SciShops

ENHANCING THE RESPONSIBLE AND SUSTAINABLE EXPANSION OF THE SCIENCE SHOPS ECOSYSTEM IN EUROPE

D3.9

Knowledge Exchange Roadmap 2

Project

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Consortium: **SYNYO GmbH (SYNYO)**, Austria
Handelsblatt Research Institute GmbH, Germany
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University of Oxford, United Kingdom
Katholieke Universiteit, Belgium
Universidad Carlos III De Madrid, Spain
Universitatea Politehnica Din Bucuresti, Romania
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Universiteit Leiden, Netherlands
International Center for Numerical Methods in Engineering, Spain
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Authors: **Elías Sanz Casado,** University Carlos III of Madrid
Núria Bautista Puig, University Carlos III of Madrid
Sven Jung, Handelsblatt Research Institute
Liselotte Rambonnet, Citizen Science Lab, Leiden University
Marta Nuñez, European Students' Union
Maria Hagardt, Vetenskap & Allmänhet
Katerina Kaouri, SciCo Cyprus
Marit Bogert, WaterLab, TU Delft
Sandra de Vries, WaterLab, TU Delft
Helen Szoor-McElhinney, University of Edinburgh
Franziska Stelzer, Wuppertal Institute
Petros Sorokkos, KPMG
Anastasia Constantinou, University of Cyprus
Mark Reed, Newcastle University & Fast Track Impact
Michaela Livingstone-Banks, University of Oxford

Contributors: **Helen Garrison**, Vetenskap & Allmänhet
Christina Zübert, University of Hohenheim

Review: **Pedro Russo**, Leiden University
Liselotte Rambonnet, Leiden University

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Executive summary

The Horizon 2020 SciShops.eu project aims at building on and expanding the capacity of the Science Shops ecosystem in Europe and beyond. WP3 is focused on two objectives of the project: identify and engage stakeholders through the organisation of the events (Objective no. 2) and conceptualise and organise summer schools and knowledge cafés with students and trainers (Objective no. 5).

In this regard, Task 3.6 aims to elaborate on a Scishops.eu Knowledge Exchange Roadmap based on the findings from the initial stakeholder involvement process undertaken in the project for further development of the knowledge exchange between Science Shops and their communities. This deliverable is composed of two iterations. In the first, the aim was to include insights gained from the first round of events from participants, experts and other stakeholder groups and was composed of the lessons learned, challenges and conclusions. With that aim, general considerations of planning knowledge exchange activities between Science Shops and the community were described. Moreover, general steps were provided for implementing knowledge exchange activities for Science Shops. It also included an update on the second round of planned events and, in the last part, recommendations relating to, participants, methodology, communication, and evaluation for the organisation of knowledge cafés, co-creation events or summer schools.

Considering that the typology of activities carried in the framework of the project is similar in nature (see more information in D3.5. Events Status Report 1 and D3.8. Events Status Report 2), this second part of the Roadmap seeks to offer a more practical perspective. In this regard, it focuses more on the insights obtained from the 2nd SciShops Summer School held in Cyprus 1-4 July 2019. This event was the second summer school of the project and its main purpose was providing training and knowledge exchange on practical skills (e.g. communication, moderation, business planning, etc) that could be used to set up, coordinate and run Science Shops and participatory research activities. This deliverable presents a guide collaboratively created with experts on each topic and provides practical tips and information on topics including presentation techniques, moderation, business planning, citizen science, partnership building, and measuring and evaluating impact.

Table of Content

1. Introduction

Are you setting up a new Science Shop or community-based research initiative? Are you looking for ways to make your Science Shop more participatory, more sustainable or better known in the community?

The aim of this guide is to provide practical skills in topics that could be used to support the development of Science Shops and some of the many different activities that they may undertake. These include moderation of co-creation events involving different stakeholders, presentation techniques and "pitching" your initiative to different audiences, and the use of social media and other communication channels; all skills needed to set up and promote a Science Shop. Moreover, it includes contributions from experts on topics such as partnership building, citizen science, business planning and monitoring, impact planning and assessment, which will guide you through these different types of participatory activities.

This guide is based on sessions held during the 2nd Summer School of the EU-funded project SciShops.eu held in Cyprus from 1-4 July 2019 and knowledge gained about Science Shops in the deliverables produced by the project.

2. Engaging audiences: Social media tricks & tips

Contributors: Liselotte Rambonnet (Citizen Science Lab, Leiden University) and Marta Nuñez (European Students' Union)

The main purpose of this chapter is to explain how to use social media strategically as part of a Science Shop's communication activities in order to engage audiences and create impact. It includes tips and tricks on what to consider when using social media for effective communication.

Communication is a crucial skill for a Science Shop, not only to support the communication of results but also to engage different audiences at different stages. Moreover, it can contribute to achieving the objectives and sustainability of a Science Shop. However, the message to be communicated will depend on your objective (what to communicate?), the audience (who is your target?), and place (when and where to communicate)? Communication objectives should follow the following rules and be: **S**pecific (well defined and clear); **M**easurable (so you will know if you have reached the goal); **A**chievable (so the gocal will be accomplished the goal and you ensure you have the tools or skills needed); **R**elevant (to ensure that your goal will help in the long run) and **T**ime-bound (has a realistic time frame for achieving the goals). To sum up, your objectives should be **SMART** (Figure 1).

Figure 1. Objectives of communication

Where to start?

Creating and running a user-friendly website is important in order to increase the visibility of your Science Shop and can be used to communicate activities undertaken within the framework of your Science Shop (For a good example, see the website of the Science Shop run by Queen's University Belfast https://www.qub.ac.uk/sites/ScienceShop/). There are also numerous tools that can be used to create simple websites, for example Wordpress (www.wordpress.com; www.wordpress.org); Wix (www.wix.com) or Google (www.sites.google.com).

Setting up and running social media channels is also an important part of your communication strategy and can be used to promote your activities and direct people to your website for further information. It is estimated that 3.5 billion people (45% of the global population) is active on social media (source: Hootsuite). However there are different social media channels, each with its pros and cons, some of which are summarised in the following table:

Table 1. Pros and cons by social media platform

Platform	Pros	Cons
Facebook	High level of penetration, wide audience	Algorithm changes (2018-2019) make it difficult to reach a large number of users without using Facebook Paid Ads tools
Twitter	Easy to identify individuals and communities with similar interests via #hashtags and followers of similar accounts; good to connect with NGOs, politicians, companies, journalists, professionals of different fields.	High level of content shared every minute (difficult to stand out from the crowd); limit to number of characters (280).
LinkedIn	Blog posts, ebooks, tools and resources, case studies, photo gallery of an event; networking; less content being published by users (less competition, easier to be seen).	Lower number of users than other social media (SM) platforms.

Instagram	Growing audience; visual content, easy to consume; new generations are using it more than other social media platforms.	Type of content (lifestyle, beauty, travel, food dominate); high quality pictures/videos require time and resources; hard to be seen (overload of content + algorithms).

Additional ways to improve your social media activity

You should select the social media channels you use depending on the audience you want to reach and what you want to achieve. As social media and engaging with your audience can be time consuming it is important to prioritise your efforts and start with one channel that suits your resources and aim. To ensure consistent branding of your Science Shop in the long run, it is a good idea to already reserve the profiles on the other channels that you are planning to use in the future. With the free online tool namecheckr you can check if a username is available for use on the different social media platforms.

Social media strategy

In order to help you design your social media strategy, the following Planning Template in Figure 2 can be used as a tool to create a social media plan for your Science Shop.

