SciShops

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

D4.1

Science Shops Scenarios Collection

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Executive summary

This report constitutes the Scenarios Collection (Deliverable 4.1) of the SciShops.eu project. The goal of the scenarios collection is to provide everyone interested in the Science Shop concept with an understanding of how Science Shops are set up and run. Setting up a new and sustainable Science Shop requires some insights into the key aspects that influence how a Science Shop operates and how certain events or developments might affect the Science Shop's activities and contribute to its growth, stability or decline.

For the purpose of this deliverable, seven key aspects related to the operations of the Science Shop have been identified: organisational model, funding, infrastructure, coordination staff, implementation staff, project types, and thematic scope. For each of these aspects, the advantages and disadvantages of the identified operational options are discussed. In addition, several key developments are identified for each key aspect. These developments consist of both challenges and opportunities that have a profound impact on how the Science Shop is run, and how they can be handled. In order to reflect the diversity of existing and future Science Shops, we reflect on how these key aspects play out in different types of Science Shops (university-based, NPO-based, and business-based), and supplement all options and developments with real-life case studies wherever possible.

The results of this comprehensive analysis point to some marked differences between Science Shops, first and foremost between university-based and NPO-based Science Shops. The reflections of the business-based model, which are mostly hypothetical for now, indicate that these Science Shops might correspond more closely to the NPO-based model. University-based Science Shops have some particular advantages, including more or less secured (continuous) funding, direct accessibility to students and supervisors, and better access to infrastructure (laboratories, libraries, dissemination channels, etc.). Thus, it is quite common for university-based Science Shops to conduct more projects on a wider range of topics. On the other hand, Science Shops based at NPOs, and possibly businesses, are not dependent on governmental or university educational policies and requirements. They can therefore be more independent, flexible and creative, as well as more involved in action research, the facilitation of stakeholders' engagement, and production of services and products as needed by civil society.

Regarding the life cycle of Science Shops, a crucial finding is that their development is rarely a linear process. Science shops that have existed for a long time have had their moments of growth and decline, which can lead to discontinuity or renewal of the Science Shop. These critical moments require an adequate reaction to the changing environments and conditions by rethinking the key aspects of a Science Shop's operation. During the different stages of life cycles, a Science Shop's organisational model might change, different kinds of staff could be involved, the thematic scope can widen or narrow, different project types might be undertaken, and funding options might be expanded, secured or, alternatively, lost.

The key message to take away from this analysis is that there is no one-size-fits-all when it comes to establishing and running Science Shops. While a lot can be learned from existing models, every Science Shop can develop its own unique scenario adapted to its particular institutional and societal context.

Acronyms

CBPR	Community Based Participatory Research
CESI	Community Engaged Scholarship Institute
DTU	Denmark Technical University
EFSUPS (project)	Exploring the Ground - Fostering Scientific Understanding in Primary Schools
ESSRG	Environmental Social Science Research Group
EU	European Union
EUC	European University Cyprus
EWI	economics, science and innovation (Department Flemish government)
Institute FBI	Forschung, Bildung & Information – Institute
IT	Information Technology
MA	Master of Arts
MaTra (project)	Maatschappelijke Transformatie (Societal Transformation)
NPOs	Non-Profit Organisations
PERARES (project)	Public Engagement with Research and Research Engagement with Society
PR	Public Relations
RRI	Responsible Research and Innovation
SII	The Institute of Social Innovations
SMEs	Small and Medium Enterprises
SWOT analysis	Strengths, Weaknesses, Opportunities, Threats analysis
UOC	Universitat Oberta de Catalunya
UTS	University of Technology Sydney

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1 Introduction

SciShops.eu (Enhancing the Responsible and Sustainable Expansion of the Science Shops Ecosystem in Europe) is a Horizon 2020 project involving 18 partners in 13 European countries aimed at promoting the growth of socially responsible community-based research in Europe. The project explores how different types of research organisations, such as research institutes, large enterprises, SMEs, NPOs and universities can develop sustainable Science Shops with the ambition of establishing ten new Science Shops during the course of the 30-month project. The project runs from September 2017 until February 2020.

Work Package 4 of the project is dedicated to the development of a strategy for community-based participatory research and knowledge transfer from Science Shops to civil society.

This document, which forms the deliverable of task 4.1, is designed to outline scenarios based on different stages of development; in other words, it details the life cycle of a Science Shop. The purpose is to provide those setting up new Science Shops with an understanding of the key aspects that influence how a Science Shop is set up and run; how Science Shops are affected by changes to these, particularly with regard to their growth, sustainability and decline; and to predict the challenges they might encounter.

The Science Shops scenarios have been developed based on the premise that each Science Shop is unique and there is no dominant organisational model or way to run a Science Shop. How Science Shops operate and develop highly depends on their context, both institutional and the wider social, cultural, economic and political environment of the country[1], as well as the resources it has access to.

For the purposes of this deliverable, a **scenario** can be broadly defined as the course of development of a Science Shop. In order to account for the diversity of the Science Shop models, and to show the various types of courses of development, the scenario can be broken down into two elements:

(1) **key aspects** - the essential organisational characteristics of a Science Shop. These characteristics are a reflection of the possible operational options for successful Science Shops, adapted to the particular institutional and external context. The operational choices may change throughout the life cycle of the Science Shop in order to respond to certain institutional or societal developments;

(2) **key developments** – or critical changes, either in one of the key aspects or in the institutional or external environment of the Science Shop that have important consequences for the way the Science Shop operates. These key developments consist of both challenges and opportunities that potentially occur throughout the life cycle of the Science Shop.

In the light of these distinctions, it is possible to clarify various options relating to the key aspects and key developments, so that those who establish a Science Shop can recognise and build their own unique scenario adapted to the institutional strengths and environment in which they operate, as well as plan potential changes. This is particularly relevant for the case of business-based Science Shops, a type which the SciShops.eu project aims to explore and test, since there are no ready-made real life scenarios to follow and learn from.

[1] Cf.: Hende and Jørgensen (2001); Fisher, Shophaus and Leydesdorff (2004)

The **key aspects** addressed in the scenarios in chapter 2 are:

Organisational model (the type of entity)

Funding (funding sources to support the operation of the Science Shop)

Infrastructure (the location of the Science Shop and the availability of infrastructure and supplies)

Coordination staff (the people who will deal with the management of the Science Shop)

Implementation staff (the people who conduct the Science Shop projects)

Project types (the type of work undertaken by the Science Shop)

Thematic scope (any thematic focus of work undertaken by the Science Shop)

The scenarios are focused around three main types of **Science Shops,** defined by the type of organisation that establishes a Science Shop – university-based, NPO-based and business-based Science Shops. Descriptions of key aspects and choices point to which options are applicable for which type of organisation. In this way, each type of organisation can easily identify the possible models and course of development of its Science Shop.

Finally, four **stages of development** relating to the life cycle of a Science Shop are addressed – *establishment*, *stability*, *growth* and *decline*. At the *establishment* stage, a Science Shop makes decisions about all key aspects of how it will operate. *Stability* is a period in a life cycle of a Science Shop when there are no major changes relating to the key aspects. Science shops can also undergo *growth* and/or *decline*, which are often affected by *key developments* but also mean that the Science Shop may have to make new choices regarding the *key aspects*.

It can be mentioned that although the key aspects and key developments are dealt with separately, they do not exist in isolation, and this will become clear in the discussion of concrete instances. Chapter 3 in particular looks at the interdependencies between the different key aspects and key developments and how these affect the operational aspects of a Science Shop. Furthermore, it can be seen that additional contextual factors outside the control of the Science Shop may bring about key developments, particularly those relating to growth and decline, such as the institutional context or broader cultural, political and economic factors in society. Therefore, the conclusion includes some reflections on the future outlook of Science Shops.

The key aspects and key developments have been identified on the basis of a number of Science Shop use cases undertaken by the SciShops.eu project and presented in Deliverables 2.2[2], 2.4[3] and 2.5[4] (Stanescu, 2018) as well as information publicly available online. The majority of scenarios will be illustrated by means of examples of real-life Science Shops from these use cases, particularly those based at universities or NPOs. With regard to Science Shops based within companies or run as for-profit enterprises, there are very few examples (see section 2.1.1.5). However, the scenarios also address the potential opportunities for these types of Science Shops and many options could be applied to for-profit organisations.

The Science Shop movement is constantly evolving and adapting to changing circumstances and opportunities. This document will therefore consider some possible options for the future direction of Science Shops, and this is particularly explored in section 3.3.

[2] Garrison (2018)
[3] Jung (2018)
[4] Stanescu (2018)

2. Key aspects and key developments

2.1 Organisational models

When a Science Shop is established, there are many decisions that need to be taken about how the Science Shop will run in terms of the type of organisation or the entity that is set up. There is no dominant or prescriptive organisational model for a Science Shop since cases in the past and possible combinations that can be envisaged are so many and varied. Yet it is still always the case that each Science Shop must take advantage of available resources, expertise and other environmental factors in order to settle on the best approach.

The following scenario presents the most common types of organisational models and the key developments related to the organisational structure of Science Shops.

Who can set up a Science Shop?

The answer is anyone with the time and commitment. The initiative for setting up a Science Shop usually comes from individuals, either within or outside an existing organisation, who recognise the benefits of community-based research or community-based participatory research.

2.1.1 Organisational options

There is a wide diversity in the organisational structure of existing Science Shops. In what follows, we discuss the advantages and disadvantages of each of these models. Figure 1 provides an overview of the organisational models that are included in this section.

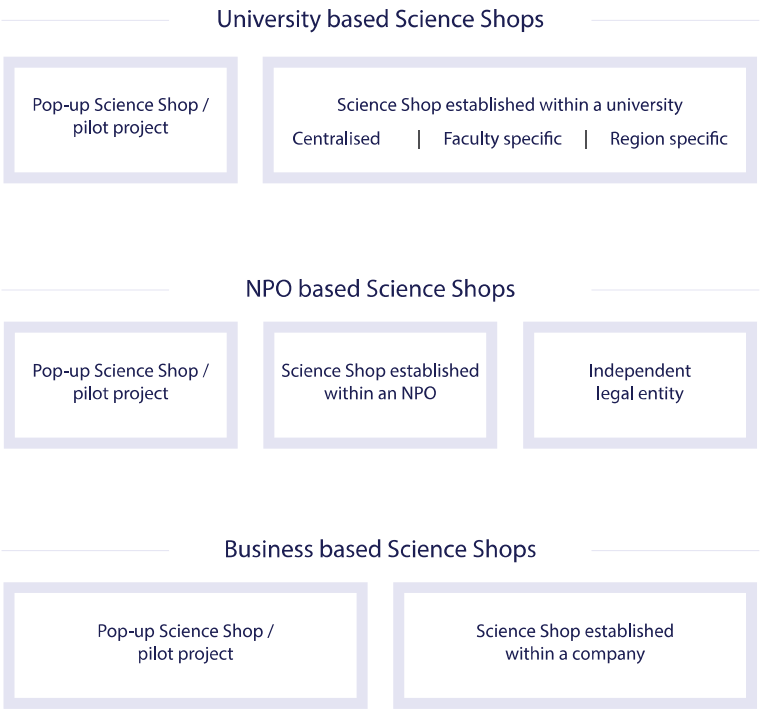

Figure 1: Overview of organisational options by type of science shop

2.1.1.1 Pop-up Science Shop / pilot projects

Science shops may decide to start with some kind of pilot activity involving a small number of Science Shop projects due to the funding that is available, to see what kinds of needs or demands there may be and/or allow them to test parts of the process before the Science Shop becomes an established entity.

Pop-up Science Shops are **non-permanent entities** which may operate for a short period of time. They are typically run by universities or other non-university organisations, including NPOs and SMEs. Activity is limited to a small number of one-off events or interactions with civil society organisations, often run as a project. Pop-up Science Shops provide flexibility, allowing the Science Shop to pilot activity.

Malmö University in Sweden has set up a **pop-up Science Shop** to connect civil society organisations with researchers to tackle societal challenges. The concept was piloted twice during 2017 as part of a regional social innovation project involving a number of partners. Four staff at Malmö University from different departments and faculties have been involved in driving the project forward. They do not have formal roles but function more as an informal network of people facilitating the initiative.[5]

2.1.1.2 University-based Science Shops

University-based Science Shops are referred to as the Dutch model, in reference to the very first Science Shops established in the Netherlands in the 1970s. Science shops based at universities and research institutes are often branded and marketed as an entity, but in fact the legal entity is their mother organisation, i.e. the university through which staff are employed and finances are handled.

University-based Science Shops generally fall within three types of models:

- **Centralised Science Shop**

Centralised Science Shops mediate research across the whole of the university. They provide a contact point for civil society organisations, regardless of the subject or the issue to be investigated. Although the Science Shop staff may be physically based within a specific university department for organisational purposes, this type of Science Shop has a cross-university remit and usually deals with research requests relating to a wide range of research topics, working closely with researchers from different departments throughout the university.

Centralised Science Shops are often embedded in the strategy of the university and likely to have the support of senior management and may receive core funding. However, in order to successfully operate, they are often reliant on the support of staff in departments throughout the university in order to be able to respond to a wide range of research needs and topics.

European University Cyprus (EUC) Science Shop is a Science Shop based at the European University Cyprus. Although the Director and Administrator of the Science Shop are based with in the Business School, for organisational purposes, they have cross-university remit and mediate projects from all fields of science and research represented at EUC. The Science Shop acts as an intermediary between the civil society organisations (or other organisations) and lecturers in the various schools of the university, who manage teams of students to conduct the research. [6]

[5] For an extensive case study on the Pop-Up Science Shop at Malmö University, see Deliverable 2.2 (Garrison 2018)

[6] For an extensive case study on the EUC Science Shop, see Deliverable 2.2 (Garrison 2018)

Science Shops in Canada and the US are often based in a specific centre for community-based research. For example, the **Research Shop at the University of Guelph** in Canada is managed by the Community Engaged Scholarship Institute (CESI), which acts as an intermediary organisation to foster collaborative and mutually beneficial community-university partnerships.[7]

❖ **Faculty specific Science Shop**

Some university-based Science Shops may be based within a faculty or department and therefore have a specific expertise that is the focus of the Science Shop projects which are undertaken; e.g. environmental sciences or social studies.

