the table host summarises the findings from each table and a brief discussion will follow (UNICEF, 2015). The CoP moderator ends the session with a conclusion.

MATERIALS NEEDED

- Table host and reporter
- Flipchart
- Pens

Moderation techniques for making knowledge explicit

This method helps to make implicit knowledge explicit and facilitates exchange.

Overview

- Expert knowledge

Expert knowledge

Moderation techniques for decision making

These methods help the participants in a CoP to reach consensus and to make decisions.

Overview

- Perspectives
- Personas
- Scenarios

Towards the end of the project decisions must be made and thus consensus and agreement will be sought. The following moderation techniques can facilitate these decision-making processes.

Perspectives

Personas


MODERATION TECHNIQUE
Personas
WHAT
This method stimulates the participants to step out of their own perspectives and to create more understanding for others' perspectives and jointly identify drivers and barriers for collective action (Freitas et al.,2018).
HOW
The group maps all relevant stakeholders in the context of their project/issue. The group then divides the personas of the different stakeholders among the group. The CoP participants with the same persona are asked to develop a profile of this persona with their perceptions of the issue at hand.
The groups then share their developed persona profiles with the group and the group is asked to discuss the drivers and barriers for joint action based on the profiles (Freitas et al., 2018). The CoP moderator writes down the identified drivers and barriers for collective action.
BENEFITS
• The participants are forced to think from different perspectives
• Identifies the drivers and barriers
• Enhances mutual understanding
ONLINE TIP
This method can be used online as well if a meeting platform with breakout sessions is used, such as Zoom. Online note taking can be done with an online program such as Mural, GroupMap, WhiteBoard or Google Slides with a shared screen.
TIPS
MATERIALS NEEDED
• Poster
• Pens
• Markers

Scenarios

MODERATION TECHNIQUE

Scenarios

WHAT

The scenarios method is used to reach consensus between a wide range of stakeholders and to come to a well informed decision (Dirkse-Hulscher & Talen, 2007).

BENEFITS

- Quick overview of the consequences of solutions
- Helps to reach consensus between the CoP participants
- Helps to come to a joint decision

ONLINE TIP

This method can also be used online if a meeting platform which offers breakout sessions such as Zoom. Note-taking and presenting the ideas can be done via a PowerPoint on the shared screen, or with an online tool such as Mural, Whiteboard, Google Slides, etc.

TIPS

HOW

During the CoP meeting there will be a discussion which aims to come up with a list of possible solutions or decisions.

The CoP moderator writes down the solutions/decisions on a flipchart or whiteboard. The group is divided into small groups. Each group is assigned a solution or decision. In these smaller groups the participants are asked to list the positive and negative consequences of each solution/decision and the effects on the involved stakeholders.

The groups are then asked to identify the consequences with the biggest impacts and are asked to think of ways to lower the impact. In this way, scenarios are formulated. The group comes together again and the CoP moderator will note down all the identified consequences of the solutions/decisions on a poster of flipchart. Based on this overview, the group can vote for a decision (Dirkse-Hulscher & Talen, 2007).

MATERIALS NEEDED

- Flipchart, whiteboard
- Pen

Annex 3 – Evaluation form for CoP meetings

This form will be slightly adjusted to the specificities of the project.

Place: _____ **Date:** _____

It was a pleasure to have you in this meeting. We would like to know your opinion, so that we can improve future events and meet your expectations. Thank you for your collaboration!

Organisation Support

The **Evaluation form** will be made available online by **KWR.**

Name *(optional)*:_____

Organization *(optional)*: _____

Please rate the extent to which you agree with each of the following statements: (1=strongly disagree; 2=disagree 3=neutral; 4=agree; 5=strongly agree; N.A=not applicable)

1. Meeting logistics and stakeholder engagement	
1.1 I received the information about the meeting and materials well in advance	
1.2 The venue was adequate for the purpose of the meeting	
1.3 The meeting had the right duration in time	
1.4 During the meeting I improved or made new connections for my professional network	
1.5 The presentations and speakers were clear and understandable	
1.6 During the meeting, I felt save to behave spontaneous and unfiltered	
1.7 I believe others were communicating openly with me	
Comments: *(optional)*	

2. Awareness and increased understanding	
2.1 I believe that all relevant stakeholders were present at the meeting	
2.2 I had sufficient opportunities to provide input to the discussion	
2.3 Differences and (potential) conflicts among us were addressed in a constructive manner	
2.4 All ideas/perspectives were included and respected during the discussion	
2.5 I feel that the right topics were discussed during the meeting	
2.6 I have a better understanding of the perspective of the stakeholders	
2.7 The way the discussion was facilitated and moderated supported the meeting objectives	
Comments: (*optional*)	

3. Outcomes and conclusions	
3.1 There was enough time to reflect on our collective experience and functioning as a group	
3.2 I believe that clear conclusions were formulated at the end of the meeting	
3.3 I believe that clear actions were formulated to improve solutions	
3.4 The meeting inspired me to take follow-up actions in my own organization	
3.5 Participating in the meeting increased my knowledge on the solutions	
3.6 My expectations on the outcomes of the meeting were met	
3.7 I am aware of my own role in the project and how each of us can contribute to the projects goals	
Comments: *(optional)*	

Pros and cons of the local CoP	
What is your overall rating of the CoP meeting (1 to 5)?	
In your opinion, what were the most positive and less positive aspects of the meeting? Most positive: Less positive:	

Suggestions for improvement
What suggestions for improvement do you have for future meetings?