Additional tips and tricks regarding social media can be found in Figure 3

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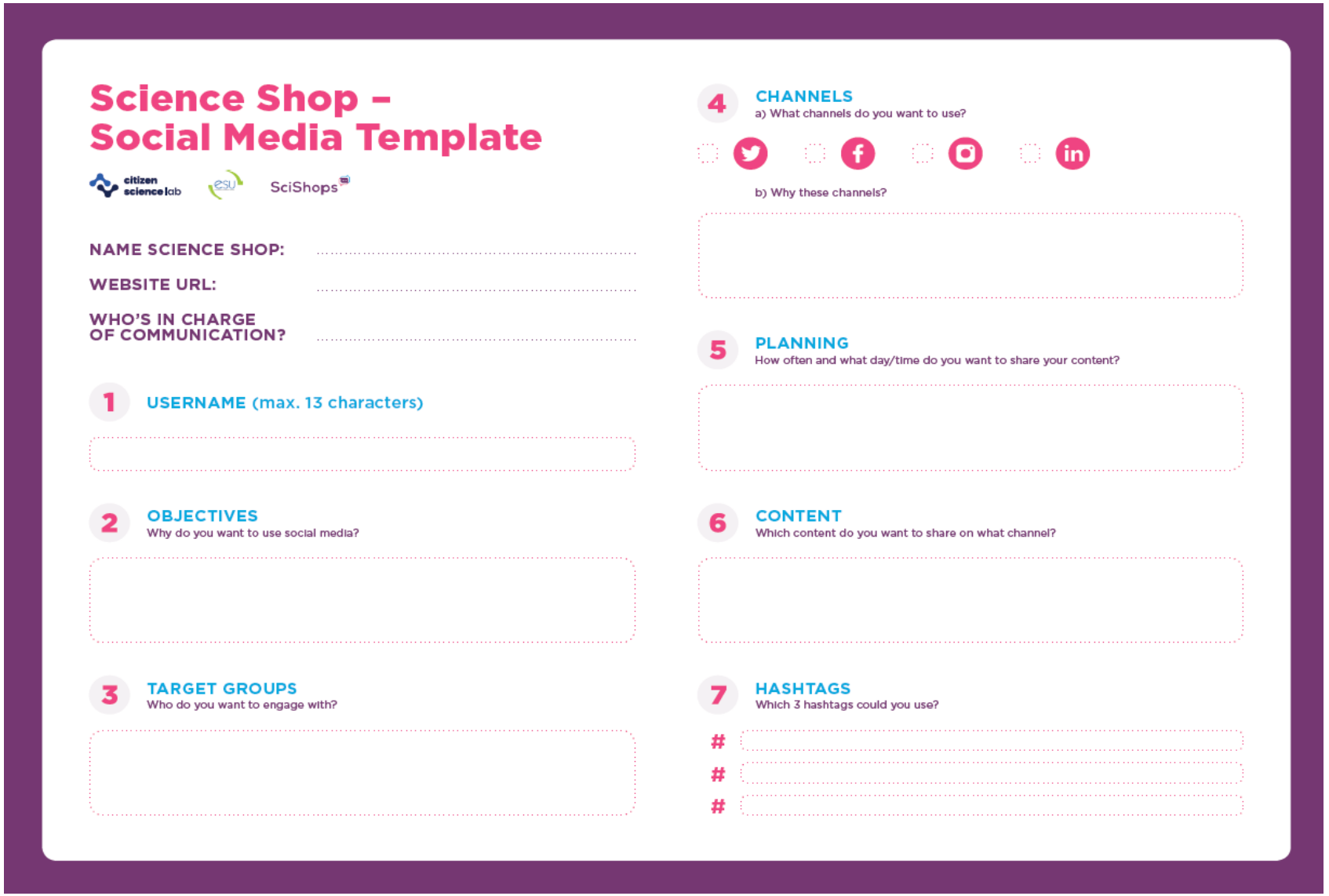


Figure 2. Social Media Planning Template

Figure 3. Social media tips & tricks to improve your social media strategy

3. Moderation techniques for participatory events

Contributors: Maria Hagardt (Vetenskap & Allmänhet)

The collaborative nature of Science Shops often involves bringing diverse stakeholder groups together to share knowledge, opinions and ideas. The main goal of this chapter is to provide tips on what to consider when moderating a workshop/co-creation event in the framework of a Science Shop in order to ensure that they run smoothly.

Group dynamics

There are different theories on how to effectively form a group in order to achieve a task (group dynamics). One of the most well known theories is the one by Raoul Schindler (Schindler, 1957). This author stated that in a group there are: an Alpha (leader), Beta (expert), Gamma (a simple member of the group), Omega (counterpart to Alpha) and the Moderator (observes and steers group processes, keeping to the objectives and watching the time).
Tuckman in 1965 developed a theory that explains team development and behaviour. It is composed of the following steps: Forming (Little agreement, Unclear purpose, Guidance and direction), Storming (Conflict, Increased clarity of purpose, Power struggles, Coaching…), Norming (Agreement and consensus, Clear roles and Responsibility and Facilitation), Performance (Clear vision and purpose, Focus on goal achievement, Delegation) and Adjourning (Task completion, Good feeling about achievements, Recognition).

Another notable theory is from Baumann (Figure 4). He identified three phases: Preparatory Phase (opening and closing), Main Phase and Post processing. The first and second phases consist of the design (opening), implementation (implementing your design in your workshop or seminar) and assuring transfer (before and after the event). The aim is to obtain the objectives in the post processing phase.

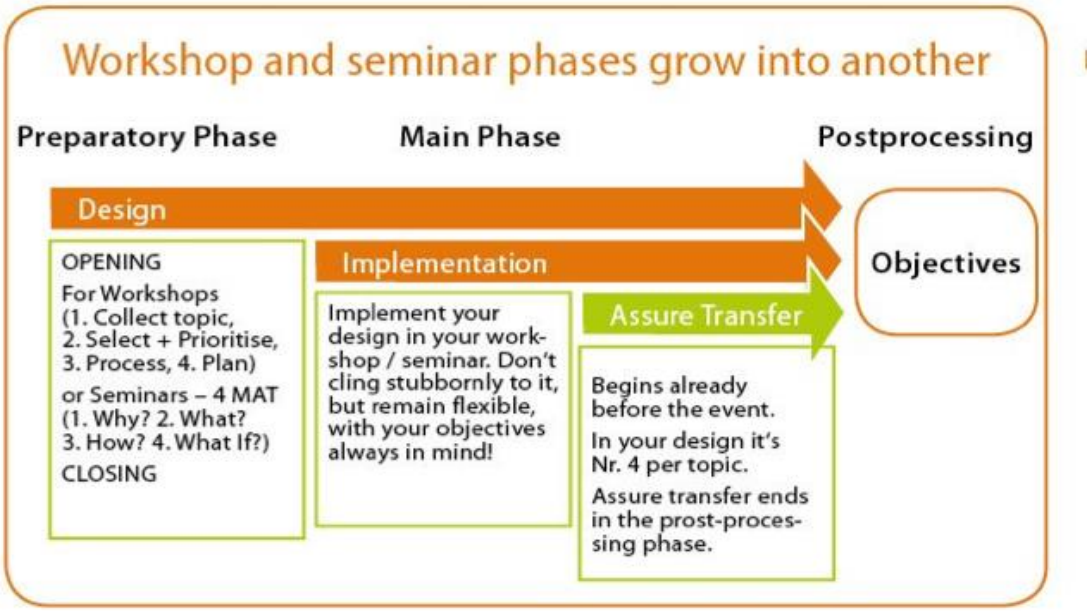


Figure 4. Phases for workshops and seminars.

Basic principles for dialogue

With the aim of establishing a good environment for constructive dialogue, the following principles must be considered.

- Open atmosphere for discussions
- Share the time
- Co-create
- Share experiences
- Build on each others' knowledge

The 10 most important moderation DON'Ts

The 10 most important things you should not do when you are moderating an event in the framework of your Science Shop are:

1. You have no idea about the topic.
2. You intervene in the content of discussions between the participants.
3. You change between the role of moderator and expert randomly.
4. The goals are unclear, or you did not define any goals at all.
5. Forget about timing. We don't need anything like that.
6. You are too strict with your time schedule and do not allow for any adaptation.
7. You ignore the sensitivities of your participants.
8. You make rules without asking your participants if they accept them.
9. You give up control of the workshop.
10. You have the wrong or fixed mindset.

4. Presentation skills and Marketplace techniques

Contributors: Maria Hagardt (Vetenskap & Allmänhet) and Katerina Kaouri (SciCo Cyprus)

This chapter focuses on presentation skills and offers some recommendations about how this could be improved. Moreover, it explains a method called Marketplace which was held in the Summer School.

Presentation skills are very important: they enable you to present (or 'sell') your Science Shop, your expertise and activities as well as to engage new agents (students, stakeholders, collaborators, etc.). Presentation skills enable you to successfully run various activities your Science Shop may organise or participate in, for example Science Festivals, Knowledge Cafés and other co-creation events and participatory activities.

Presentations vary in length and style depending on your audience and must always be adapted to the context. As part of your Science Shop work, you may be required to present your work in a variety of events and formats. For example, an "elevator pitch" is a short, succinct and persuasive presentation that lasts from 20 to 60 seconds and is useful when you have to quickly explain what a Science Shop is (many people do not know!), or the results of a particular community-based project on the spot. It is advisable that you prepare one or more pitches, polish them and have them ready to deliver depending upon the occasion. There are many resources that can help you to create the perfect pitch. This YouTube video https://www.youtube.com/watch?v=Lb0Yz_5ZYzI for example, shows you how to create a successful 30-second elevator pitch.

Other times, you may be given more time to talk but you should still always aim for maximum effectiveness and to deliver a clear and engaging presentation that is designed to achieve your objectives.

The following tips will help you prepare a good presentation of any duration:

1. **Know Your Audience** - Who is your audience? What are they interested in? What is important to them?
2. **Key message** - Have one overarching key message. What is the one most important point that you want them to remember?
3. ***Once upon a time...*** - Start with a relevant story, a story from your own life why the subject is important for you. Or start with a shocking fact or a question that matters to the audience.
4. **Use Hooks** - Use of hooks to build intrigue, suspense or raise a question in the audience's mind - to get someone excited about what you are doing as quickly as possible.
5. **Language** - Use short sentences. Keep language simple, natural etc.
6. **Simplify** - Imagine that you are explaining your research or project to a close friend or a new stakeholder.