Being based within a faculty means that the Science Shop activity is closer to the staff and students undertaking the research. However, its limited research scope can also be a disadvantage in terms of the projects it is able to undertake. Also, being embedded within a faculty makes the Science Shop less accessible to CSOs.

A Science Shop may start out as faculty-specific because it is where the initiator of the Science Shop is based. Once established, however, a faculty-specific Science Shop may expand to encompass other faculties or become a centralised Science Shop.

InterMEDIU Bucharest is a university-based Science Shop at the University Politehnica of Bucharest in Romania. It is run by staff in the Department of Analytical Chemistry and Environmental Engineering within the Faculty of Applied Chemistry and Material Science. The research projects are undertaken by students and coordinated by the research staff in the Faculty and are related to environmental issues.[8]

The University of Groningen in the Netherlands currently has six Science Shops, each with a specific focus run by staff based in different faculties within the university:

- The Language, Culture and Communication Science Shop is part of the Faculty of Arts.
- The Beta Science Shop deals with Chemistry, Biology and Physics (which once ran as individual Science Shops until they were merged in 2008) and is run by staff in the Faculty of Science and Engineering.
- The Science Shop for Medicine & Public Health is run by staff at the Faculty of Medical Sciences.
- The Science Shop for Education is located within the Faculty of Behavioural and Social Sciences.
- The Economy & Business Science Shop is run by the Faculty of Economics and Business.

❖ **Region specific Science Shop**

Regional Science Shops are less common. They operate as a collaboration between a number of partner organisations. The Science Shop acts a central contact point for civil society organisations in a specific region and involves a number of universities, who carry out the research. The Science Shop will have a contact person at all of the participating universities and research projects are carried out by students at the participating universities. In this case, the Science Shop may be branded as an individual entity, but staff and funding are managed separately by each of the universities (mother organisations).

[7] For an extensive case study on the Research Shop at the University of Guelph, see Deliverable 2.2 (Garrison 2018); *http://www.cesinstitute.ca/*

[8] For an extensive case study on InterMEDIU at the University Politehnica of Bucharest, see Deliverable 2.2 (Garrison 2018)

Science Shops at Queen's University Belfast and Ulster University are jointly branded "The Science Shop". Both employ Science Shop staff who mediate projects with relevant departments within their own universities.[9]

The Flemish Network of Science Shops is coordinated by Vrije Universiteit Brussel and has regional branches at three universities (Vrije Universiteit Brussel, the University of Antwerp and Ghent University). As coordinator, Vrije Universiteit Brussel acts a central contact point for NPOs in Flanders, collecting research questions and distributing them to the Science Shops in the network. All research topics are put into a database in which students of the different universities can search.[10]

2.1.1.3 Science shop based within an NPO

As in the case of university-based Science Shops, Science Shops based within an NPO are often branded and marketed as an entity, but their mother organisation, the NPO, is the legal entity through which staff are employed and finances are handled. The NPO will carry out a wide range of activities, of which the Science Shop is just one of them.

Being based within an NPO provides the Science Shop with access to additional support and resources and the NPO is often able to subsidise the Science Shop's costs, if required. The Science Shop may also have access to other expertise and staff within the mother organisation, such as financial management, marketing and communications and other administrative support. However, if the Science Shop is just one of the activities undertaken by the NPO, competing demands may limit the Science Shop's capacity in terms of the number of research projects it can carry out or the effort it can commit.

The **Social Innovation Institute Science Shop** is based in Vilnius, Lithuania at the Institute of Social Innovations, a non-profit organisation. The Science Shop has no core funding and costs are subsumed in the overall running and staff costs of the SII.[11]

2.1.1.4 Science shop based within a company

To our knowledge, although there are no existing examples of Science Shops based within companies, the possibility exists for Science Shops to be run by for profit businesses. Similar to a Science Shop based within an NPO, the Science Shop could be branded as a separate entity but the staff and finances handled by the company.

2.1.1.5 Independent legal entity

Alternatively, a Science Shop may be an independent legal entity itself. There is a wide range of legal forms that a Science Shop could take, such as a **non-profit association, charity,** or **foundation**. The choice of the type of legal entity will partly depend on how legal entities are defined in the legal systems of the country in which the Science Shop is based and country-specific options and rules.

Depending on the type of legal entity and country-specific regulations, an independent Science Shop is often required to have a Board, which has legal and ethical responsibilities relating to the governance of the organisation.

One advantage of being an independent entity is freedom in terms of how the Science Shop is run. However, independent Science Shops are fully dependent on external funding sources and have no

[9] https://www.qub.ac.uk/sites/ScienceShop/

[10] http://www.wetenschapswinkel.be/Homepage/

[11] For an extensive case study on the Social Innovation Institute Science Shop, see Deliverable 2.2 (Garrison 2018)

access to support or resources from a mother organisation. They also must take full responsibility for fulfilling legal duties such as financial report and accounting.

Bonn Science Shop was founded in 1984 as an independent NPO. With more than 35 employees, it is one of the biggest Science Shops in the world.[12]

The Science Shop **Interchange** is a registered **charity** with an office at one of its partner organisations, the University of Liverpool in the UK. It has a Management Committee consisting of academics from the University of Liverpool and Liverpool John Moores University, representatives from community organisations, as well as student alumni. The Management Committee acts as a legal and advisory board.[13]

Another option for a Science Shop may be to operate as a for-profit entity, such as a **limited company** or as a **social enterprise**. Social enterprises are run on a for-profit basis, but have social objectives, and profits are primarily reinvested back into the business or community.

The Science Shop **ESSRG Ltd** (Environmental Social Science Research Group) in Hungary is a small research and development company (SME) established by researchers of different disciplines. It is legally registered as a limited company.[14]

Table 1: Advantages and disadvantages of the different organisational models

	Advantages	Disadvantages
Pop up / pilot	• Flexible, don't require huge resources (staff or funding) • Can be used to pilot activity before committing resources	• More difficult to establish reputation and branding
University: Centralised	• Cross-university engagement • Able to respond to wide range of research needs and topics • Often more embedded in university's strategy & funding	• Can require dedicated funding and coordination • Reliant on cross-university support
University: Faculty specific	• Closer to staff and students undertaking the research • Easier to coordinate	• More difficult for CSOs to approach • Offers limited research scope to CSOs (if no other science shops within the university)
University: Regional	• Provides a central regional contact point for CSOs • Shared knowledge and networking opportunities	• Requires an additional level of coordination

[12] For an extensive case study on the Bonn Science Shop, see Deliverable 2.2 (Garrison 2018)
[13] For an extensive case study on Interchange at the University of Liverpool, see Deliverable 2.2 (Garrison 2018)
[14] http://www.transitsocialinnovation.eu/sii/living-knowledge-4

Based within NPO / SME	• Access to support and expertise within the mother organisation (e.g. financial, marketing & communications) • Can utilise mother organisation's visibility and reputation for branding and marketing	• May be limited in capacity due to other demands (how many projects can be done)
Independent legal entity	• Freedom and flexibility (with regard to how it is run, funded, branding etc).	• Funding insecurity as fully dependent on external funding • No access to additional support & resources from a mother org • Financial report and accounting responsibilities and other legal duties

2.1.2 Key developments related to organisational structure

In this section we discuss a number of key developments that can lead to a change in the organisational structure of a Science Shop. A few factors are discussed that relate, respectively, to the establishment, growth, and decline of a Science Shop.

2.1.2.1 Formal Establishment

Science shops that start as informal entities will reach the stage when they will need to decide whether to formalise their operations and become a permanent entity. This may happen, for example, when funding for a pilot activity has come to an end.

In order to receive funding as well as employ staff, the Science Shop must be a legal entity or be part of a mother organisation (which takes the role of the legal entity), which is why Science Shops that start as voluntary initiatives often need to take this step-in order to receive grants.

It is important that Science Shops have the appropriate funding, staff and other support structures in place in order to become a permanent entity. The various options for permanent entities are outlined above.

Bonn Science Shop (Wissenschaftsladen Bonn) was founded in 1984 as a volunteer student initiative involving people from a non-university research institute, the University of Bonn, other institutes and the municipality. A proposal to establish the Science Shop within the University of Bonn was rejected so it was decided to set up the Science Shop as an independent, non-profit organisation.[15]

2.1.2.2 Growth

As a Science Shop grows, it may decide to remain in its existing organisational format. However, for a whole range of different reasons relating to funding, staffing and other environmental or even political factors, a Science Shop sometimes may decide to change its organisational format.

For example, an independent Science Shop may merge with a larger organisation to accommodate its growth. Or a Science Shop may decide to branch out from a mother organisation to become an independent one.

[15] see Deliverable 2.2 (Garrison 2018)

A Science Shop based within one faculty of a university may expand to encompass other faculties. It may even become a centralised Science Shop, becoming fully integrated within the university structure and working with faculties right across the university.

The Science Shop **InterMEDIU** Bucharest originated in the Faculty of Applied Chemistry and Material Science and has recently been extended to include the Faculty of Power Engineering.[16]

2.1.2.3 Decline

Just as a Science Shop may decide to change its organisational model to accommodate growth, the same may apply when it is trying to ensure its survival. This often happens when a mother organisation for political and/or economic reasons no longer wishes to support the Science Shop and withdraws funding.

Universities, for example, are often subject to austerity measures and budget cuts during which priorities have to be reassessed and departments reorganised. If the work of the Science Shop no longer fits clearly into the university's strategic plan and is unable to demonstrate impact, the Science Shop often suffers as a result.

The Science Shop **ESSRG** in Hungary originated from work undertaken by a research group at St. István University (the agricultural university in Hungary) in 2002. In 2004 the group gained a national grant to establish a community service and volunteering centre at the university. However, once the grant came to an end, it failed to get funding from the university and, after the dissolution of the department and institute in which the research group was based, it was decided to set the ESSRG up as an independent limited company in 2008-2009. Being an independent company allows ESSRG to freely collaborate with researchers at a range of universities and means that the Science Shop is no longer vulnerable to university politics and funding.[17]

The nucleus of the **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)** was founded as a development project at the University of Innsbruck as part of the pedagogical faculty in the early 1990s. In 1993, universities in Austria became autonomous and the University of Innsbruck decided against financing the Science Shop without the support of public money. As a result the Science Shop decided to set up as an independent non-profit organisation.[18]

If, however, it becomes no longer viable to continue to operate the Science Shop and no alternative model can be found, then the Science Shop is likely to have to shut down.

However, as in the case of the DTU Science Shop described below, the closing of a Science Shop may lead to new opportunities, and the Science Shop coordinator may be go on to utilise their knowledge and experience to set up a new Science Shop in a completely new environment.

[16] Ibid.

[17] http://www.transitsocialinnovation.eu/sii/living-knowledge-4

[18] For an extensive case study on Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI), see Deliverable 2.2 (Garrison 2018)

A Science Shop was set up at the **Technical University of Denmark DTU** in 1985. Over time it evolved to become an individual activity within the university and by the mid 1990s, 10-15 staff were involved in running Science Shop. However, due to general budget cuts, the Science Shop subsequently lost funding and eventually shut down in 2012 when the coordinators of the Science Shop relocated to new jobs at Aalborg University, where a new Danish Science Shop has subsequently been set up. [19]

The **Amsterdam Science Shop** was set up at the University of Amsterdam in 1978 and became one the largest Science Shops in the Netherlands. During the 1990s, it was renamed the Agency for Advancing Social Research, specialising in social and urban development issues. Following financial cutbacks at the university and changes in the political climate, staff members moved on to other jobs and the Science Shop subsequently closed.[20]

2.2 Funding

When setting-up a Science Shop, one of the first and foremost aspects to consider are the potential sources of funding for the Science Shop's daily operations. In order to set up a long term sustainable organisation, the Science Shop needs a reliable and continuous source of funding. This is often the main challenge, both for early and more established Science Shops. However, as with any organisational aspect, there are many, if not endless options, and the ingenuity of existing Science Shops is a valuable source of inspiration. The two main funding sources for Science Shops are dedicated funding from a mother organisation and project funding. We will outline these and other prevalent funding options for Science Shops set up at a university, NPOs, or businesses, with a particular focus on the advantages and disadvantages of each option. Moreover, these options will be supplemented with real life examples of Science Shops that have chosen to pursue each alternative. Afterwards, a number of key developments related to funding are discussed.

2.2.1 Funding options

In this first section, a number of funding options are discussed in more detail, with examples of case studies that have pursued each option. Figure 2 provides a graphical overview of the identified funding options for each type of Science Shop.