Thank you!
Please give this questionnaire back to the workshop organizer before leaving.

Annex 4 – Template for CoP reporting

CoP Meeting Report

The CoP facilitator is responsible to prepare and share a CoP Meeting Report after each CoP meeting.

Title of CoP Meeting (key topic):

- Organizing partner:
- CoP facilitator:
- CoP moderator:
- Meeting Place:
- Date:
- Number of guests attending:

Agenda for the meeting

- Please insert the agenda from your meeting

Objectives

- Describe the CoP meeting objectives

Participants characterization

- The table below shows the number of participants, the respective sector of activity and the level of governance each stakeholder is active in.

Overview of stakeholders:

Institution / sector	No. of participants (registrations)			
	In total	Male	Female	Non-binary
Project members				
External stakeholders (outside of the project partners)				
Authorities				

Engineering companies
Representatives of other sectors
Research institute
End-users
Water industry
Other: name

Please, include a list of participants as annex to this form.

Description of meeting's activities

- Provide a summary of activities carried out. Were there plenary or working group sessions? Presentations by whom on what? (Provide presentations as appendices).
- Describe the moderation technique and method for open dialogue applied.

Please, include all presentations given at the meeting as annex to this form.

Main achievements

- Describe briefly the main outcomes and results from the meeting, including the answers on the central questions such as outlined in Section 4.1 'Key topics of CoP meetings', as well as any actions to be taken by members, as agreed upon.
- Summarise the perspectives of the stakeholders (i.e. stories as anecdotal evidence).

Reflection notes

- Describe your observations on stakeholder engagement (e.g. do we need to add others?)
- Describe any relevant observations for further steps
- Questions such as below can be asked:
    - What did you enjoy most/less about this workshop?
    - Which methods/tools were successful/not successful?

In your opinion, what were the positive/negative aspects of the workshop? Pros: • xxx • xxx • xxx Cons: • xxx • xxx • xxx
What suggestions for improvement do you have for future workshops? • xxx • xxx • xxx

Annex 5 - Consent form for treatment of personal data

CONSENT FORM

Title of Project:

Researcher in charge of meeting/interview: **[Name/Affiliation]**

Thank you for participating in this meeting/interview, which is intended for research purposes only, and aims at investigating **<purpose>**.

Please initial all boxes

1. I confirm that I have read and understood the purposes of this meeting/interview. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I agree to allow researchers of the WATER-MINING project to record the meeting/interview and analyse an excerpt for internal reporting of the project, project deliverables, and to potential publishing of conference/journal papers. ☐
3. I understand that the data collection will not be linked to me as an individual, not even internally in my institution/organisation. ☐
4. I understand that at the end of the project (after 2024), all personally identifiable data will be anonymised and sources (audio recordings etc.) will be destroyed after 5 years. ☐
5. I understand that my participation is voluntary and that I am free to withdraw at any time, even after the completion of the meeting/interview (*but before my data has been anonymised*), by contacting the researcher/interviewer, without giving any reason. ☐
6. I give permission to the researchers to use the pictures taken during the meeting/ interview for the purposes of disseminating the WATER-MINING project. ☐

Name & e-mail of participant	Date	Signature

Note: This consent form may be translated in the local language of each meeting in case the organiser considers it necessary for the participants; otherwise the English version will be used.

Annex 6 – Stakeholders' mapping table

Case study	Organization	Type of stake-holder (choose one from drop-down menu)	Person (full name)	**Gender** M=male F=female O=other	Role in the organization	email	Phone

Internal or external (internal stakeholder = project partner)	**End-user or technological development** Indicate whether the stakholders is an end-user or related to technological de-velopment	**End-user**	
		Indicate end-use	**Type of end-user** Choose one from drop-down menu

Technological development		How could the stakeholder contribute to the project?	Anticipated Involvement	Comments
How much influence do they have over technology development? 1.- Very high 2.- High 3.- Moderate 4.- Low 5.- Very Low	Assets to mobilise: - human capital, - knowledge - technology supplier, - inputs supplier, - funding provider, - natural resource deliverer, - authority, regulator - other (specify)		What level of involvement is expected? (Strong, Medium, Low, None)	