7. **Body Language** – think about how you are going to stand and deliver your talk. Your body language is important, don't over gesticulate, but don't be too stiff. Practicing in front of people will help.
8. **Tone of Voice** – even a short 3 minute presentation will seem dull if delivered in a monotone voice. Remember to show your enthusiasm.
9. **Revise** - read it aloud, firstly to yourself and then to an audience of friends and family. This allows you to not only check your presentation, but it will allow you to receive critical feedback.
10. **Practise** - it is so important we can't say it enough!

If you are allowed to use PowerPoint slides also be mindful of the following:

- Choose or create a consistent and simple design template. It is fine to vary the content presentation (i.e., bulleted list, 2-column text, text & image), but be consistent with other elements such as font, colours, and background. (Patterned backgrounds reduce readability.)
- Limit the number of slides. Presenters who constantly "flip" to the next slide are likely to lose their audience. A good rule of thumb is one slide per minute maximum.
- Limit the number of words on each screen. Use key phrases and include only essential information. Empty space enhances readability. Text and graphical images should be large enough to read, but not so large as to appear "loud".
- Limit punctuation and avoid putting words in all capital letters. Use contrasting colours for text and background. Light text on a dark background is best.
- Avoid the use of flashy transitions such as text fly-ins. These features may seem impressive at first, but are distracting and get old quickly.
    - Do not overuse special effects (if you employ lines of text appearing each time you click the mouse. Have content appear on the screen in a consistent, simple manner; from the top or left is best.)
    - Use good quality images that reinforce and complement your message. Ensure that your image maintains its resolution when projected on a larger screen.
    - Practice moving forwards AND backwards within your presentation. Audiences sometimes ask to see the previous screen again.
    - If possible, view your slides on the screen you'll be using for your presentation in advance. Make sure slides are readable from the back row seats.
    - Have a back-up plan in case you face technical difficulties. Remember that transparencies and handouts will not show animation or other special effects.
    - Practice with someone who has never seen your presentation. Ask them for honest feedback about colours, content, and any effects or graphical images you've included.
    - Do not read from your slides. The content of your slides is for the audience, not for the presenter.

- Do not speak to your slides. Many presenters face the direction of their presentation rather than their audience.
- When possible, run your presentation from the hard disk rather than a USB disk.

There are various short talk formats around that have been successful and you may review examples of them for inspiration. Below we list a few:

- **FameLab**[1], international science communication competition: the contestants have to explain a scientific topic of their choice in **three minutes** with *Content, Clarity* and *Charisma* (the 3 C's) without using any slides (only props the contestant can carry are allowed on stage).
- Three Minute Thesis competition[2]: the contestants (who are PhD students) explain their PhD topic in **three minutes** using a single static presentation slide. (Note: In some sense, this is similar to presenting a poster, which might be another type of opportunity you may have at a conference to present your Science Shop.)
- Pecha Kucha[3] The presenter delivers **three minutes** (20 slides and each slide lasts only 20 seconds). From their website: "*The art of concise presentations. PechaKucha Night, now in over 1,000 cities, was devised in Tokyo in February 2003 as an event for young designers to meet, network, and show their work in public*." The format has been adopted also in scientific events, for example the European Open Science Forum[4] and the EC-run event "Science for Europe, Science for Me[5]"
- TED talks[6]: These talks last **18 minutes** and could provide you with good examples for a conference talk where you usually have 20-25 minutes to present your topic (always allow time for questions from the audience!). TED curator Chris Anderson explained the organisation's thinking:*"18 minutes is long enough to be serious and short enough to hold people's attention. It turns out that this length also works incredibly well online. It's the length of a coffee break."*

[1] More information of Famelab available at: https://www.cheltenhamfestivals.com/science/famelab/
[2]Three Minute Thesis competition information: https://www.auckland.ac.nz/en/students/academic-information/postgraduate-students/3-minute-thesis-competition.html
[3] Information about Pecha Kucha: https://www.pechakucha.com/
[4] European Open Science Forum Congress available at: https://www.esof.eu/en/home.html
[5] "Science for Europe, Science for Me" https://ec.europa.eu/jrc/en/event/conference/science-europe-science-me
[6] Ted Talks website: https://www.ted.com/#/

Sell your Science Shop: Marketplace method

The name “Market place” comes from the design of a method whereby participants at the end walk around a “market” to hear what the others are “selling”. The Marketplace method is a way to combine a pitch with a visual presentation in an interactive way, encouraging the participants to be creative, co-create and collaborate around a chosen subject/activity.

This methodology consists of three steps:

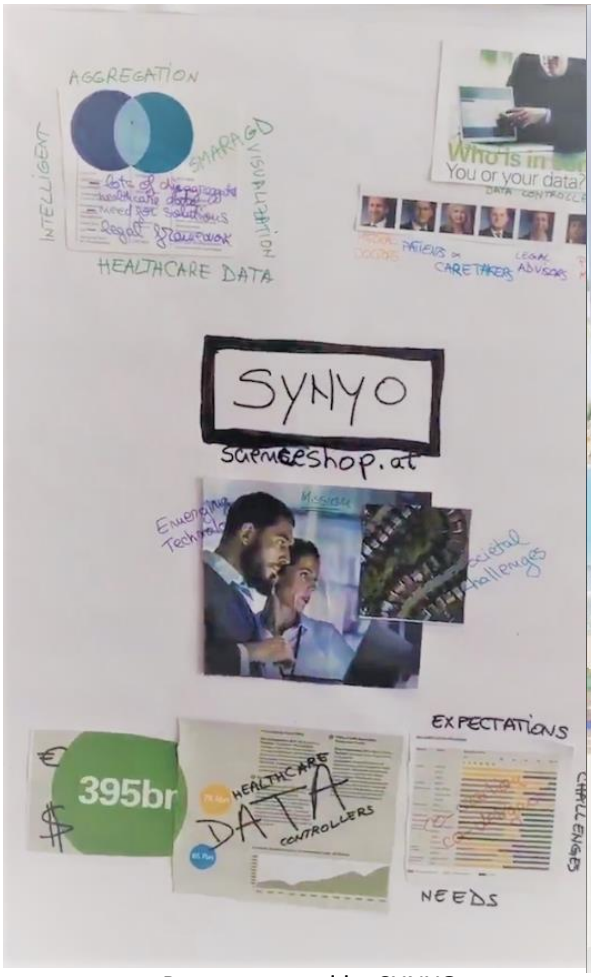
1. Participants choose a common subject/activity to present.
2. Co-creation of an informative poster that showcases and “sells” their subject/activity.
3. Presentation of the poster in a brief talk.

During the Summer School, in the MarketPlace training session, the participants created a poster using cuttings from old magazines and different coloured pens. They then presented their poster to the other participants).

It is always a good idea for a Science Shop to prepare a well-designed, visually appealing poster summarising their thematic area(s), activities and vision that can be taken to events and exhibitions. This activity could also be used to develop ideas for the content of a poster, which is then graphically designed.

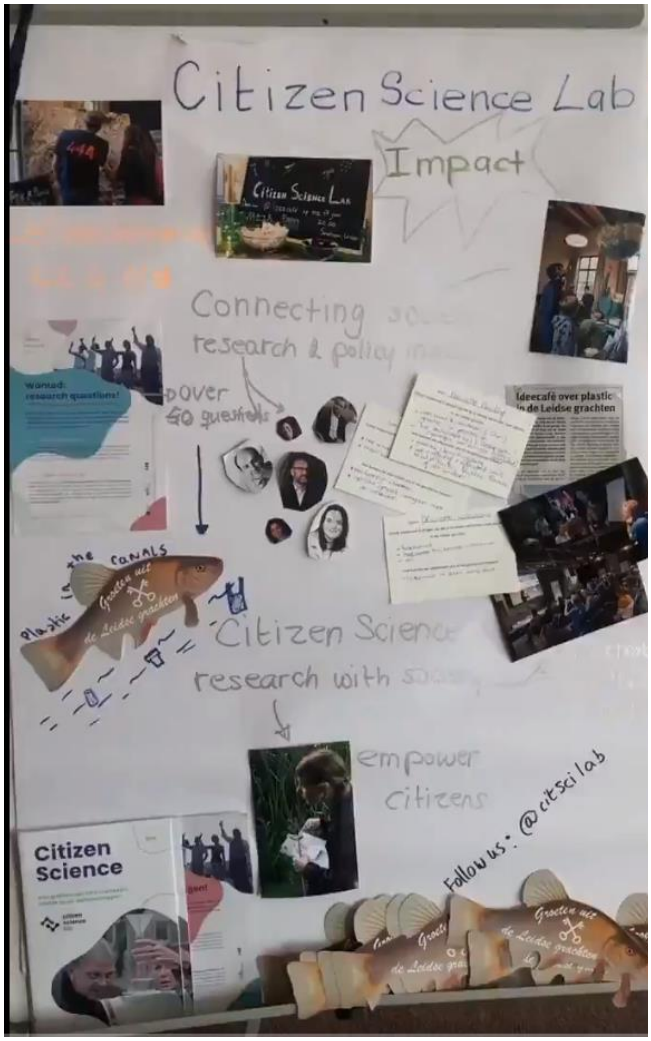
Images of the activity held in the Summer School to “sell” a Science Shop

Participants in the process of creating the posters



Poster created by SYNYO

Poster created by UC3M



Poster created by the Citizen Science Lab

Participants 'selling' their Science Shop

5. Engaging and empowering citizens through citizen science

Contributors: Marit Bogert (WaterLab, TU Delft), Sandra de Vries (WaterLab, TU Delft)and Liselotte Rambonnet (Citizen Science Lab, Leiden University)

The aim of this chapter is to explain what citizen science is and how Science Shops can use it to engage with different groups and stakeholders in order to make their projects more participatory and response. It looks at what to consider when undertaking citizen science and outlines the necessary steps, tools and principles to start a citizen science project.