[19] *http://www.transitsocialinnovation.eu/sii/living-knowledge-1*

[20] Sijbrandij (2017)

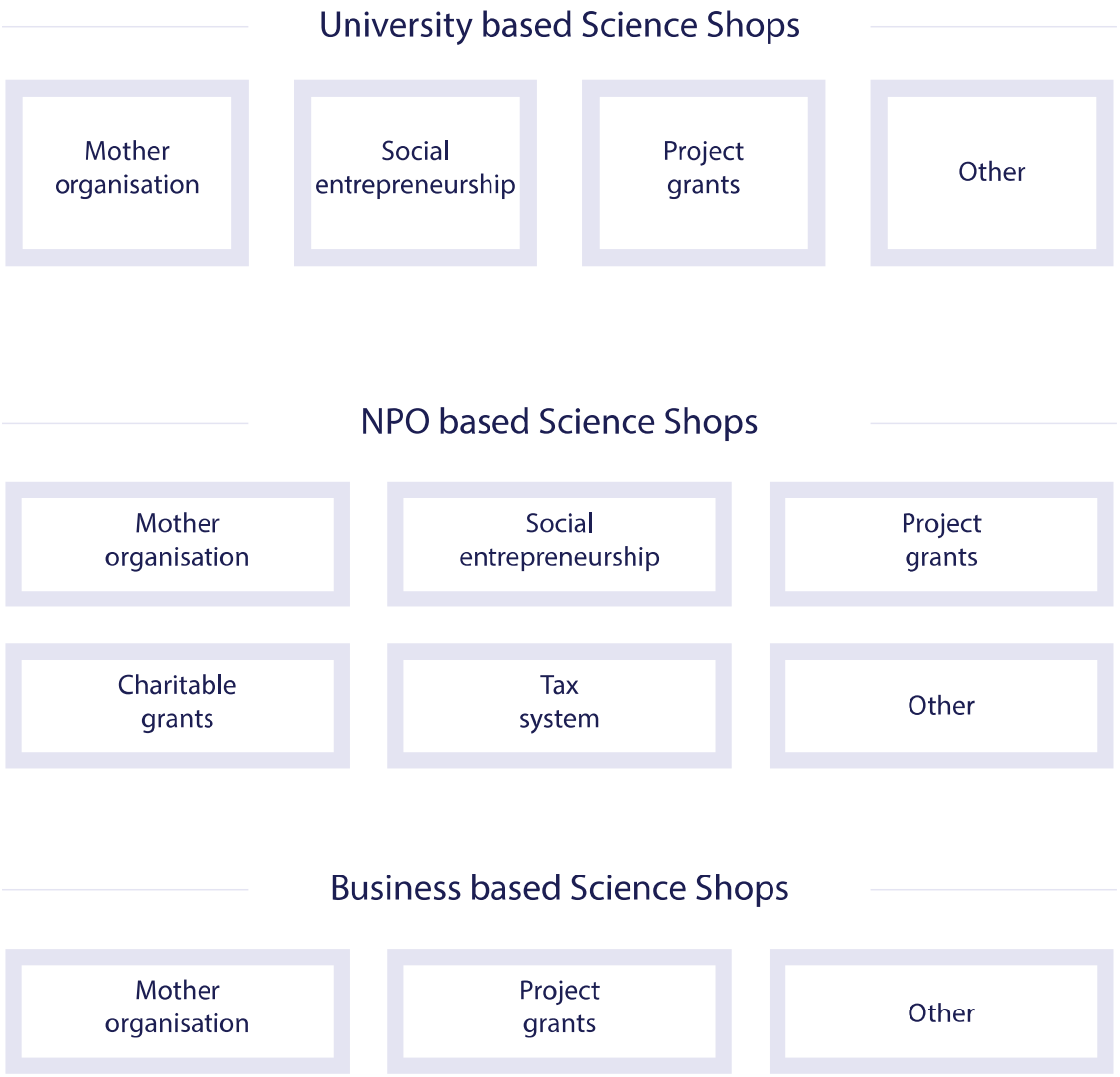

Figure 2: Overview of funding options by type of organisation

2.2.1.1 Mother organisation

The majority of Science Shops operate within a mother organisation. In most cases, this mother organisation is a university. However, some Science Shops are also embedded within another (larger) NPO. In this case, it is possible for the Science Shop to be co-funded with the NPO. More recently, for-profit organisations have also started showing considerable interest in the Science Shop model. For example, within the SciShops.eu project, a Science Shop is to be established at KPMG Cyprus.

In any of these scenarios, a primary source of funding for the Science Shop's activities can be provided by the mother organisation. This type of funding is relatively common. Crucial in this regard is convincing the board of the mother organisation to allocate funding to the Science Shop. There are some distinct advantages of having a Science Shop at the university. Not only are Science Shops a good instrument for community engagement and awareness, they often implement interesting research projects that can lead to extensive research collaborations. Moreover, these types of outreach activities are often seen as an inherent social responsibility of the university. Similarly, Science Shops can be of great value to SMEs, providing a good instrument for local PR and potentially resulting in fascinating public-private collaborations. Moreover, some companies see it as their social responsibility to give something back to society. By providing in-house mentoring and evaluation services to NPOs, Science Shops can also be instrumental in attracting donations and funding opportunities.

In addition, small Science Shops require relatively little financial funds for their everyday activities. For example, university staff may be able to partly support the Science Shop as part of their teaching, administrative or research activities, while students can carry out the research as part of the curriculum. Science shops at universities also have access to extensive research expertise of senior academic staff and can use the network and prestige of the university in the research process. Similarly, SME or NPO staff can partly support the Science Shop as part of their everyday tasks, while internships can be provided for students through partnerships with universities or colleges. In addition, NPOs often rely on volunteers for part of the work.

Of course, the mother organisation does not necessarily fund the Science Shops activities in full. Funding can vary from about 20% to 100% of the activities and can be limited to the costs of management or extended to allocating budgets for particular projects. It could also be limited to the free use of infrastructure, such as office space. With partial funding, the Science Shop staff have to supplement the institutional funding using other sources (mostly project grants).

Of course, a few downsides to this type of funding need to be acknowledged as well. The Science Shop will be unable to function independently from the mother organisation. In addition, this type of funding can be quite precarious, given its dependence on institutional support and budget availability.

Science Shops at the University of Groningen, the Netherlands: The University of Groningen hosts a number of Science Shops that are to a large extent embedded in the university. For example, the Language, Culture and Communication Science Shop receives funding for most direct costs and two part-time coordinators (2 days a week). In addition, the university provides the office space and computers required for the day-to-day activities of the Science Shop.[21]

Wetenschapswinkel Brussel (Science Shop Brussels, Belgium): This Science Shop in Brussels is partly funded by the university (Vrije Universiteit Brussel). The university provides the funds for one part-time coordinator (2 days a week). Institutional funding is supplemented with funding originating from project grants (Horizon 2020), and the department of economics, science and innovation (EWI) of the Flemish government.[22]

UTS Shopfront receives core funding from the University of Technology Sydney and has done so for its entire 21 years. Following its initial three-year establishment grant, the intention had been for Shopfront to operate by sourcing external funding. But following consultation with stakeholders, the decision was taken at a senior management level to continue to core fund its work. This was partly influenced by the political climate at the time, where there was uncertainty and significant cuts to funding in the non-profit sector, and a belief that Shopfront's purpose should be to support the community, not to compete for funding or ask NPOs to use their limited resources or project grants to pay for this type of work.[23]

Living Lab for Health (Spain): The Living Lab for Health is an NPO based Science Shop located at the IrsiCaixa AIDS Research Institute. It receives part of its core funding from the La Caixa Foundation.[24]

[21] For an extensive case study on the Language, Culture and Communication Science Shop at the university of Groningen, see Deliverable 2.2 (Garrison 2018)
[22] http://www.wetenschapswinkel.be/Homepage/
[23] For an extensive case study on UTS Shopfront, see Deliverable 2.2 (Garrison 2018)
[24] For an extensive case study on the Living Lab for Health, see Deliverable 2.2 (Garrison 2018)

2.2.1.2 Project grants

A second source of funding to consider is project grants. Many project funding opportunities manifest themselves at the EU, national or local levels. Overall, we differentiate between two types of project grants. The first type funds the operation of the Science Shop, the second type consists of grants for individual research projects.

In the past, numerous Science Shops have been established as part of European FP5, FP7 and Horizon 2020 research projects. The European programme "Science with and for Society" (SwafS) is particularly dedicated to cooperation between science and society through responsible research and innovation (RRI) and community-based participatory research (CBPR). Project grants from this research programme usually provide seed funding for establishing new Science Shops. Therefore, these project grants are extremely useful for setting up a new Science Shop. Likewise, many national (or local) projects can provide similar funding opportunities.

These type of project grants can have several advantages. First of all, they are often quite elaborate, and sometimes include research and administrative funds as well. Secondly, they provide the opportunity for new Science Shops to explore the possibility and sustainability of a Science Shop in a particular environment. At the same time, they are also crucial to maintain the continuity of established Science Shops. Thirdly, they provide a high level of financial security for an extensive period of time (usually about 3-4 years).

Project funding also has a number of disadvantages, however. The flipside of the coin of financial security is that these grants are inevitably time restricted. When project funding comes to an end, the Science Shop is therefore forced to look for new sources of funding, including applying for new project grants. This brings us to the second disadvantage. Science shops that are highly reliant on project funding will spend considerable time on the application process for new project grants. It is estimated that Science Shops can spend about 33% of their time on these applications. The third, related, downside is that these project grants are highly competitive. Science shops will have to compete with other qualified organisations for a limited pool of funds. Especially in times of budget cuts, the success rate of applications can decrease. Failed applications are a considerable waste of time and money for Science Shops with a limited budget.

Science shops can also approach potential public or private partners for specific research projects. However, looking for partners for each project can also be very time-consuming. In the case of universities, funding for research projects conducted by the Science Shop can also be embedded in project proposals of the university that compete in the annual bidding procedure for national research grants or for PhD project funding. These kinds of project proposals can yield interesting collaborations.

An important limitation, specifically for business-based Science Shops, is that they are not eligible for all projects. The idea of establishing Science Shops at a for-profit organisation is relatively new and not everyone is currently convinced that a Science Shop should operate in a commercial environment. There are concerns that this might compromise the fundamental objective of providing easy-access impartial research for the benefit of society.

SciShops.eu: SciShops.eu is an EU-funded Horizon 2020 project that aims to expand the Science Shops ecosystem in Europe. Through twinning with experienced Science Shops, the project provides the funds for the establishment of ten new Science Shops in Europe.[25]

European University Cyprus Science Shop: EUC Science Shop was founded in 2011 by the EUC Business School. It started as a pilot initiative under the PERARES (Public Engagement with Research and Research Engagement with Society) FP7 project (2010-2014)2. The Science Shop was set up with the aim of creating an information bridge between society and academia in Cyprus.[26]

[25] https://www.scishops.eu/

[26] See Deliverable 2.2 (Garrison 2018)

InterMEDIU (University Politehnica of Bucharest): InterMEDIU has been involved in a number of EU-funded projects relating to research on Science Shops including EFSUPS and PERARES. Currently, InterMEDIU is a partner in SciShops.[27]

Living Lab for Health (Spain): The IrsiCaixa AIDS Research Institute was created as a private non-profit foundation in 1995 with the support of two founding partners, the La Caixa Foundation and the Department of Health of the Generalitat of Catalonia. Today, the research institute receives funding from the La Caixa Foundation and from the local government, private companies and competitive funds. The Living Lab is partly funded by the institute but its projects and part of its personnel rely on project grants. To date, this has mainly been in the form of EU-funded projects (such as Xplore Health, EnRRICH, RRI Tools and InSPIRES). Since European Commission funding of Xplore Health expired, this project has been funded by La Caixa Foundation. Three members of staff have been working for the Living Lab for Health and a fourth joined the team in January 2018. One member of staff is fully funded by the research institute and has responsibility for scientific and media communication for the whole institute, not just the Living Lab.[28]

2.2.1.3 Social entrepreneurship and paid services

Whereas Science Shops generally try to offer their services free of charge, or at least at an absolute minimum of costs, offering paid services to clients who can afford this can provide an additional source of income. Consequently, these funds can be allocated to research projects for clients who have limited resources. Nowadays, most Science Shops restrict their services to organisations that have no access to research, nor the funds to pay for research. Therefore, paid services and social entrepreneurship require an expansion of the types of clients to be approached by the Science Shop, and the implementation of a system to decide on the amount that will be charged to each client.

This option has several advantages. For one, expansion of the client base increases the number of potential clients that can be accommodated by the Science Shop. This can raise both societal visibility and the number of research questions that can be taken into consideration. Moreover, this type of funding also reduces the dependence on external sources of funding and is therefore more sustainable in the long run.

However, some risks need to be acknowledged as well. When a Science Shop accommodates both paying and non-paying clients, there is a certain risk of bias. The staff might lose sight of clients with limited resources by prioritizing clients who generate income for the Science Shop. This could potentially cancel out the social function of the Science Shop. Therefore, some might argue that operating in a for-profit environment compromises the fundamental objective of providing easy-access research for the benefit of society. Moreover, the Science Shop should be able to guarantee the completion of the research project when the client is paying. Science shops that work with students and/or volunteers are often reluctant to make such promises. For instance, students might not complete their thesis project in the agreed-upon time period.

Science shops based at SMEs or LEs will by default operate in a for profit environment. Social entrepreneurship is mostly found as the basis of emerging Science Shops in corporate environments. Similar activities are already taking place in some for-profit organisations. For instance, some consultancy firms in the Netherlands support one position within the firm for pro-bono consulting. This position is supported by the revenue from paying clients and is therefore very similar to social entrepreneurship at Science Shops.

[27] See Deliverable 2.2 (Garrison 2018)
[28] Ibid.

Science Shop(s) Utrecht University: While the Science Shops at Utrecht University have closed down in the last decade, they used to have a schedule to calculate what project costs will be charged to the client and what cost will not be charged. Costs to be charged depended on the type of client, type of research question, and whether the project could be carried out as part of the curriculum or not.[29]

The Bonn Science Shop finances its activities from paid services, funded research and communication projects; overheads on several projects and additional project funding allow for some free consultancy for civil society.[30]

The Ibercivis Foundation (Spain): The foundation is partly funded by providing citizen science consultancy services.[31]

2.2.1.4 Other funding options

Aside from the more common funding options, Science Shops have been creative in finding new sources of funding. Several alternatives are listed below, but the possibilities are numerous. One example of other sources of funding are donations, sponsorships and membership fees. Wissenschaftsladen Potsdam is one example of an independent Science Shop that is, to a certain degree, funded by donations from the local community and membership fees. However, income from donations can also be quite volatile. Moreover, income from donations and membership fees is usually rather limited. Private sponsorships are another possibility. Some individuals or organisations might choose to support the Science Shop and this can be an interesting funding source. However, in case of private sponsorships, the Science Shop should be careful not to compromise its independence.

Some Science Shops also bring in small amounts of funding by offering other paid services, such as giving external lectures. This additional source of funding is quite common for Science Shops at the University of Groningen, for instance.

Another alternative funding source can come from membership fees, publications and subscriptions. The Bonn Science Shop is an interesting example in this regard. A considerable proportion of its annual budget comes from subscriptions to their magazines. The revenue from publishing constitutes about 50% of the Science Shop's turnover and allows the Science Shop to pay the wages of their +35 employees in between projects. However, to our knowledge this is the only Science Shop pursuing this source of funding. Yet, it is clearly another sustainable source of income.

Some Science Shops in the UK have registered as charities. This makes them eligible for charitable grants, thereby opening new potential channels of funding. The challenge with this type of funding is that there are several requirements an organisation has to meet in order to be able to register as a charity. These requirements might also hamper future developments. Interchange Liverpool is an example of a Science Shop that is registered as a charity.

Similarly, some countries allow individuals and businesses to give a certain percentage of their taxes to an NPO or charity. In these instances, Science Shops have the option to supplement their funds by approaching individuals and companies for this type of donations. However, given that these mostly consist of very small amounts, finding sufficient sponsors to generate a sustainable source of funding

[29] http://www.livingknowledge.org/fileadmin/Dateien-LivingKnowledge/Dokumente_Dateien/Toolbox/LK_D_Blueprintbudgetproposal.pdf

[30] See Deliverable 2.2 (Garrison 2018)

[31] For an extensive case study on the Ibercivis Foundation, see Deliverable 2.2 (Garrison 2018)

is extremely time-consuming. This system applies in Lithuania for instance, where any Science Shop that is registered as an NPO is eligible for this type of funding.

Some Science Shops have also managed to survive without any dedicated funding. They rely mainly on the commitment of volunteers. For instance, the European University Cyprus Science Shop receives no official funding. The Science Shop is fully integrated in the structure and everyday operations of the university, based on voluntary commitments of faculty members. Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI) is an NPO-based Science Shop in Austria. The Science Shops lacks a consistent flow of funding and is reliant on voluntary inputs of its members in between project grants. In addition, the staff uses personal equipment and works from home offices for the management of the Science Shop activities. Future Science Shops can also draw on innovative models such as crowdfunding or online collaborations that include the public (citizen science) and require no dedicated funding.

Table 2: Advantages and disadvantages of funding options

Option	Advantages	Disadvantages
Mother organisation	• Primary funding source • Potentially sustainable • Stable	• Dependence on mother organisation • Reliant on budgetary considerations of the organisation
Project grants	• Often full funding of science shop activities and/or research projects • Financial security for set periods of time	• Limited in time • Application process can be time-intensive • Competition for limited funding sources
Social entrepreneurship	• Sustainable • Independence of external funding • Expanding client base	• Risk of bias in allocation of time and resources • Potential erosion of social function of science shop

2.2.2 Key developments related to funding

Throughout the life cycle, Science Shops face certain key developments related to funding. These developments have a large impact on the operations of the Science Shop. Below we outline several developments that typically occur during specific phases of the development of the Science Shop and provide examples of how existing Science Shops have handled these situations in the past.

2.2.2.1 Establishment

Some funds are required to start a Science Shop. The two main sources of funding for starting a Science Shop are the mother organisation and (mostly EU) project grants. The course that is taken, will to some extent depend on the initiators of the Science Shop and the opportunities that are available. Science shops usually come about when certain individuals or organisations become interested in the Science Shop concept. When the initiative of the Science Shop comes from a few enthusiasts within an organisation, they can attempt to receive funding from the mother organisation. Starting off with a pilot project or previous positive experiences with community-based research projects can help to convince the mother organisation to provide funds. Quite often, the initiative to set up the Science Shop can come from the mother organisation itself. For instance, universities are often looking for new research projects for students or might want to increase engagement with the local community. The

same holds for NPOs or SMEs. In this case, the institution will most likely provide funds for the day-to-day activities of the Science Shop.

On the other hand, Science Shops are very often established with project grants. In this regard, the European Commission, through its research programme "Science with and for Society", plays a crucial role in stimulating cooperation between science and society through RRI and CBPR. Numerous new Science Shops have been established as part of FP5, FP7 and Horizon 2020 projects. Keeping an eye out and applying for these project grants is therefore crucial. These will provide sufficient funds to get a new Science Shop off the ground.

There are many examples of Science Shops that receive dedicated funding from the university. One example is the **Wageningen University & Research Science Shop** in the Netherlands.[32]

An example of a Science Shop that was established as part of an EU-funded project is **Lab Worm** at the Sapientia Hungarian University of Transylvania in Romania. It was established as part of the PERARES project and mentored by the InterMEDIU Science shop at the University Politehnica of Bucharest.[33]

2.2.2.2 Stability

The key challenge for most Science Shops is to obtain financial security and sustainability. Key developments in this regard are securing long-term funding commitments and opening up new sources of funding. Science shops that are set up through project grants often struggle with sustainability once the project funding ends. For Science Shops that are set up within a mother organisation, it is important to maintain institutional support, and also to persuade the mother organisation to make a long term commitment to support the Science Shop's activities. Science shops that are not established within a mother organisation can attempt to set up collaborations with local institutions or governments. Sometimes they may even become embedded within a larger mother institution.

Another crucial strategy to increase financial security is to diversify the sources of income. This will make the Science Shop less dependent on a single funding source and will therefore increase its sustainability. In the previous section, many alternative funding options were discussed in more detail: paid services, tax benefits, sponsorships, donations, lecturing, publishing, and membership fees. In addition, Science Shops should keep an eye out for upcoming project funding opportunities. Many Science Shops operate solely on project grants. However, this funding strategy is resource intensive and can be quite precarious due to the competitive application process and the limited number of grants.

While **Interchange** Liverpool is an independent Science Shop registered as a charity, their partnership agreement with the University of Liverpool includes office space and access to graduate students to work on the projects.[34]

The **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)** in Austria is an example of a Science Shop that has no dedicated funding and survives solely on project funding.[35]

2.2.2.3 Growth

Successful projects can lead to increased demand for the Science Shop's services. Sustaining this growth often requires some changes to the operation of the Science Shop. Evidently, taking on more projects requires more staff (both in terms of implementation and coordination), more office space and supplies. On the other hand, growth also requires additional funds. This issue is aggravated

[32] See deliverable 2.4 (Jung 2018)
[33] See deliverable 2.5 (Stanescu 2018)
[34] See Deliverable 2.2 (Garrison 2018)
[35] Ibid.

because Science Shops try to offer their services at a minimal cost. One possible solution to sustaining this growth is social entrepreneurship, where Science Shops do for-profit research or offer paid consultancy services in order to fund projects for clients that cannot afford to pay for research. However, in many cases the clients are willing to pay for some small costs associated with the research. Social entrepreneurship does require a formalisation of the selection procedures and eligibility criteria in order to decide the percentage of the costs that can be charged to the organisation. On the other hand, paid research should also offer certain guarantees, which could be difficult when the projects are conducted by students and volunteers. For instance, a research project might not get finished on time in case a student does not complete the master thesis. An example of a Science Shop that offers consultancy services is the Living Lab for Health in Spain. One other viable option is to look for stakeholders to fund specific research projects. These individual project grants will cover the expenses of the research but looking for partners can take a lot of time. The Bonn Science Shop often actively approaches potential funding partners with research ideas.

Finally, securing extensive funding from the mother organisation or receiving a substantial project grant can also provide the required funds for growth.

The **Living Lab for Health** at the IrsiCaixa AIDS Research Institute started with a project on HIV/AIDS but has expanded its topics of research over the years. The Science Shop is mostly funded by project grants, but also from the La Caixa Foundation, local government and private sponsorships. Moreover, the organisation also generates some revenue from organising workshops and training sessions.[36]

Over the years, **Bonn Science Shop** has expanded its sources of income in order to sustain the growth of the organisation. These sources include income from publishing activities, training courses, and project grants.[37]

2.2.2.4 Decline

Unfortunately, many Science Shops are likely to face some difficulties during their life cycle. This could be due to many factors, such as a decline in the number of research questions, the loss of key personnel, or funding difficulties. How the Science Shop responds to these challenges is a crucial determinant of the continued existence of the Science Shop. In this regard, two key developments related to funding are the end of a project grant or the termination of funding by the mother institution. While these two options are the most likely, any loss of a key funding source will cause similar difficulties for the Science Shop.

Given that project grants always have a specified duration, the end of project funding and the transition to other sources of funding should be carefully planned for. The end of funding by the mother organisation, on the other hand, cannot be foreseen in most cases. Therefore, Science Shops should always be conscious of the inherent instability of any type of funding. To this end, Science Shops should aspire to diversify their sources of funding in order to reduce their reliance on a single funding source. While project grants and institutional funding remain the key funding sources for Science Shops around the world, the discussion in the previous section has shown that Science Shops have found numerous other sources of funding to sustain the Science Shop. These include: paid services, tax benefits, sponsorships, donations, lecturing, publishing, and membership fees. From the onset, Science Shops that are set up through a project grant should explore these funding options in order to prepare for the end of the grant agreement. For these Science Shops, achieved results throughout the project could also strengthen the case for funding from a mother organisation. On the other hand, it is always important to keep an eye out for new upcoming grant applications.

[36] See Deliverable 2.2 (Garrison 2018)
[37] Ibid.

Similarly, Science Shops that are principally funded by the mother organisation should also aspire to diversify funding sources in order to reduce the reliance on the mother organisation. In this regard, any other funding source can reduce the burden on the mother organisation, for instance by applying for project grants to supplement the institutional funding. In this way, the Science Shop can significantly reduce the costs to the mother organisation. The same holds for pursuing other types of funding. This business model is pursued by most established Science Shops that receive dedicated funding from a mother organisation.

However, in some instances the Science Shop may fail to find sufficient funding for maintaining the Science Shop as it is. This does not necessarily mean that the Science Shop will cease to exist. There are many options available for saving costs, for example by changing some operational options regarding staffing, the number of projects undertaken, infrastructure, etc. Other examples include reducing the number of (paid) staff by relying more on volunteers/students and saving costs on office space by moving to home offices.

Sustaining the Science Shop at the end of a project grant is a big challenge for most Science Shops. For instance, four Science Shops were set up in Romania as part of the MATRA project (2002-2005). While some are no longer operational, **InterMEDIU Bucharest** made a successful transition at the end of the initial project and is still active today.[38]

When the University of Innsbruck in Austria ceased to fund the **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)**, the organisation became an independent NPO depending on project grants. Currently they operate from home office in order to reduce operating costs.[39]

2.3 Infrastructure

An important organisational aspect to consider is the location of the Science Shop and the availability of infrastructure and supplies. Whereas many Science Shops have dedicated office space, others do not. Similarly, Science Shops based at universities have access to laboratories and other supplies that are required for implementing research projects.

Nowadays, many Science Shops have dedicated office space at universities or NPO's. Independent Science Shops have to find their own office space or may choose to work together with government or other local organisations. Some large established Science Shops have managed to acquire office buildings of their own. Others have opted to rent office space or reduce costs by relocating their activities to home offices of staff members.

More recently, some innovative Science Shops have chosen not to set up a physical office at all. Instead, they have set up online Science Shops, offering virtual platforms that can be accessed anywhere. In what follows, we will discuss each of these options and their respective advantages and disadvantages. In addition, a number of key developments related to infrastructure are discussed.

2.3.1 Infrastructure Options

In this first section, prominent infrastructure options are discussed in more detail, supplemented with examples of case studies. Figure 3 provides a graphical overview of the identified infrastructure options for each type of Science Shop.

[38] For an extensive case study on InterMEDIU Bucharest, see Deliverable 2.2 (Garrison 2018)

[39] For an extensive case study on the Institut für gesellschaftsbwissenschaftliche Forschung, Bildung & Information (FBI), see Deliverable 2.2 (Garrison 2018)

Figure 3: Overview of infrastructure options by type of organisation

2.3.1.1 Mother Organisation

Given that many Science Shops are linked to a mother organisation, the most common option is to locate the Science Shop at the mother organisation. In many cases, mother organisations can afford to share office space, infrastructure and supplies with the Science Shop. Moreover, when this mother organisation is a large/established organisation, there are particular advantages to locating a Science Shop at this organisation. For instance, Science Shops based at universities usually have access to all the in-house expertise (IT-services, general support, academic expertise), academic infrastructure (laboratories, conference rooms, access to journals, library, high speed internet, etc.). The same holds for large NPOs and SMEs/LEs.
Locating at the mother organisation is perhaps the most common option among Science Shops all over the world.

Both **UTS Shopfront** in Sydney (Australia) and **The Research Shop** in Guelph (Canada) have dedicated offices within the universities i.e. their mother organisations.[40]
Living Lab for Health (Spain) is based at a larger NPO, the IrsiCaixa AIDS Research Institute.[41]

[40] See Deliverable 2.2 (Garrison 2018)
[41] Ibid.

2.3.1.2 Renting or acquiring office space/building

Science shops that function independently from a mother organisation might look for office space on the market. In this case, one option could be to rent office space.

For large independent Science Shops, it can sometimes be feasible to acquire a private building. Renting or acquiring personal office space or a building has the advantage that the Science Shop is in full control of the situation and not at risk of external decisions. On the other hand, renting or acquiring office space and other supplies could be too expensive given the financial constraints that most Science Shops currently face.

Profits from publishing activities allowed the **Bonn Science Shop** in Germany to invest their excess revenues to acquire their own building in 2012. It is a large Science Shop with 35 employees and an annual turnover of about three million euros.[42]

When the University of Innsbruck decided against funding the **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)** (Austria) in 1993, they initially rented office space before moving on to the private premises of one of the members a few years later.[43]

2.3.1.3 Sharing with other organisations

One option to reduce the costs of office space and infrastructure is to share office space and supplies with other organisations. Due to economies of scale, this option will always be less expensive than acquiring personal offices. This option is not uncommon. Independent Science Shops sometimes share a building with NPOs or charities, either in government owned buildings or buildings owned by one of the organisations.