Firstly, what is citizen science? "Citizen science is a flexible concept […]. Citizen Science projects actively involve citizens in scientific endeavour that generates new knowledge or understanding […] Citizen science projects have a genuine science outcome. With the development of technology and internet it has gained enormous popularity since 2000 (McKingley et al., 2015).

There are different levels of engagement in citizen science projects (Figure 5). Moreover, there are different goals for citizen science: science (data collection, knowledge); society (knowledge, awareness); policy (change, support of community).

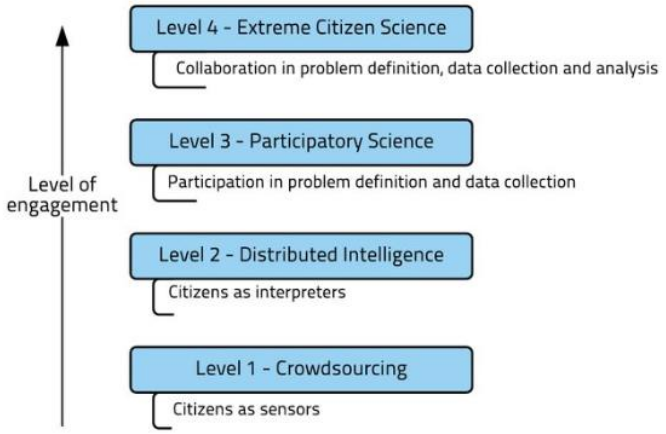


Figure 5. Levels of participation and engagement in citizen science projects. Adapted from Haklay (2013). Available via licence: CC BY 4.0.

From start to citizen science – What are the steps to develop a citizen science project?

There are some essential elements that must be considered before initiating a citizen science project.

- A clear research question
- An involved principal investigator (PI)
- Clear indicators for the question you want to monitor
- Enthusiastic and motivated citizen scientists
- A fun factor

• Infrastructure for communication, data collection and feedback

The steps can be summarised as follows:

Step 1: Identify a relevant question within your organisation or community. What would be interesting or relevant to find out? Or a more accessible option: which existing projects can we join?

Step 2: Think critically: is this question solvable by means of citizen science? If yes: why is citizen science a relevant or even indispensable addition? Keep in mind: collecting data about citizens with, for example, surveys, is not doing citizen science. Collecting data together with citizens is!

Step 3: Who will be the principal investigator? Identify possible collaborations or partners. What are their strong and weak points, means and knowledge? How can you complement each other?

Step 4: Which target group do you want to involve? What group of people are a good fit as citizen scientists for your case? What's in it for them and why would they want to participate?

Step 5: Think about the practical side: what infrastructure and materials do you need? For instance a website, data platform, communication plan etc. What do you need for data collection: consider training for the citizen scientists, manuals and measuring materials. Or: what are the available infrastructure and materials from the project that you are joining? Is that workable for you?

Ten principles of citizen science

According to the European Citizen Science Association (https://ecsa.citizen-science.net/), there are ten principles of citizen science (ECSA, 2015).

1. Citizen science projects actively involve citizens in scientific endeavour that generates new knowledge or understanding. Citizens may act as contributors, collaborators, or as project leader and have a meaningful role in the project.
2. Citizen science projects have a genuine science outcome. For example, answering a research question or informing conservation action, management decisions or environmental policy.
3. Both the professional scientists and the citizen scientists benefit from taking part. Benefits may include the publication of research outputs, learning opportunities, personal enjoyment, social benefits, satisfaction through contributing to scientific evidence e.g. to address local, national and international issues, and through that, the potential to influence policy.
4. Citizen scientists may, if they wish, participate in multiple stages of the scientific process. This may include developing the research question, designing the method, gathering and analysing data, and communicating the results.

5. Citizen scientists receive feedback from the project. For example, how their data are being used and what the research, policy or societal outcomes are.
6. Citizen science is considered a research approach like any other, with limitations and biases that should be considered and controlled for. However unlike traditional research approaches, citizen science provides opportunity for greater public engagement and democratisation of science.
7. Citizen science project data and meta-data are made publicly available and where possible, results are published in an open access format. Data sharing may occur during or after the project, unless there are security or privacy concerns that prevent this.
8. Citizen scientists are acknowledged in project results and publications.
9. Citizen science programmes are evaluated for their scientific output, data quality, participant experience and wider societal or policy impact.
10. The leaders of citizen science projects take into consideration legal and ethical issues surrounding copyright, intellectual property, data sharing agreements, confidentiality, attribution, and the environmental impact of any activities.

Qualities required of each type of participation in a citizen science project

What qualities do you need to undertake a good citizen science project? According to the different type of participation, the following qualities are required.

- Researcher/PI
    - Communication skills
    - Feedback
    - Relatable results
- Citizen scientist
    - Enthusiasm
    - Wanting to learn
    - Interested in subject
- Science Shop/organisation
    - Approachable: easily accessible, network
    - Relate to participants daily live: make it relevant!
    - Flexible and adaptable

Plan your citizen science project

In order to be successful with the development of a citizen science project, the following Canvas could be useful to help you design and plan this type of project. The Project Design Canvas helps to focus on some of the main constraints and foundation points for a well-designed citizen science project (Figure 6).

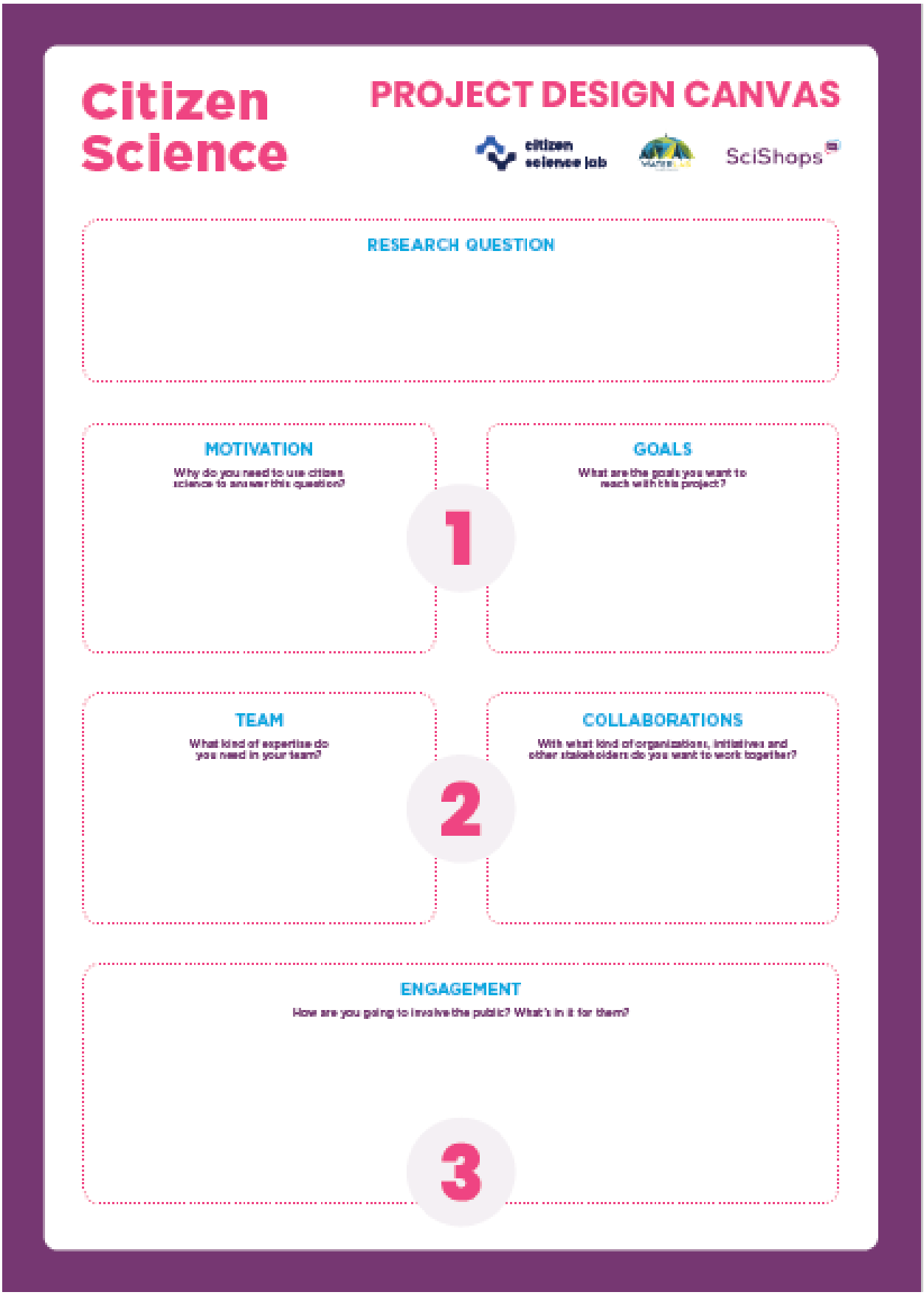


Figure 6. Citizen science project design canvas

6. The art of crafting successful community partnerships

Contributor: Helen Szoor-McElhinney (University of Edinburgh)

The purpose this chapter is to provide knowledge and tips on how to establish successful partnerships with community organisations within the framework of a Science Shop or a community-based participatory activity. This includes how to manage expectations, prioritise needs and solve tensions.