Wissenschaftsladen Potsdam (Germany) is located at the Freiland cultural centre, a publicly funded building that grants them free use of (some) materials and conference rooms.[44]

2.3.1.4 Home offices

When sharing is not an option and the resources are limited, (small) Science Shops might also opt to operate from the private premises of one of the members of staff. Moreover, Science Shops can even choose not to operate from any centralised location. In this case staff members can manage the Science Shop working from home offices. In both instances, these options boil down to a type of personal sponsorship and commitment of individual members. However, they can provide a viable (temporary) solution when resources are scarce.

In order to reduce expenses, all staff members of the **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)** in Austria initially moved to the private premises of one of the members. Today, all staff members work from home, using personal equipment.[45]

[42] Ibid.
[43] Ibid.
[44] For an extensive case study on Wissenschaftsladen Potsdam, see Deliverable 2.2 (Garrison 2018)
[45] See Deliverable 2.2 (Garrison 2018)

2.3.1.5 Online platforms

Whereas, previous Science Shops working from home offices have indicated that Science Shops do not necessarily need a centralised office, recent innovative initiatives have taken this idea one step further by establishing virtual "e-Science Shops" without any physical office space. The advantage of these online platforms is that they require little funds and can be accessed by everyone from any place and at any time. This allows for a lot of flexibility both from the side of the 'clients' and the staff. The obvious disadvantage of virtual platforms is the lack of personal contact between the staff and the client, though sustaining online relationships has also been shown to be a feasible model for collaboration and researchers engaging with the public.

The **Universitat Oberta de Catalunya (UOC)** in Spain is a completely online university that is experimenting with the incorporation of an e-Science Shop (UOC Science Shop) in the general operations of the e-university.[46]

Table 3: Overview of advantages and disadvantages of each infrastructure option

Option	Advantages	Disadvantages
Mother organisation	• Usually elaborate infrastructure available • Very common	• Dependence on mother organisation • Reliant on budgetary considerations of the organisation and availability of spaces
Private office space/building	• Independence • Security • Sustainable	• Expensive
Sharing office space	• Reduction of operating costs of the science shop	• Not always an option • Dependence on external organisation/ government decisions
Home offices	• Significant reduction of operating costs of the science shop • Flexibility	• Dependent on commitment of individual staff members
Virtual science shop	• Significant reduction of operating costs of the science shop • Accessibility • Flexibility	• Lack of personal contact (but online modes of collaboration and engagement may substitute for these in some cases)

2.3.2 Key developments related to infrastructure

Throughout the life cycle, certain developments can have an impact on the infrastructure of the Science Shop. Below we outline several developments that typically occur during specific phases of the

[46] For an extensive case study on the UOC Science Shop, see Deliverable 2.2 (Garrison 2018)

development of the Science Shop and provide examples of how existing Science Shops have handled these situations in the past.

2.3.2.1 Establishment

Upon establishment, most Science Shops use office space and supplies of a mother organisation or collaborate with other organisations. Renting office space is quite rare at this stage due to the high financial cost associated with this option. For Science Shops that are established within a mother organisation, it is most common to make use of the available office space and infrastructure of the host organisation. Sometimes, young Science Shops do not have dedicated office space at the mother organisation. In this case, staff members often work part-time managing the Science Shop from their own desk.

Independent Science Shops sometimes work together with other organisations or make use of publicly funded infrastructure, if possible. Recently some Science Shops do not have physical offices at all and have chosen a virtual model.

The **Bèta Science Shop** is part of the University of Groningen. All Science Shops at the University of Groningen make use of office space and supplies of the university. Similarly, the **Institute of Social Innovations Science Shop** in Lithuania uses office space of the NPO (Institute of Social Innovations) in Vilnius.[47]

The **UOC Science Shop** at the Universitat Oberta de Catalunya in Spain, an online university, is currently piloting an e-Science Shop.[48]

2.3.2.2 Stability

For a Science Shop to reach stability in the sense of access to infrastructure, it is important to have a long-term perspective on future access to office space and supplies. For Science Shops based at a mother organisation, this can be reached by receiving a long-term commitment/funding agreement with the host. Of course, this might be hard to achieve given that consecutive board members might not support the idea of the Science Shop. Similarly, independent Science Shops reach agreements with other organisations or (local) government for the use of infrastructure. Alternatively, Science Shops could always rent or acquire office space. However, most Science Shops do not have the means to pursue this option.

Interchange Liverpool is an independent NPO (charity) that has a funding agreement with the University of Liverpool that includes the use of office space and supplies.[49]

The **Science Shop in Potsdam** is located at the Freiland Cultural Centre. The building and maintenance is publicly funded.[50]

2.3.2.3 Growth

When a Science Shop grows in terms of capacity (number of projects a year) and staff, it will require the infrastructure to support the increased activity. For Science Shops operating at a mother organisation this requires extra office space, if possible. Moreover, it could also be interesting to

[47] See Deliverable 2.2 (Garrison 2018)
[48] Ibid.
[49] Ibid.
[50] See Deliverable 2.2 (Garrison 2018)

acquire dedicated space for the Science Shop within the mother organisation. This is conducive for meetings and provides a contact point for (potential) clients.

If the host organisations are not capable of accommodating the needs of the Science Shop, another option is to branch out and look for a different location for the Science Shop.

For independent Science Shops, increased revenue can allow for an expansion of office space.

The **Bonn Science Shop** is one of the biggest Science Shops in the world. Their large annual turnover, in large part due to revenue from publishing, allowed them to acquire their own building in 2012.[51]

2.3.2.4 Decline

Unfortunately, Science Shops can also face challenges related to infrastructure, office space and supplies. For instance, Science Shops based at a mother organisation are at risk of losing their office space if the host organisation decides to use the offices for a different purpose. Similarly, independent Science Shops might run into problems if a partner organisation or local government is no longer willing/capable of providing office space for the Science Shop. Science shops that rent or own office space might have financial difficulties that force them to relocate the Science Shop. Luckily, there are many other options to explore when facing these problems.

When the University of Innsbruck decided against funding the **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)** (Austria) in 1993, they initially rented office space before moving on to the private premises of one of the members a few years later. Nowadays, staff is working from home offices. They are considering to shift to an online platform in the future.[52]

2.4 Coordination staff

Science shops can be organised in different ways, but all of them need some coordination and administration efforts. Coordination staff perform several functions. First, there is the coordination of projects: collecting research requests and managing them to the stage of selection, monitoring the interaction between the community organisation and the implementation staff etc. The management function includes managing the overall operation of the Science Shop, financial resources, maintaining relationships with the stakeholders, etc. Coordination staff also perform communication and promotion tasks: disseminating information about completed and ongoing activities of the Science Shop, communicating results to the broader audiences, ensuring the Science Shop is visible and sufficiently promoted to local communities, as well as applying for institutional and financial support.

2.4.1 Coordination options

Depending on the organisational model and the size of the Science Shop, the coordination team might consist of a single coordinator or a team, with each member having more specific roles. That also means that one person can be responsible for one task or perform several coordination roles. Depending on these factors and the available financial resources, coordinator(s) might work in a paid position or on a voluntary basis, part-time or full-time. Besides professional staff, students and volunteers can also perform some coordination and/or administrative tasks. An overview of these options is presented in figure 4.

[51] Ibid.
[52] Ibid.

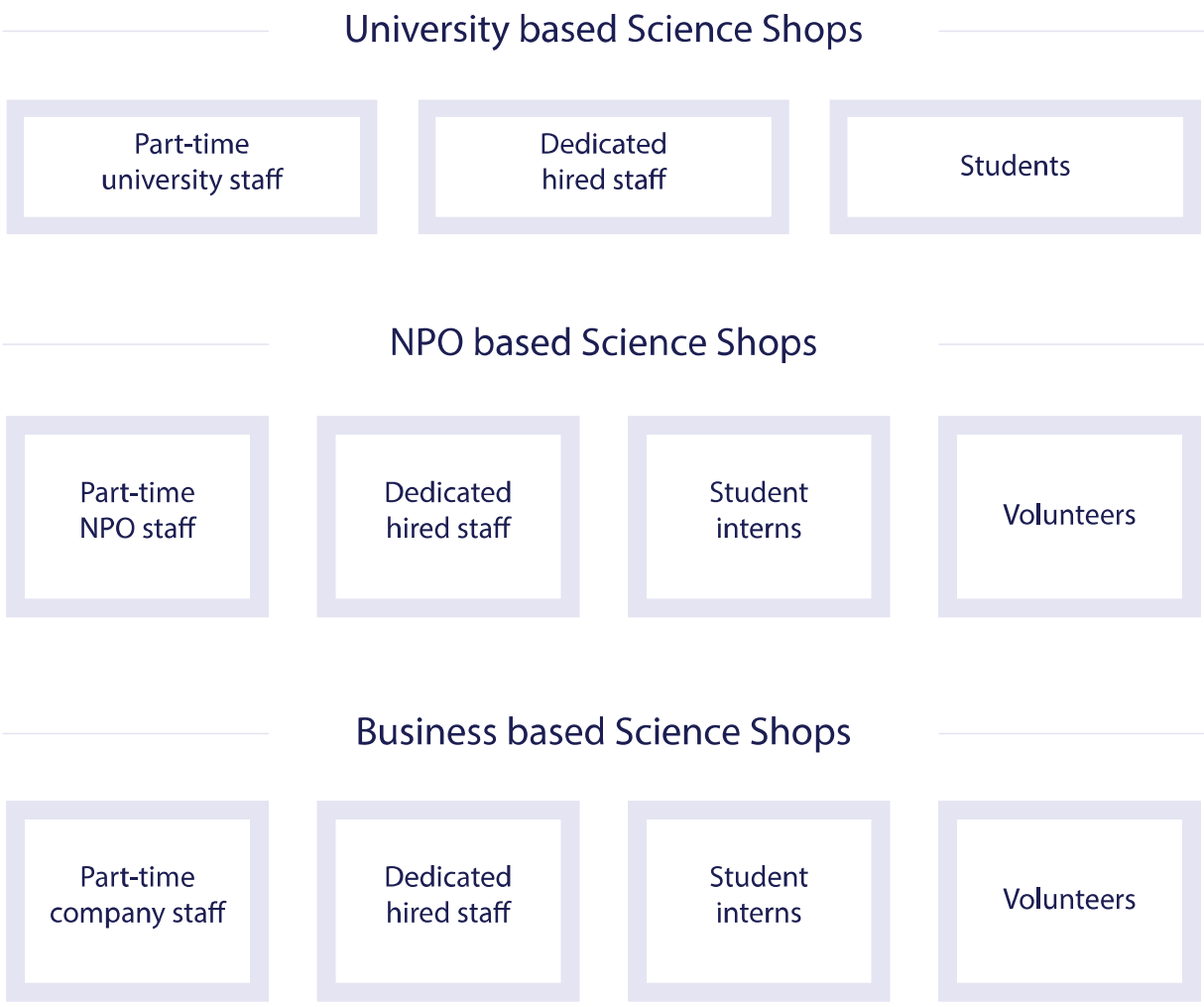

Figure 4: Overview of coordination staff options by type of organisation

2.4.1.1. Part-time mother organisation staff

One of the options for Science Shops is to assign the task of coordinating Science Shop activities to the staff already employed at the mother organisation in other positions. This is particularly common at universities, but it is also an option for NPOs and, hypothetically, business companies that run small Science Shops as one of their activities. In most cases their work at the Science Shop is covered by the mother organisation's or the project budget, although it is also possible without extra payment, if the additional workload is not large.

At universities, coordination roles at Science Shops are often performed by lecturers/researchers, who often do it as a part-time job alongside everyday lecturing and research work. Also, people in administrative or managerial positions may have a part-time job at a Science Shop.

The coordinator of the Science Shop **Language, Culture and Communication at the University of Gronigen** (Netherlands) is a lecturer and researcher at the Faculty of Arts and does the coordination work of the Science Shop part-time. The Science Shop also employs a person to undertake communication, who works part-time and has another management position at the Faculty of Arts. Their salaries are covered by Groningen University.[53]

[53] See deliverable 2.2 (Garrison 2018); https://www.rug.nl/society-business/science-shops/taal-cultuur-en-communicatie/contact

Within **the Institute of Social Innovations** (Lithuania), there is one person responsible for the Science Shop (alongside other duties and without extra payment), supported by an assistant, who helps with communication and publicity.[54]

2.4.1.2 Dedicated hired staff

Depending on the size of Science Shop and available financial resources, a Science Shop can also hire employees to coordinate Science Shop activities and perform other administrative tasks. They can be employed full-time or part-time, but the difference from the option above is that they do not have other positions at the mother organisation.

As part of the **Community Engaged Scholarship Institute** at the University of Guelph (Canada), the Research Shop receives core funding from the university. It has one full-time staff member and employs an average of 14 student interns and four student project managers per year. The Research Shop also receives extra support from the staff employed at CESI itself.[55]

The number of staff employed by **Ibercivis Foundation** (Spain) fluctuates between 1.5 and 5, depending on available resources. These staff are responsible for the operational management of the organisation, including coordination, finance, dissemination, engagement, events, software development, infrastructure maintenance as well as data and web services.[56]

Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI) (Austria), an independent association working in a Science Shop spirit, is run by a director and one other permanent member of FBI; further employees are employed on a project basis.[57]

2.4.1.3 Students

Due to a lack of experience, students are not likely to be responsible for the main coordination and project management tasks at Science Shops. However, they might be engaged in communication and promotion activities or as assistants. They might work at Science Shops in paid assistant positions, in paid or unpaid internships, or might be rewarded with study credits. NPO and business-based Science Shops could also involve student interns for administrative or technical work.

Green Office Living Lab at KU Leuven (Belgium), established in October 2016, is an initiative of University's Sustainability Office in collaboration with student organisations of the university. One of its activities is science shop projects, whereby students undertake theses on the topics submitted by community organisations. The Green office is run by students together with more experienced staff of the university: "The Green Office for KU Leuven thrives because of a dedicated team of student employees, volunteers and staff members. Thanks to the unique set-up of the Green Office, which is halfway between bottom-up and top-down, students are given the autonomy and support they need in order to implement their sustainable ideas at the university and inspire many students and staff members to adopt a more sustainable lifestyle."[58]

[54] See Deliverable 2.2 (Garrison 2018)
[55] Ibid.
[56] Ibid.
[57] Ibid.