Establishing partnerships is fundamental in a Science Shop. It is a way of building bridges between the different stakeholders. However, not all partnerships are the same and there is no golden rule.

When assessing a wide range of Science Shops we can see that the associated partnerships can look very different in terms of how they are organised, what the interest of the partnership focuses upon, where the community partners have originated from and currently exist, and the level of participation that is given to each partnership.

Arnstein, S.R (1969) described a ladder model of citizen participation whereby partnerships are characterised by the types of activities they undertake. A low level of participation within the partnership may be thought of as the lowest step of the ladder and might involve activities such as information dissemination. The mid section of the ladder may involve activities such as listening and seeking views, while the highest level of high level of participation may indicate the highest step of the ladder and involve activities such as planning, developing and doing together in a co productive process. Arnstein considered the higher levels of participation within partnerships to be the most beneficial of all, creating positive impacts for all partners.

However, Reed (2018) suggests that this well-established view is a misleading one and argues that participatory processes at the top of the ladder have been shown to fail to achieve the positive outcomes that were sought within partnerships, while low levels of participation and the associated activities, such as dissemination or consultation, have been shown to succeed in ensuring beneficial impacts within partnerships.

Just as there is much variation in the types of partnerships that can prove successful in achieving their aims, there are also many types of participatory processes (from consultation to co production) that can bring about positive outcomes if used within an appropriate context and for a particular purpose. Therefore, perhaps the wheel of participation model can be used, which describes a range of participatory processes, to match the appropriate type of engagement to the purpose and context in which engagement is needed.

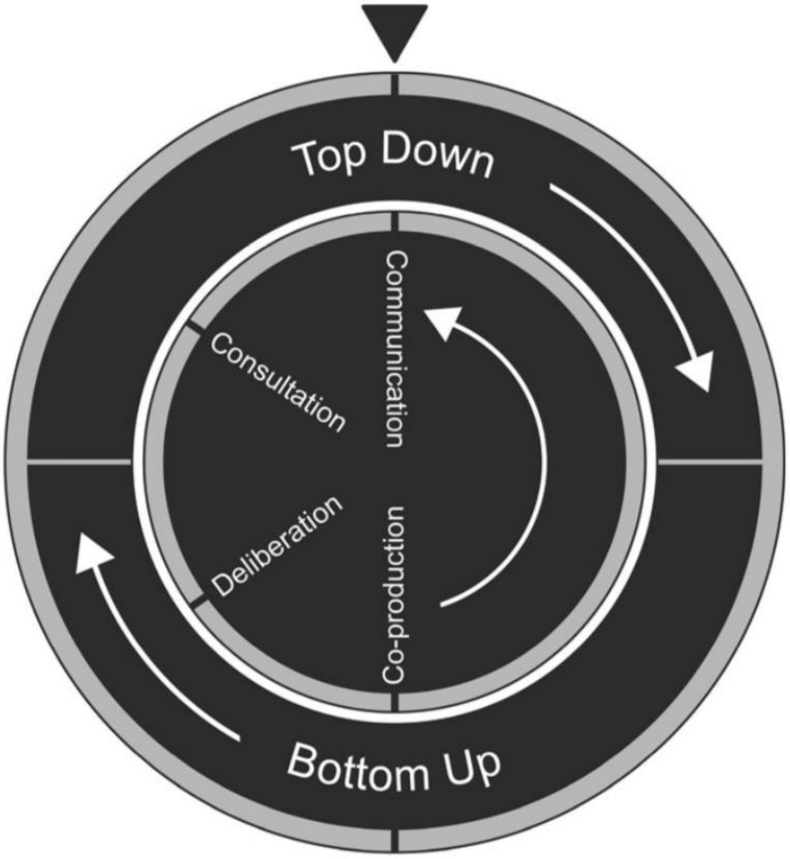


Figure 7. The wheel of participation is a typology that defines different types of stakeholder and public engagement. It combines four modes of engagement with either top-down or bottom-up agency. It consists of an inner and outer wheel that can be spun in different directions to create different combinations of agency (who initiates and leads the process) and mode of participation (from one-way communication to co production). This identifies four types of engagement: top-down one-way communication and/or consultation; top-down deliberation and/or coproduction; bottom-up one-way communication and/or consultation; and bottom-up deliberation and/or coproduction. (Reed, 2018)

Tensions with partnerships

Partnerships can bring very different worlds together, people who express different cultural, societal and world views. When such differences come together, tensions can arise. In order to create new knowledge and understandings within a partnership, it is often useful to step towards the tensions with care and with a desire to understand the tensions better.

To do this, it may be helpful to reflect upon what 'partnership' actually means to the individual partners involved, and to contextualise a particular partnership to understand what motivations partners have for their involvement. To begin this reflective process, posing philosophical questions about the partnership can help to understand its dynamics better and unpack any tensions that have emerged.

Philosophical questions are ones that express a person's own beliefs, have no final answer, are likely to raise a difference of opinion, or touch on human experiences and emotions.

Can we achieve **harmony** without **compromise?**

Figure 8. An example of a philosophical question posed at the Scishops Summer School 2019 to describe a tension within a Science Shop partnership.

Acknowledge different cultures
Clarify expectations
Put power & equity on the agenda
Distribute funding
Build capacity
Communicate and communicate again
Identify and measure the value
Commit - create a legacy

Figure 9. Learning taken from the SciShops Summer School 2019 from participants who identified common factors that can help manage tensions within partnerships.

Prioritising outputs and outcomes

One way to clarify expectations within partnerships is to identify the work priorities that the partnership is working towards early on in the partnership. It can be helpful for groups of partners to prioritise separately so that they have a very clear sense of what their priorities are before coming together to share those priorities with all partners. It maybe that priorities align, or that some do not, and therefore further dialogue will be necessary to negotiate which priorities can be agreed by all partners.

Figure 10. Scishops Summer School 2019 delegates setting priorities for their own Science Shop work and comparing those with priorities set by their community partners.

Begin with the end in mind
Be flexible
Keep communication channels open
Find a shared language
Share resources
Help partners to belong – bridge cultures
Be creative
Be prepared for it going wrong
Start small

Figure 11. Learning taken by SciShops Summer School 2019 from participants who identified common factors that can help create successful partnerships.

Tips for making partnerships work well

The following tips could be useful to create proper synergies between the different agents involved:

- Plan well and together
- Begin with the end in mind
- Be flexible
- Keep communication channels open
- Find a shared language
- Share resources
- Help partners to belong – bridge cultures
- Be creative
- Be prepared for it going wrong
- Start small

7. Getting the most out of twinning and mentoring

Contributor: Franziska Stelzer (Wuppertal Institute)

The aim of this chapter is to provide tips on how Science Shops can get the best out of mentoring and twinning activities in order to gain knowledge and support to help the development of their Science Shop.

Twinning and mentoring are key support activities in the development process of a Science Shop, and can help contribute to the sustainability and success of a Science Shop over time. But, what do we mean when we are talking about mentoring and twinning? Is there a difference? Mentoring can be defined as the relationship in which more experienced/knowledgeable Science Shops help to guide less experienced/knowledgeable Science Shops. On the other hand, twinning is it more related to the pairing of two (or more) Science Shops for the sharing of best practices.

Overall, new Science Shops can benefit greatly from the support and knowledge that can be gained through twinning and mentoring activities with established Science Shops and the new Science Shops being set up as part of the Horizon 2020 SciShops project are being encouraged to set up twinning partnerships to support their development.

Here are some of the top tips that came out of the discussions at the SciShops summer school about how to get the best out of mentoring and twinning activities:

The top three best ways to find a mentor:

- Networking events
- Upon recommendation
- Making your Science Shop interesting to partners

The benefits of twinning/mentoring:

- Best practice and ideas exchange
- Providing support
- Access to new networks
- Learning new skills
- Keeping up your motivation
- Saving time so you can avoid reinventing the wheel and making mistakes
- Gaining increased confidence
- The potential of new collaborations

It’s also important to be aware that things can go wrong in a twinning/mentoring experience. These include:

- A lack of chemistry
- A one way relationship in which only one side benefits
- Different expectations between mentor/mentee resulting in disappointment and frustration
- Not being open to share failures with your mentor/twinning partner
- Poor communication

Success factors that make a positive twinning/mentoring experience:

- Good communication
- Ensuring mutual benefit
- Being open
- Geographical proximity – being able to occasionally meet face to face
- Having a clear framework of cooperation and setting clear expectations and objectives
- Having similar goals and topics that you are working with
- Having a clear vision of both sides
- Being generous
- Being respectful
- Regular reviews to see what is working and what needs changing

8. Business planning and development for Science Shops

Contributors: Petros Sorokkos (KPMG) and Anastasia Constantinou (University of Cyprus)

The aim of this chapter is to provide information on business skills to support the development and management of a Science Shop. It includes information on business tools such as a business plan and balanced scorecard that can be used by organisations to manage and monitor their work.

One of the problems that face Science Shops is sustainability. This remains the main challenge for these organisations, mainly caused by funding insecurity and changing circumstances. Many Science Shops do not receive any consistent financial support and funding often comes from a larger project on Science Shops or community-based participatory research or sporadic funding to support specific activities. This is the reason why Science Shops need to be prepared to adapt and find new funding sources and partners if required (Garrison, 2018) in order to ensure their longevity and future success. A business plan can be useful tool to help Science Shop manage improve this fact.

Alternative sources for funding for Science Shops

The primary traditional sources of funding for Science Shops include funding supplied by the mother organisation, such as university, or project grants (e.g. EU, national or local grants). See Schroyens et al. (2018) for detailed information on funding sources for Science Shops.
Although, Science Shops are conceived as non-profit organisations, new models of Science Shops are emerging aimed at tackling the challenge of sustainability. The following is an example of an alternative business model that Science Shops could consider.

Social enterprise. These types of organisations that are characterised by
a) having an economic, social, cultural or environmental mission-aligned to public or community benefit;
b) trade to fulfil their mission;
c) derive a substantial portion of their income from trade; and
d) reinvest the majority of their profit/surplus in the fulfilment of their mission.

Their goals are based on three elements: providing benefits for a community, creating opportunities so people can help themselves as well as others, or utilising sound commercial business practices to ensure their sustainability. For instance, one action point for achieving its purposes could be to provide services or products to directly meet a social need or achieve a social impact or train and employ people who are experiencing some form of exclusion and disadvantage.

Why is important to have a Business Plan?

Having a business plan is important when putting together any form of venture. It helps you to know your business better but also to clarify the purpose and direction of your business. Moreover, it helps to make the best decisions and events to attract funding. Figure 12 outlines the importance of having a business plan that can be summarised by the following points:

1) Ensures clarity in direction of your Science Shop: this helps to define what the main goal of the business is or what it intends to be over time (e.g. its purpose according to its expertise and the goals that the organisation wants to achieve).
2) Vision development: this is the vivid mental image of what you want your business to be at some point in the future (e.g. IKEA 'to create a better everyday life for many people' or McDonald's 'to be the best quick service restaurant service'). This provides a focus for business growth and should be adjusted over time as circumstances change. A comprehensive business plan also shows whether or not a business has the potential to sustain itself financially.
3) To attract resources: To build the core team, the business plan must be shared with key stakeholders to help convince them of the potential for the business scope and potential success.
5) Governance management: To develop a strategy and allocate resources according to priorities defined within the Science Shop.

Figure 12. Key reasons for having a business plan

How to create a business plan for a science shop

The following canvas is provided for creating a business plan within the framework of the Science Shop.

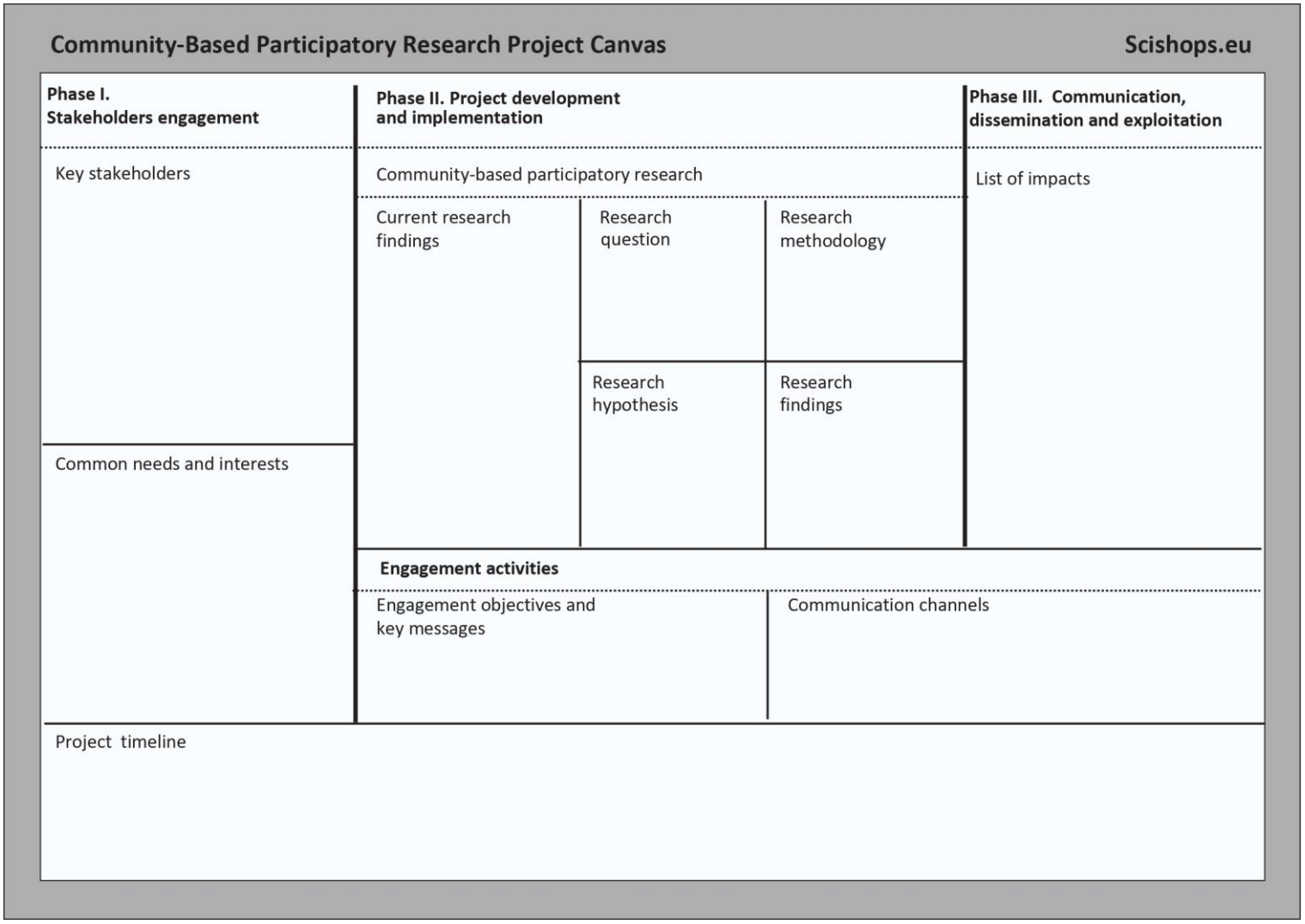


Figure 13. Business Plan for a Science Shop

Balanced Scorecard

Once a business plan has been developed, a balanced Scorecard can be used as a strategic planning and management system to align the business activities to the vision and strategy of the organisation by monitoring performance against strategic goals. It is a monitoring tool that can help you improve organisational performance, increase focus on strategy and results or prioritize projects/initiatives, among others. Table 2 summarises different perspectives and the ways of measuring it. In order to obtain acceptance and commitment, it is advised to involve as many colleagues as possible, appoint a Scorecard Champion or get outside help if needed.

Table 2. Balanced Scorecard measurements.

Perspective	Generic measurements
Financial	Economic value added, cash flow etc.
Customer	Satisfaction, retention,
Internal business process	Internal value chain measurements: - Innovation – how well a business identifies the community's future needs. - Operations – measure of quality, costs and benefits. - Being close to the customers to provide additional services.
Learning and growth	- People. - Employee retention, training, skills, morale, sense of ownership and care. - Systems – measures of availability of critical real time information needed for front liners.

These measurements can help you ask and answer business perspective questions such as:

- Financial: What must we do to create sustainable economic value?
- Internal Business Process: To satisfy our stakeholders, what must our levels of productivity, efficiency, and quality be?
- Learning and Growth: How does our employee performance management system, including feedback to employees, support high performance?
- Customers/ community/ stakeholders: What do our customers require from us and what are we doing to meet those requirements?