[58] https://www.kuleuven.be/duurzaamheid/archief-1/greenofficeeng;
http://greenofficeforkuleuven.be/#projects

2.4.1.4. Volunteers

There are Science Shops that are entirely or partly run by volunteers, including management tasks. This is a more common option at newly established Science Shops, but also older Science Shops can involve volunteer work.

Wissenschaftsladen Potsdam e.V. (Germany) is a Science Shop run by volunteers. There is the possibility to pay people to work on funded research projects or to pay instructors to run courses and workshops, but otherwise there are no paid employees to manage the overall organisation.[59]

Table 4: Advantages and disadvantages of coordination staff options

Option	Advantages	Disadvantages
Part-time mother organisation staff	• Inside knowledge on the organisation • Good knowledge of the research process (if lecturers/researchers) • Lower costs (might be employed for a small part of their time or work on voluntary basis)	• Potential difficulties to allocate time and combine with other positions
Hired staff	• High quality due to possibility to hire specialised professionals • Undivided attention to science shop tasks (particularly if full-time)	• Higher costs, not available for all science shops
Students	• Lower costs • High communication and promoting potential	• Possible lack of experience • High turnover • May be difficult to fit into timescale of work
Volunteers	• Free • Natural motivation	• Can invest only limited time • Potentially high turnover (to compare to permanent staff)

2.4.2 Key developments related to coordination staff

2.4.2.1. Establishment phase

At the establishment phase or during the piloting of the Science Shop, there is often a reliance on the participation of the mother organisation's staff on a voluntary or project basis, or on volunteers in the case of NPOs. During the later phases, Science Shops, in most cases, change to employment-based coordination staff, which allows for greater stability.

2.4.2.2 Stability and growth

Options for coordination staff are highly related to financial resources. Stably operating or growing Science Shops mostly rely on permanent core coordination staff, possibly involving students for

[59] See Deliverable 2.2 (Garrison 2018)

supporting roles. Growth is related to, and requires an increase in, funding, because then it is possible to employ more staff and handle more research requests.

One of the challenges experienced by **Interchange Liverpool** (UK) is the growth in student numbers at the university, which means there is increased pressure to involve more students and undertake more projects. This greatly increases the workload of the current staff and most likely will require additional resources.[60]

Stable Science Shops may also rely on coordinators working on a voluntary basis, but this option creates a potential threat to sustainability (see the Decline section). Reliance on volunteer coordinator work can be a limiting factor, as it only allows a limited number of projects to be implemented and restricts other tasks needed for running the Science Shop.

The capacity of the **Wissenschaftsladen Potsdam** (Germany) is limited due to being an organisation run by volunteers – even coordination work is performed on a voluntary basis. It has reached a critical threshold where they have so many projects and activities that it is becoming difficult to manage them purely with the help of volunteers. Lack of funding, people and time also means that they have limited capacities for any public relations activities and have to rely on word of mouth marketing via their networks and the community at the culture centre.[61]

2.4.2.3. Decline

If a Science Shop has secured funding, coordination staff should not be a problematic area, as it is then always possible to find personnel for paid positions. Thus, a decline could be caused by reduced or suspended funding, or longer gaps between projects, which would mean that the Science Shop cannot retain staff.

Many smaller Science Shops are driven by highly committed and enthusiastic individuals. The sustainability of small Science Shops can suffer if these key people leave or retire from the organisations.

Much of management work at **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)** (Austria) is currently done on a voluntary basis. Therefore, its main coordinator, who is approaching retirement age, is rather pessimistic about whether FBI can remain operational once she retires. So far, she has not been able to find a successor who is willing to invest this effort.[62]

One of the reasons that several **Romanian Science Shops** did not survive was due to their reliance on individual people within the university. When these people moved on to other positions or retired, the driving force behind the Science Shop vanished. There is obviously a lack of rewards and incentives to get involved in this type of work.[63]

2.5 Implementation staff

Project implementation staff is one of the key aspects relating to the establishment, running and expansion of Science Shops, as the availability of project implementation staff affects how many and

[60] see Deliverable 2.2 (Garrison 2018)
[61] Ibid.
[62] see Deliverable 2.2 (Garrison 2018)
[63] Ibid.

what types of projects the Science Shop will be able to undertake. An important message for those who are thinking of establishing a Science Shop is that people who will implement the projects do not have to be hired and paid staff – there are numerous other possibilities. Precisely because of the availability of 'free' staff, many Science Shops can offer free services to community organisations.

Typically, the project implementation team consists of a project coordinator or supervisor and people who do the actual research, i.e. do experimental work, collect and analyse the data or do other associated tasks. Both of these roles are discussed below. The role of the overall coordinator of a Science Shop has been addressed in the previous section.

With regards to project implementation staff, there are two main choices. Firstly, Science Shops can engage either professional or non-professional researchers. Professional researchers are university teachers, researchers, or other staff employed by the organisations that run the Science Shop. Non-professional researchers are typically students or volunteers. Supervisors are usually professional researchers since the role of supervisors requires research experience. Secondly, participation in Science Shop projects can take place as part of a person's work or studies or as a voluntary activity. Researchers and supervisors can be involved in Science Shop projects on a voluntary basis or as a part of their work at university; in the case of students, their work in Science Shop projects can receive course or degrees credits (or not). Besides these most common options, Science Shop projects can also involve people from the client's (community organisation's) side or lay people, if they are implemented as citizen science projects.

2.5.1 Implementation staff options

In this first section, the different organisational options related to project implementation staff are discussed. An overview of these options in different types of Science Shops is presented in the figure below.

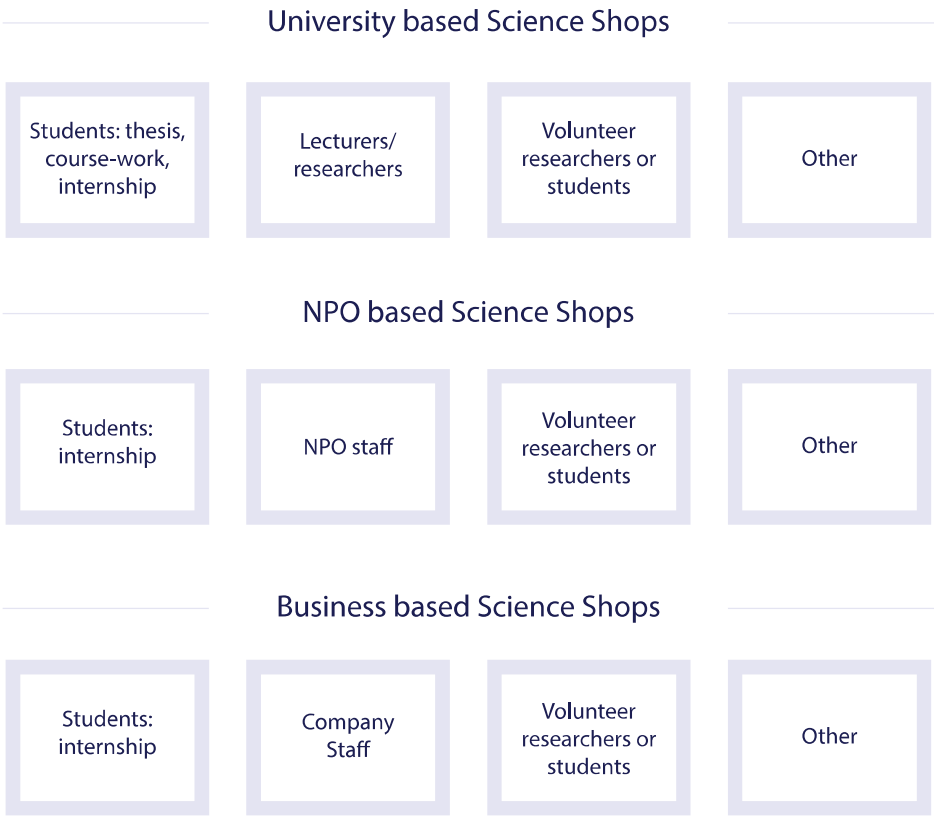

Figure 5: Overview of implementation staff options by type of Science Shop

2.5.1.1 Students

At all types of Science Shops, research projects most typically are implemented by students. Their work with projects on behalf of community organisations may take several forms: final thesis, coursework, or an internship, explained in more detail below.

There are numerous cases when a Science Shop's client's request becomes the subject of a Bachelor's, Master's or PhD thesis.

Vrije Universiteit Brussels Science Shop mostly relies on Master's theses for Science Shop projects. Master's theses topics performed on behalf of Science Shop clients are listed in the 'Reports' section of Science Shop's internet site.[64]

A Science Shop project can also be implemented as an individual or group coursework. Depending on the study field or other factors, a Science Shop project may be integrated into a course on research methods or a subject-related course. It could also be a special module for Science Shop projects not attached to any of the 'regular' courses at the university.

Student groups at **Vilnius Design and Technology College** in Vilnius (Lithuania) do course projects on environmental design and engineering solutions. Projects are related to one of the courses taken for credit and form a part of the coursework that is assessed and contributes to the overall grade for the course. Groups of students implement the projects, which consist of real-life cases provided by community organisations through the Science Shop.[65]

At **Interchange Liverpool** (United Kingdom) students undertake projects as a part of a special module. Projects can be of two types: either a research project that results in a 6000 word Client Report, in which they present and analyse their findings for the community organisation; or a work project, which involves different types of outcomes and for which students are expected to write an accompanying policy analysis or reflective analysis for academic assessment.[66]

Finally, students can be involved in Science Shop projects as a part of an internship. This is a more frequent option for NPO-based (potentially, also for SMEs) Science Shops since they do not have their 'own' students and have to invite them from outside. Therefore an internship is the best option in this case. At universities, internships are less frequently used, although it is a possible option e.g. at Groningen University's Science Shop Language, Culture, Communication (the Netherlands), as well as at the University of Guelph's Research Shop (Canada).

The **Social Innovation Institute Science Shop**, Vilnius (Lithuania) relies on an informal collaboration with Vilnius University and other universities, whereby social science students undertake internships at SII. The Science Shop gets human resources for project implementation, while students get the possibility to acquire practical research skills and complete a credit-bearing internship.[67]

When students are involved, they get credits for work undertaken on a Science Shop project, which is a strong motivational factor. At universities, students can also be employed in paid research assistant positions. Finally, Science Shops could involve students on a voluntary basis, although this is not common practice.

[64] http://www.vub.ac.be/onderzoek/wetenschapswinkel#onderzoeksrapporten-
[65] See deliverable 2.5 (Stanescu 2018)
[66] See deliverable 2.2 (Garrison 2018)
[67] Ibid.

Students from all levels can be involved in Science Shop project implementation. The difference lies in different levels of skills. Master of Arts (MA) level students are already more experienced in using research methods and research data analysis, while BA level students have less experience and therefore need more guidance from teachers or researchers. PhD students can take on even more demanding projects. Some requests may also be broken down into a number of projects and undertaken by different students or levels of students.

Science Shop Language, Culture, Communication (University of Groningen, the Netherlands) implemented a project upon request from a high school to test the effectiveness of a radically new method of teaching French that the school was experimenting with. First, three students of applied linguistics did the testing with the pupils and followed them for half a year. Later, one of the students turned the project into a PhD project involving more schools and following the language acquisition of pupils over three years. Her results inspired a website to improve French teaching methods and numerous workshops and has reached many teachers.[68]

Being able to engage students in projects is a general advantage for many Science Shops – without this 'free' and abundant resource, operation of many Science Shops would be impossible.

As mentioned briefly earlier, one of the disadvantages of involving students is potentially conflicting timescales. If a Science Shop relies on students, the possibility of carrying out a particular project depends on the availability of students undertaking a course related to the topic, or students being interested in taking a research request as a topic for their thesis. Even if there are students available, the project must be aligned to study cycles too. Another disadvantage is the risk of lower research quality, related to lack of experience by students, and risk of project abandonment due to personal or other reasons.

2.5.1.2 Lecturers/researchers

University lecturers or researchers typically act as supervisors of Science Shop projects that are carried out by students. In many cases, university lecturers do this without extra payment as student supervision is a part of their job. However, such projects may involve extra work, time for meetings etc. Hence some universities might opt to allocate extra remuneration for lecturers taking part in Science Shop projects. On the other hand, some academic researchers may have strong incentives to supervise Science Shop work where it aligns with their research interests or projects that are already ongoing or that they wish to carry out.

Some Science Shop projects can be entirely implemented by researchers with experience instead of students, particularly more demanding projects.

Wageningen University & Research Science Shop implemented a research project to answer the question: Which dietary advice can we give to HFE-hemochromatosis [an iron disorder in which the body absorbs too much iron from the food] patients? Gerdien van Doorn, a dietician and graduate nutritionist from Wageningen University performed an extensive literature study and talked with experts and patients. Based on all the information, nutritional advice was compiled.[69]

2.5.1.3 NPO/business company's employees

At universities, people employed at the Science Shop are involved in projects as coordinators (see section 2.4), while research projects are implemented by students under the supervision of lecturers. At NPO or business-based Science Shops, its employees not only coordinate the projects, but also supervise the research projects if they are implemented by intern students, or implement the projects themselves.

[68] See deliverable 2.2 (Garrison 2018)

[69] https://www.wur.nl/en/Education-Programmes/science-shop/Testimonials/Show/Concrete-dietary-advice-for-hemochromatosis-patients.htm

At **Bonn Science Shop** (Germany) all of the work (except in cooperation projects, where joint work is undertaken with other project partners) is carried out by its members of staff. Many of them have expertise in research relating to a range of fields, focused around environmental, education and social sciences.[70]

2.5.1.4 Volunteers

It is not uncommon for Science Shops to be established by volunteers or rely heavily on volunteering work at the beginning of their existence. However, a small number of Science Shops continue to be run by volunteers. All Science Shops at all stages of maturity may rely on volunteer researchers and students from universities and other research institutions.