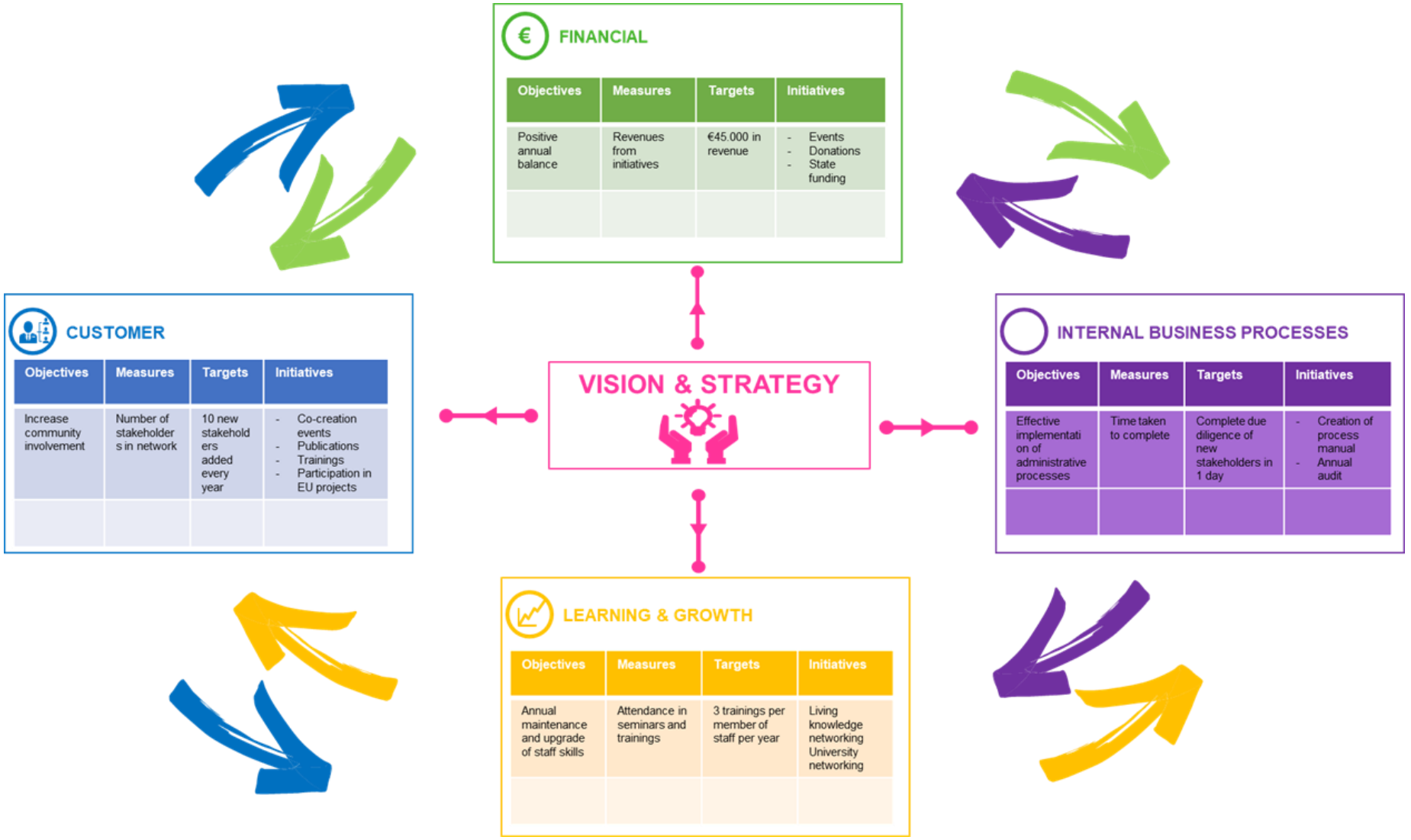


Figure 14. Example of a Balanced Scorecard

9. Impact planning, monitoring and evaluation

Contributor: Mark Reed (Newcastle University & Fast Track Impact)

This chapter focuses on ways in which Science Shops can plan, monitor, and evaluate the real-world impacts that are generated from the research projects that they undertake. It includes tips and tools to time-efficiently increase the significance and reach of your impact, and evaluate the benefits.

What is impact?

Put simply, impact is the benefits that arise for society from research. There is an implicit value judgment in this definition; we are seeking benefits and working for the good of others beyond the academy. This means we need to reflect on whether there may also be unintended negative consequences, and do everything we can to avoid those. It is our responsibility as researchers to anticipate and assess the potential consequences of research and work with stakeholders to design responsible, sustainable and inclusive research.

There is also an implicit venue for those benefits in my definition: they lie beyond the academy. There are of course many forms of academic impact we may be equally interested in (for example bibliometric indicators of impact), but here we are concerned with non-academic impacts.

Impact may be direct or indirect. If someone else is able to use your non-applied research (say a new mathematical algorithm or theory) to derive significant benefits (say a piece of software that saves lives), and that benefit would not have been possible without your research, then you can share some of the credit for that impact.

Of course, for this to be “research impact”, the benefits must be clearly linked to your research. This doesn’t mean that every part of your work needs to be used. Things can go wrong when people cherry pick the parts of your work that they like and overlook parts that are uncomfortable for them. However, very often only one of your findings is relevant for a particular group, or someone might be interested in the theory or method behind your work rather than the ultimate findings. It is also perfectly normal to go beyond your own research to draw on other evidence to help the people you are working with, or just get involved in some other way that has nothing to do with research but that helps make a difference. If you are drawing on other people’s research, that’s still research impact (but you won’t be able to claim this as impact from your research). If you are doing something else to help that is not related to research, then that’s still impact, but it isn’t research impact (and you won’t be able to claim that as impact from your research either). It is important to be prepared to “go the extra mile” and help those you are working with in ways that go beyond your own research if you want to maintain trust and avoid the perception that you are only doing this for your own gain. In many cases, the most effective approach is to find other researchers who can help. In

this way, you are able to add value to the publics and stakeholders you are working with, whilst providing opportunities for impact to your colleagues.

Finally, impact is often conceptualized as beneficial change, but we may have just as much of an impact if our research prevents a damaging or harmful change from occurring. Impacts can be immediate or long-term, in our back yard or in outer space, transforming one person's life or benefiting millions, tangible or illusive.

You can look for beneficial changes in:

- Understanding and awareness
- Attitudes
- Economy
- Environment
- Health and wellbeing
- Policy
- Other forms of decision-making and behaviour change
- Culture
- Other social
- Capacity or preparedness

Impact planning

Table 1 shows the Fast Track Impact Planning Template – by following the questions below to complete the table, you can make a plan for your impact:

1. **What are my impact goals?** The first step in an impact plan is to set your goal, but this is often the hardest part. If you are struggling to come up with impact goals, start by doing a publics/stakeholder analysis. This will give you a list of organisations or groups who should in theory be interested in your research, and may lead you to identify benefits for these groups. If you don't get as far as identifying benefits, ask yourself why they are interested in your research to convert interest to benefit. If impact is simply benefits from your research, then you have just come up with an impact goal. Don't worry if it is a bit basic - you will revisit this and improve it later.
2. **Who is interested in my research?** Conduct a stakeholder analysis using Table 2, and ask three questions: who is interested (or disinterested) in my research; who has the influence to (indirectly) facilitate or block my impact; and who is directly impacted (positively or negatively) by my research? Based on your stakeholder analysis, you can now complete the second and third columns of the Impact Planning Template, detailing who your stakeholders or publics are, and what aspects of your research you think they are likely to be interested in.

3. **What activities get benefits to these people?** Next, identify activities that will engage each of the organisations or groups you have identified. Ask whether you may need different activities for different sub-groups (e.g. civil servants versus politicians or different teams within an organisation), so you have an activity plan that is tailored to the interests and other characteristics of each group.
4. **How will I know I'm achieving impact?** The next step is to identify indicators that will tell you if your activities are working (so you can identify issues and get things back on track if necessary). You also need to identify indicators that will tell you if you are achieving impact. What milestones do you expect to see on the pathway to impact and how will you know when you've actually achieved your impact goal? I encourage you to also identify a "means of measurement", whether quantitative or qualitative, so you get realistic about exactly how you will get the data you need to monitor each indicator. In some cases you will need a baseline or you may need to design some research to collect the necessary data. This may have a resource implication, which you can enter into the penultimate column in the template. If you are unable to get resources then you'll need to think of alternative indicators that are within your grasp. At this point, revisit your impact goal in the first column, and see if you can make it more specific and measurable, based on the thinking you've done on indicators. The more specific your impact goal, the more credible it will be (and the more competitive it will be in a funding bid).
5. **What might go wrong?** Consider what might go wrong with the activities you have planned (e.g. no-one engages with the activities you plan) and consider barriers to you impact (or worse, unintended negative consequences). How might you mitigate each of these risks?
6. **What will I prioritise?** Finally, stand back from your impact plan and decide which impact goals you want to pursue, and which activities you will prioritise to reach these goals for specific groups that are important to you. I tend to focus on the goals that inspire me most, and then prioritise activities I think I can realistically do within the time and resources at my disposal. If it is important that you will be able to evaluate and claim impacts (for example to a funder), then you may prioritise impacts and associated pathways that have impact indicators that are easy to measure. The choice is yours. Be strategic and use your limited time wisely.