At the **Ibercivis Foundation** Spain, many of the researchers that are involved in the projects work as volunteers or are employed at organisations they collaborate with. The Foundation also has a number of volunteers, including teachers, and other active supporters, that are heavily engaged in their work.[71]

2.5.1.5 Other options

There are several other but less frequently used options of implementation of Science Shop projects. In some projects, a community organisation's (client's) staff may take part in the project implementation, e.g. by taking part in the research design and helping to collect data. Another example is projects that are based (partly or entirely) on citizen science, when lay people from the wider society are invited to contribute to the project with data collection or analysis, thus becoming involved in the project implementation.

Some Science Shop projects, particularly larger ones, may rely on an advisory committee that supplements the project supervision role. Such a committee might include representatives of clients, local authorities, relevant citizen or professional associations, and other stakeholders.

Many of projects run by **Wageningen University & Research Science Shop** (the Netherlands) are supervised by a coordinator and an advisory committee. As an example, the advisory committee of a project that aimed to propose a plan for reconstructing an allotment complex in Ede, Netherlands, besides the supervisors of the master student who did the main research, also included a representative of the client, chairman of the steering group for renovation of the garden complex, a consultant from a private consultancy firm, a representative of a national organisation for hobby gardeners, a coordinator of the district were the complex was located, a representative of "Green Office" at Utrecht University, and two coordinators of the Science Shop.[72]

Table 5: Advantages and disadvantages of different options

Option	Advantages	Disadvantages
Students	● Free (no direct costs) ● Abundant	● Risk of lower quality or drop out ● Need supervising
Teachers/researchers, science shop staff	● High quality ● Can work independently	● Higher costs (compared to students or volunteers)
Advisory committee	● Direct involvement of stakeholders	● Potential differences in opinion and need to compromise

[70] See deliverable 2.2 (Garrison 2018)
[71] See deliverable 2.2 (Garrison 2018)
[72] http://edepot.wur.nl/210766

	● Help from more sources in project implementation	
Volunteers	● Free ● Natural motivation	● Can invest only limited time ● Potentially high turnover (to compare to permanent staff)
Client's staff	● 'Inside' knowledge	● Need training in research methods
Citizens (e.g. in citizen science projects)	● Free ● Large scale potential	● Needs extra efforts and possibly funding to mobilise ● Might need more guidance ● Risks related to data quality

2.5.2 Key developments related to implementation staff

2.5.2.1 Establishment phase

At the establishment phase or during the piloting of the Science Shop, there is often a reliance on volunteer participation as the procedures for participation might not yet be formalised. In later phases, Science Shops more typically rely on other forms of participation: students and supervisors that engage in Science Shop projects as a part of their studies/work.

When the **Social Innovation Institute Science Shop** (Lithuania) was implementing their first project, it involved a number of students that took part on a volunteer basis. However, in subsequent projects it proved easier to involve students who come to the Institute for internships. This meant less effort to look for students and more formalised responsibilities for project quality. Also, this allows better planning as the internships take place every year at the same time.[73]

2.5.2.2 Stability

Stably operating Science Shops mostly rely on paid implementation staff or established procedures that involve students and researchers.

In the **Science Shop at the European University of Cyprus**, research projects are carried out by students taking research methods courses as part of their degrees. Participation of the faculty members and everyone involved is unpaid but regarded as part of commonly accepted obligations. When the Science Shop receives a research request from a civil society organisation, it is discussed by the Scientific Committee and eventually forwarded to the relevant School(s) of the university. It subsequently reaches the most relevant department and the faculty member that is in charge of a research methods course. The project is then assigned to a student or a team of students[74].

Analysis of Science Shop cases reveal situations when factors related to implementation staff can work as an impediment to growth. For example, if a Science Shop receives a high number of requests from civil society organisations, it has to have access to more students to implement them all. In such cases, the interests of students and availability of supervisors can become a limiting factor. For NPOs that do not have direct access to universities, availability of implementation staff is related to external funding and can therefore also limit the number of projects that can be undertaken. The issue of project implementation is also problematic for those NPO-based Science Shops that heavily rely on volunteers. Even if they manage to involve volunteers on an ongoing basis (as with Ibercivis Spain, mentioned above), this nevertheless means that only a limited number of projects can be implemented and expansion is difficult.

[73] See deliverable 2.2 (Garrison 2018)
[74] Ibid.

When addressing the challenge to identify appropriate Master's students to be involved in its projects, the **Living Lab for Health (Spain)** is keen to build a bigger platform of Master's students that could be involved in their work. However, another challenge is finding appropriate academic supervisors for the students that have the right expertise, particularly as some research institutes require that the supervisor comes from the same institute.[75]

2.5.2.3 Growth

A potential for growth can be changes in curricula which lead to more students undertaking research projects, or special programmes designed to involve more students.

Science shop Language, Culture, Communication at Groningen University (Netherlands) is hoping to ensure the sustainability of its activities as a result of a change to the curriculum that is planned for September 2018, namely the implementation of a career minor (a programme designed to prepare students for the labour market). All students in the faculty will be able to opt to do a project for an external organisation as part of an interdisciplinary team. The Science Shop's role will be to provide suggestions of projects. As a result, projects will be less dependent on individual supervisors and students. It is estimated that a potential 200 students a year will select this career minor.[76]

In 2013, Sydney **University of Technology Shopfront** launched a new programme, UTS SOUL Award, an extra-curricular volunteering programme for students who complete 100 hours of volunteering and training during the course of their degrees. Although this is not specifically designed for work on research projects, it nevertheless presents an example of wider student involvement in community-based work.[77]

2.5.2.4 Decline

If a Science Shop has established procedures for the involvement of staff, this should not be a reason that would cause a decline of a Science Shop. Changes related to implementation staff are more likely to be related to changes in funding, if the end or reduction of funding would mean that the Science Shop cannot hire or keep staff.

2.6 Project types

In serving communities and civil society organisations, Science Shops can perform a wide variety of project activities. While research is the most common type of Science Shop project, particularly at university-based Science Shops, other types are possible too. In this part we will present four different types of activities that we found in the Science Shop cases and project examples analysed for other deliverables of the SciShops project: research, stakeholders debates, services/products, and educational activities, but they are by no means exclusive. All these activities can be performed by all types of Science Shop. Which of these types of activity dominates depends on the organisational model of the Science Shop and on the particular focus of each individual Science Shop.

2.6.1 Different project types

Below are descriptions of four main types of project activities and examples of separate activities or their combinations. All types of project activities are usually very interrelated. The only activity that can be seen as being a separate self-sufficient activity is research, in the case where projects are entirely research-based. However, the very nature of community-based research requires consultation and engagement with local communities, so even research-based Science Shops are not separable

[75] Ibid.
[76] See deliverable 2.2 (Garrison 2018)
[77] Ibid.

from broader activities. Concrete projects run by Science Shops therefore inevitably involve a combination of different activities. Figure 6 provides an overview of the different project types that will be discussed in this section.

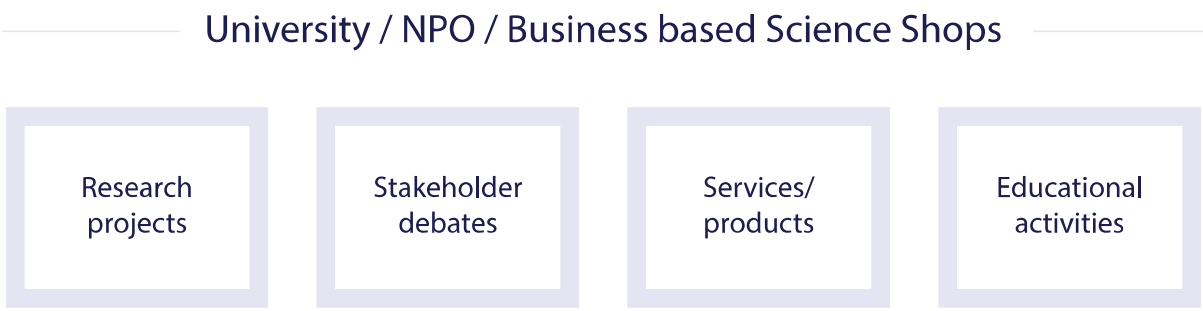

Figure 6: Overview of project types by type of Science Shop

2.6.1.1 Research projects

Research is the most common type of activity undertaken by Science Shops. With research projects, Science Shops respond to the research needs of community organisations. Research projects involve formulating the research question, research design, data collection, data analysis, interpretation and potential recommendations.

Research is the main activity of Science Shops at universities. The aim of university-based Science Shops is related to the needs of students' learning and requirements of coursework and theses. In NPO and business-based Science Shops, research also can be an important part of activity. This depends on the organisation's profile: if a NPOs or SME's main activity is related to research, they have the required knowledge and expertise and it is easier for them to carry out research projects. If an organisation does not work in research, its Science Shop projects might be dominated by other types of activities, such as generating community involvement or practical engagement.

Research projects often take form of applied research but can sometimes develop in a more fundamental research direction. Particularly at universities, research projects include a more theoretical approach to a research topic – unless a theoretical component is missing, it may be that the work is not regarded as suitable for a coursework or thesis. However, in most cases, the community organisations and NPOs that provide the research request do not require extended theoretical approaches and are more likely to be interested in research results and recommendations. In such cases, to make research more suitable for learning purposes, the project can be made suitable by adding a theoretical component.

When the **Science Shop Language, Culture and Communication** at the University of Groningen (in the Netherlands) started the research project "Shared Literature: Cultural transfer in and through reading groups", it aimed to improve tools to generate successful cultural transfer in reading groups. However, during the process researchers discovered gaps between practice and theory and gained new insights into how to expand the cultural transfer theory and develop further research.[78]

"**The Chemistry Shop Groningen** was asked to carry out a risk assessment of a large windmill park next to a chemical storage site and transportation route, which meant a lot of calculation work but no methodological development. In discussion with the research group supervising the student, the project was enlarged to include a comparison between this risk and the risk of an equally large gas-fired electricity plant. Comparing local and global (CO2) risks was seen as more complicated and scientific. The student worked for three months on the case and for three months on the theory.

[78] See deliverable 2.5 (Stanescu 2018)

The client was happy with the case results, and the research group with the total package. For the student, it was a complete learning experience."[79]

2.6.1.2 Services/products

Science shop activities can be focused on providing other types of contribution in terms of services, consultations, products, and the like. They are different from research projects in that research projects end with a research report and perhaps recommendations, while projects based around the development of services/products end with a more tangible or practical result. Examples include technical products, feasibility studies, the development of a website, promotional materials and campaigns, videos and visual identities for community organisations.

In many cases, projects related to services/products nevertheless have to include elements of research. Firstly, research might be needed as a project stage to collect information. Secondly, if run by universities, these types of projects need to satisfy the requirements of universities to focus on research and train students in research methods. In many cases, by providing certain expertise, the Science Shop is filling a skills gap for the community organisation, which does not have the in-house expertise to undertake this type of development work.

Hypothetically, these types of projects might be very much applicable to business-based Science Shops, since they could provide free services to community organisations in their main area of work, e.g. IT services (creating a website, a database) or consultations (in law, marketing, communication, etc.).

The aim of **Bonn Science Shop**'s project on "Green instead of Gray – Industrial Parks in Transition": is the greening and the long-term sustainable development of industrial parks. The project includes consultations and involvement of a wide range of stakeholders, such as experts, businesses, government and citizens. Areas investigated include the design of parking spaces, the use of building materials and planting of vegetation.[80]

Vilnius College of Technologies and Design Science Shop (Lithuania) in its project "Design of public space in a building plot", commissioned by the community of an urban area of Vilnius is aimed at defining the possibilities of design of a public space corresponding to the needs of the community. The result here has been analysis of documents of urban planning; a feasibility study of the design of the public space in the building plot; and proposals for design.[81]

2.6.1.3 Stakeholder debates

Science shops projects can involve other civil society engagement activities such as round table discussions, focus groups, world cafés, which are aimed at finding solutions to societal, environmental or other problems. These public engagement activities can involve different kinds of stakeholders: NPOs, communities, higher education institutions, decision makers, etc.

As mentioned earlier, many projects use a combination of activities that involve both research and public engagement, and which can be described as community-based participatory research or using an action research methodology.

The Science Shop **Environmental Social Science Research Group** (Hungary) ran a project on "Forgotten citizens of Europe: Participatory Action Research for Local Human Rights" where the aim

[79] Livingknowledge website, FAQ: 3. Working with students and researchers, available at: http://www.livingknowledge.org/science-shops/faq/faq-fragen/faq-frage-3/

[80] see deliverable 2.2 (Garrison, 2018); https://www.wilabonn.de/projekte/786-gewerbegebiete.html

[81] See deliverable 2.5 (Stanescu 2018)

was to explore local human rights problems and experiences of Roma communities in Southern Hungary. In order to achieve this aim, researchers and students performed research to investigate the Roma people's perception and evaluation of their living conditions, organised discussion groups with Roma communities and local experts, and built a network among local stakeholders, professionals, activists, schools, and the municipality. As a result, the main problems for Roma people were identified and one key solution to the complex problems was generated.[82]

2.6.1.4 Educational activities

Education is another type of project activity conducted by Science Shops. Some Science Shops focus on educational programmes combined with public engagement activities. These are carried out with and for the community with the aim of transformative change. Educational activities can be provided as classroom activities (experimental workshops, courses and seminars) and/or educational resources available online (e.g. videos, virtual experiments, online serious games, games to engage young people in a dialogue), experiment protocols, teaching guides).

The **Living Lab for Health** (Spain) carries out projects for health promotion and transformative change of the R&I system that are co-developed with different stakeholders, including the scientific and education communities, policy makers, business and industry, civil society organisations and citizens in general. These projects include educational programmes and participatory programmes related to research and innovation (R&I) and governance, and they are carried out with and for the community. One of these projects, "Xplore Health", is part of a European educational programme to promote health by facilitating decision making based on scientific reasoning. The educational programme is structured in eight thematic modules and is offered online and through a network of pilot educational centres, research centres and science museums located in different parts of Spain[83].