Evaluating impact

Impact is usually judged against two criteria: significance and reach. First, ask yourself how significant the benefits of your work are. How meaningful, valuable or beneficial is your work to those you are working with? Second, ask yourself how far-reaching your work is. Are there other groups who might benefit in similar ways, or new applications of your work that could bring new benefits to new groups?

The order in which you ask yourself these two questions is crucial. If you do something that is situated in every country of the world across multiple social groups, but no-one really cares, or benefits in any tangible or meaningful way, you don't actually have an impact. On the other hand, if you save one person's life as a result of your research, you clearly have a significant impact. Therefore, first ask yourself what you can do that would be significant at whatever scale you feel is achievable to you at this point. It may be one company, your local community or your local hospital, but if you think you could actually achieve something significant at that scale, then focus on that.

The easiest way to evaluate your impact is to simply evaluate the impact indicators and milestones identified in your impact plan (see above). However, for more complex impacts you may want to design a more sophisticated evaluation.

The core task in any evaluation is to trace cause (research) and effect (impact) relationships. The strength of any claim will only be as strong as the weakest link in this causal chain. Based on the evidence you collect, you can then create an evidence-based argument that your research made a significant contribution to the impacts that arose. It is rare that you are able to identify sole, direct attribution between your research and an impact, but as long as you have evidence that your research made a significant contribution to the impact, you will be able to make an impact claim. Most impact evaluations use triangulation to demonstrate rigour. While any single piece of evidence could be contested, when put together as part of an argument where you check the claim against different pieces of evidence from different perspectives, it is sufficiently credible.

Figure 15 shows how research leads to possible impacts via an impact plan and pathways to impact (in the case of serendipitous impacts, the impact plan is missing but pathways can typically be traced). However, these possible impact claims may be contested in terms of their significance or reach, or on the basis of the evidence that significant or far-reaching impacts can be attributed to the research. Therefore, for impacts to be considered demonstrable, an impact evaluation needs to be designed (denoted by the grey box in Figure 15). Ideally, evaluations can draw on monitoring that has been designed to track progress towards planned impacts (however an evaluation can proceed in the absence of monitoring, drawing on alternative sources of evidence). Monitoring can provide formative feedback that can help adapt and refine pathways, increasing the likelihood of delivering impacts. Various types of monitoring can be used as part of the evaluation process depending on the nature and purpose of the impact evaluation. In addition to monitoring data (such as intervention outcome data), the evaluation may produce other evidence (such as health economics evidence of cost savings resulting from the intervention), which taken together demonstrate that significant and far-reaching impacts were derived from the research.

Once determined and map the different stakeholders, the following template could be used to track impact planning on your Science Shop activity framework (Figure 16).

Stakeholder and Public Analysis Template

Name of organization, group or segment of the public	Likely interest in your research H/M/L	What aspects of your research are they likely to be interested in? Identify key messages linked directly to your research for this group	What level of influence might they have on your capacity to generate impact and/or what level of benefit might they derive from the research? H/M/L	Comments on level of influence and/or likely benefit (e.g. times or contexts in which they have more/less influence over the outcomes of your research, ways they might block or facilitate your research or impact, types of benefit they might derive from the research)	If influence is high but interest is low, how might you motivate greater interest and engagement with the research?

Figure 15. Stakeholder and Public Analysis Template

Fast Track Impact Planning Template

Impact goal	Target stakeholders or publics	Reasons for being interested in the project	Activities to engage this target group	Indicators of successful engagement [and means of measurement]	Indicators of progress towards impact [means of measurement]	Risks to activities [and mitigation]	Risks to impact [and mitigation]	Who is responsible and what resources are needed?	Timing

Figure 16. Fast Track Impact Planning Template

10. Overcoming challenges when establishing a Science Shop

Contributor: Michaela Livingstone-Banks (University of Oxford)

This chapter focuses on some of potential challenges faced by Science Shops. Different cases are presented and some ideas are listed on how to deal with these challenges.

As organisations, Science Shops face many challenges during their life that could have a consequence on their longevity and success. One of the particularities of this type of initiative is that there is no single organisational model. Science Shop structures and areas of interest consequently vary from country to country and shop to shop. They may be based with parent organsations, such as research institutes or universities, or others are the fruit of community or independent organisational action. However, some challenges are common to many of these organisations (see Garrison et al., 2008), particularly those relating to funding and sustainability.

In a session held during the SciShops 2nd Summer School, participants were invited to discuss a number of common challenges when setting up a Science Shop. Participants spent 10 minutes discussing a challenge of their choice, focussing on the potential solutions and top tips to overcome these challenges, before moving on to another challenge. At the end, each group leader fed back the discussions. Below are a number of the challenges that were discussed and solutions proposed by the participants.

Identifying and match-making citizens and researchers

One of the biggest challenges in setting up a Science Shop is to connect citizens, their questions and interests to relevant researchers. How do you make contact with citizens who might be willing to share their questions in the first place? Once you've got questions, how do you link these to researchers and students who will be willing to work with the citizens to undertake a project? The following table proposes some solutions to this challenge.

Challenge identified	***Solutions presented***
Case 1: Identifying and match-making citizens and researchers	- Make it research (individual effort, advisory group). - Look at National Coordinating Centre for Public Engagement (NCCPE - UK) Community-University Partnership Initiative (CUPI) resources. - How to get citizens? (snowball (start small with individuals, others will follow), how to find them, do they have a problem? Is it researchable?). - Organise a partners breakfast. - Open day/night.

	- Do they knock on our door? It can take many years before questions flow and community organisations start approaching a Science Shop with questions. - Be very clear on what to offer, expectations.

Evaluating the impact

Another challenge when setting up a Science Shop is to connect citizens, their questions and interests to relevant researchers. How do you make contact with citizens who might be willing to share their questions in the first place? Once you've got questions, how do you link these to researchers and students who will be willing to work with the citizens to undertake a project? Some suggestions were:

Challenge identified	***Solutions presented***
Evaluating the impact	- Planning and time should be considered. - Evaluating the results obtained. - Communication and dissemination. - Use of indicators to measure the impact (e.g. short or long-term). - Sharing best practices.

This discussion focussed mainly on where problems or uncertainty on what approach to take arises, and the answer to how evaluate is very dependent on your specific contexts. A key step in the first place is in planning, identifying and articulating your objectives clearly before mapping data collection and analysis methods on to these objectives. You also need to consider how you will use the results and who will read them. You should also remember to look of course at the outcomes and impacts of your activities on your civil society organisations (CSOs), but also on researchers/students involved.

Sustaining funding for your Science Shop

Once your original project-based funding has ceased, where can you look for funding to sustain your Science Shop? This discussion identified that context is everything, and not every organisation will have access to the same sorts of funds - this might depend on the organisation itself, the national context, etc. Some suggestions are proposed in the following table.

Challenge identified	***Solutions presented***
Sustaining funding for your Science Shop	-Collaborate with others that can support you to get funding. -Shout about what are doing and find key influencers. -Crowdfunding. -Explore community funds.

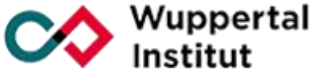
	-Look at sponsorship - corporate social responsibility. -Offer training. -Events can generate income.

Feeding back to communities – science communication

Part of doing Science Shop activities invariably involves the need to translate complex issues to citizens - and particularly the results of any research projects that have been undertaken. The key to communicating science is to know your audience (understand what they already know and how they feel about the topic), and figure out what it is you really want to get across (what's the headline? What are the three main points you need to convey to support your headline?). From here you need to make your communication (whatever the format) as clear and concise as possible. Think about turning the unfamiliar into something familiar, rather than 'dumbing down'. Get rid of all of the jargon, instead focus on concepts and ideas. Use metaphors and analogies and make sure these are as familiar and tangible as possible. Put the most important point or findings upfront - create a 'hook' - something that will grab attention and be of interest to your target audience. Most importantly, make sure you link it to something that's relevant for your citizens - this shouldn't be tough as they should have identified the question in the first place. Some solutions proposed by the summer school participants are listed in the following table.

Challenge identified	***Solutions presented***
Feeding back to communities – science communication	- Give presentations to CSOs and others. - ASK first and listen. Use design thinking - make sure you understand what your desired outcomes are, what the real issues are (practise empathy) and explore communication options that directly relate to this. - Communicate next steps - what will happen next, how have contributions been used. What, when, why, how, where? - Test out your ideas with the target audience. - Use communications professionals. - It needs also to be fun/enjoyable. - Use influencers or representatives from the community who are already trusted/know their community well and can advise.

11. Consortium



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Websites:

SciShops:
https://www.scishops.eu
(particularly, see the “Resources” section)
- **Living Knowledge network:**
https://www.livingknowledge.org
(here you can also sign up to the newsletter)
- **Living Knowledge toolbox:**
https://www.livingknowledge.org/resources/toolbox/
- **Living Knowledge library:**
https://www.livingknowledge.org/resources/library/
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