Table 6: Advantages and disadvantages of the different types of project activities

Type of project activity	Advantages	Disadvantages
Research	● Possibility to train students in research implementation, data analysis and reporting ● Possibility to use knowledge expertise of scientific institution	● NPOs and SMEs can lack scientific personnel and students for implementation of research on their own without outside help
Stakeholders debates	● Can be used by NPOs and SMEs that lack expertise in research and available human resources ● Easier to involve other stakeholders from civil society and decision makers	● Without research evidence, these debates can lack scientific arguments ● Universities can be less keen to use stakeholder debates as the main activity of students undertaking scientific projects for course papers, BA, MA thesis, and

[82] Ibid.

[83] http://www.irsicaixa.es/en/livinglabhealth

		require expert facilitation, etc.
Services/products	• Responds to very practical demands of civil society organisations (IT products, design, etc.) • This is an option for NPO and business based science shops that have limited expertise in research and available human resources	• Restricted scientific usability of this activity for universities
Education	• Increase public knowledge and awareness about the latest scientific developments	• Public is only passively involved

2.6.2 Key developments related to project types

A number of key developments can be identified that relate to the types of activities a Science Shop can undertake. Below, we outline several developments that apply to specific phases of the life cycle of the Science Shop and provide examples of existing Science Shops.

2.6.2.1 Establishment phase

During the establishment phase or even in pilot projects, the Science Shop needs to find the most appropriate type of projects that are the best for the available resources and competences. The decision here is highly dependent on available knowledge resources. Organisations ideally should undertake projects that utilise their strengths, be they in research, education, services/products, public engagement, or some combination of activities. Therefore, it is worth undertaking a SWOT analysis to identify the strengths of the organisation and the most appropriate project activities.

Universitat Oberta de Catalunya (UOC) Science Shop, during its establishment phase, made an in-house analysis of state-of-the-art participatory research and a review of internal staff support for this type of activity.[84]

There may also be possibilities to fill gaps in knowledge about project activities (for example public engagement methods, community based participatory research, or action research methodology, etc.) via training or the use of suitable guides and tools. Science shops can take an advantage of opportunities for professional development, e.g. summer schools on Science Shops, internet resources (e.g. on the Living Knowledge website or other toolkits) and attend relevant conferences and training courses. Giving more attention to training and using relevant tools can be another important key development for starting project activities of high quality.

Adam Mickiewicz University's Science Shop (Poland), during the establishment phase, provided preparatory workshops for potential supervisors on participatory research and organised study visits to other well-established Science Shops (in Berlin, Germany; Cork, Ireland; and Budapest, Hungary) in order to prepare the academic staff that will be supporting students in undertaking the Science Shop projects.[85]

[84] See deliverable 2.2 (Garrison 2018)

[85] See deliverable 2.2 (Garrison 2018)

Other key developments include a changing university or academic environment, for example, as there becomes increasing emphasis in university policy on the impact of research. This could mean a variety of things, but the main thrust is that the knowledge generated in the universities should have relevance to and play a transformative role in society. Examples include the 'impact' score in the United Kingdom Research Excellence Framework (an exercise which ranks the universities research, http://www.ref.ac.uk/) which in 2021 will count for 25% of the total ranking. This is important given that this score provides the basis for much of the funding of universities.

There are corresponding criteria in other countries, such as the 'third mission' of the universities in Sweden and elsewhere (apart from the first two missions of research and teaching). Similar policies have been institutionalised in many countries in order to serve societal needs and these sometimes also include the needs of the private sector. These demands on the universities are bound to increase in a climate of increasing economic constraints. These developments can lead to higher demand and consequently increased support of the university administration to perform community-based research, provide services and/or produce products for local communities, and also for civil society organisations.

Adam Mickiewicz University's Science Shop (Poland) was established because of the need to develop the third mission of university to address growing societal and economic challenges, so the Science Shop with its main community-based research activity was a natural consequence of this interest and involvement.[86]

2.6.2.2 Stability and growth

During this phase, Science Shops can undertake new project activities that had not previously been performed. Even well-established Science Shops will want to keep abreast of and incorporate new trends in community-based research and public engagement methods. Thus, training again is one of important key developments for the empowerment of staff to work on more sophisticated participatory research and other types of project activities.

Science Shop Language, Culture and Communication at University of Groningen (the Netherlands), even though it has more than 30 years of experience, still values training for improvement of projects activities. In 2017, the senior coordinator took part in an online course on knowledge mobilization run by the University of Guelph, Canada, while a junior coordinator, who started in 2017, attended a summer school at the Living Knowledge Conference in 2018.[87]

Participation in new types of activities such as citizen science, public engagement, may also be considered a key development as it broadens the range of experience and knowledge that the Science Shop can offer in the future.

2.6.2.3 Decline

A change of project types performed by a Science Shop is not a factor of decline as such, but rather a result of changes in other aspects. Most likely, it could be related to loss of coordination or implementation staff. For example, independent Science Shops that have a partnership with a university e.g. providing access to academic supervisors and students might struggle to continue with research projects if the supervisors are no longer willing to participate or if they do not supply students to undertake the projects. Or, if a staff member with particular expertise in a certain activity leaves the science, the Science Shop may not be able to undertake some types of projects.

[86] Ibid.
[87] ibid.

2.7 Thematic scope

Science shops can cover a variety of scientific disciplines, ranging from natural sciences to social sciences and humanities, from environmental sciences to IT, design and other applied sciences. An important message for those who want to establish a Science Shop is that it does not have to cover the whole range of disciplines – there are plenty examples of Science Shops that operate in one particular field, e.g. social research, environmental issues, health issues, etc. The focus of a Science Shop should be based on access to expertise in a particular discipline as well as potential demand.

Thus, the thematic scope can be narrow if a Science Shop focuses on a particular topic or broad if a Science Shop's activity encompasses a range of different disciplines. This is a distinction between specialised and multidisciplinary Science Shops. In reality, the definition of thematic scope might be viewed as a continuum, from very narrow to broader or almost universal coverage.

These options can be applicable to all types of Science Shops. However, because NPO and business based Science Shops tend to be smaller than university based Science Shops, it is more likely that the former have specialised Science Shops. At universities, the thematic scope is related to the organisational model. If a university-based Science Shop operates at one faculty, Science Shop projects usually only focus on topics that fall within the faculty's field of research. If a Science Shop is centralised and covers all faculties of the university, its topics will include more or less all fields of science studied at the university.

The decision to choose a narrow or wide thematic scope depends on the supply of knowledge and expertise that is available within the organisation and/or whether it has access to external human resources and expertise.

2.7.1 Thematic Scope options

In the following section, the different options in terms of thematic scope are presented in more detail. Figure 7 provides an overview of the identified options for each type of Science Shop.

Figure 7 Overview of thematic scope options by type of science shop

2.7.1.1 Specialised Science Shops

There are many specialised Science Shops which do research in one particular thematic area. In the case of universities, this is typical for faculty-specific Science Shops. In the case of NPO and business-based Science Shops, it is usually related to the particular expertise of the NPO or SME.

Examples of specialised university-based Science Shops:

- **Science Shop Language, Culture and Communication**, which is part of the Faculty of Arts, University of Groningen, Netherlands;
- **InterMEDIU Bucharest** at the University Politehnica of Bucharest (Romania), which has a focus on environmental issues.

Examples of specialised NPO-based Science Shops:

- The **Living Lab for Health** at the IrsiCaixa AIDS Research Institute in Spain carries out project and programmes for health promotion and transformative change of the R&I system;

- **Wissenschaftsladen Potsdam e.V.** (Germany) is active in applied research in natural sciences, engineering and science with and for society;
- The **Institut für gesellschaftswissenschaftliche Forschung, Bildung & Information (FBI)** (Innsbruck, Austria) carries out research projects in the field of science with and for society/social sciences;
- The **Institute of Social Innovations Science Shop** (Vilnius, Lithuania) has a focus on social sciences.[88]

However, a specialised Science Shop does not necessarily have to reject research requests that do not fall under the thematic focus of the Science Shop as it can redirect the request to another Science Shop, particularly if there is a regional network of Science Shops that unites Science Shops operating within the country.

The **Science Shop Network in Flanders** allows organisations to submit any question to the centralised database. Afterwards, the question is allocated to the Science Shop with the relevant expertise[89].

2.7.1.2 Multidisciplinary Science Shops

There are also Science Shops that have a wide thematic focus. It is more typical to find such Science Shops at universities that have centralised Science Shops, although there are also examples of more widely focused NPO based Science Shops.

Examples of multidisciplinary university-based Science Shops:

- European University Cyprus (EUC) Science Shop (Cyprus)
- UOC Science Shop at the Universitat Oberta de Catalunya (Spain)
- UTS Shopfront Community Program at the University of Technology Sydney (Australia)

Example of a multidisciplinary NPO-based Science Shop:

- **Bonn Science Shop** (Germany) is active in applied research on several topics. This NPO is a good example of how a single Science Shop has worked on a wide number of topics since its founding in 1984. It has adjusted to different, though mainly environment-related, needs, over the course of time.

Table 7: Advantages and disadvantages of the different thematic scope options

Thematic scope	Advantages	Disadvantages
Specialised	● Possibility to concentrate knowledge resources ● Easier to position as a science shop with a particular focus	● Restricted range of societal requests or lack of requests, especially if science shop orients itself to work on a very marginal topic
Multidisciplinary	● Can serve a broader range of societal requests	● More difficult to ensure the availability of experts and students in different topics

[88] See deliverable 2.2 (Garrison 2018)

[89] http://www.wetenschapswinkel.be/Homepage/

2.7.2 Key developments related to thematic scope

Thematic scope is not a kind of aspect that is likely to influence growth or decline of a Science Shop but is rather a manifestation or indication of growth or decline. It is dependent on other factors, most notably organisational model and staff.

2.7.2.1. Establishment

Newly established Science Shops, particularly at the pilot stage, are more likely to start with a limited scope of topics and to expand to include more topics later.

2.7.2.3. Growth

A Science Shop could broaden the range of topics it covers by expanding from one faculty to other faculties (at universities) or involving new team members from other research fields (at NPOs and business-based Science Shops). Similarly, Science Shops could join (or establish) regional Science Shop networks that combine their expertise in order to address a wide range of research topics.

Another development affecting the thematic scope of Science Shops is the increasing growth and emphasis on cross-, trans-, inter- and multi-disciplinary research, and also research that incorporates more and more diverse types of teams, stakeholders and modes of engagement. This development is hard to quantify, but it ranges from increasing collaboration between new organisations and universities, the establishment of multidisciplinary centers, the increasing attention paid to public engagement with science, and the establishment of interdisciplinary project teams. These trends relate to the external and changing environment of research.

2.7.2.4. Decline

If a multidisciplinary Science Shop fails to maintain a sustainable operation, instead of closing it, it could narrow its focus to become centered around one faculty, or a particular research topic based on external demand.

Green office living lab at the Catholic University (KU) of Leuven is a remnant of a previous Science Shop initiative at KU Leuven. It only conducts projects on sustainability issues within the university. Yet it is still linked to the Science Shop network in Flanders and refers students to other Science Shops for questions related to different topics.[90]

[90] https://www.kuleuven.be/duurzaamheid/living-lab-green-office

3. Conclusion

The analysis of the variety of options available to Science Shops on different aspects related to their functioning, as well numerous real-life examples on how Science Shops operate, are intended to demonstrate the idea that every Science Shop can develop its own unique scenario of development. These scenarios involve different combinations of options related to key aspects – organisational model, funding, infrastructure, coordination and implementation staff, project type, and thematic scope. Although some options might be more typical than others, they still represent a great variety and provide many flexible combinations.

These options are relevant at every stage of a Science Shop's life cycle: they have to be decided when a Science Shop is being established and their choice has to ensure a stable operation of a Science Shop after its establishment. But a Science Shop will also be influenced by key developments over time and both internal and external factors that impact the life cycle of a Science Shop, including its growth or decline. Thus, the scenarios of Science Shop development are highly contextual and dependent on changes in the environment.

Some major differences (and most typical scenarios) can be noticed between Science Shops based on their organisational models, especially university versus NPO-based Science Shops. The exploratory model of a business-based Science Shop constitutes a third use case although it appears to be more similar to an NPO-based Science Shop. University-based Science Shops have more advantages because of potentially better access to continuous secured funding, direct accessibility to students and supervisors, better access to infrastructure (laboratories, libraries, dissemination channels, etc.). Thus they can normally conduct more projects on a wider range of topics. On the other hand, Science Shops based at NPOs, and possibly businesses, are not dependent on governmental or university educational policies and requirements. This means that they can therefore be more independent, flexible and creative, as well as more involved in action research, facilitation of stakeholder engagement, and the production of services and products for civil society more than research-oriented universities.

It is helpful to look at the development of Science Shops as a non-linear process. Those Science Shops that have existed for a long time have their moments of growth and decline, which can lead to discontinuity or renewal of the Science Shop. These critical moments require the Science Shops to react to changes in the environment and rethink the key aspects of a Science Shop's operation. During the different life cycles, a Science Shop's organisational model might change, different kinds of staff could be involved, the thematic scope may widen or narrow, different project types might be undertaken, and funding options might be expanded, secured or, alternatively, lost.

In further sections of the conclusions we provide an overview of options related to the key aspects, an overview of the key developments and their interdependencies, as well as a future outlook on the development of Science Shops.

3.1 Overview of options

The aim of this deliverable has been to illustrate the diversity in operational models of Science Shops. The main message of this discussion is that there is no one-size-fits-all when it comes to running a successful Science Shop. A Science Shop should always adapt to the local context and opportunities. Table 9 provides a summary of all operational options that were discussed in the previous sections.

Table 8: Summary options key aspects

Key aspect	University	NPO	Business
Organisational Model	• Pop-up science shop / pilot project • Science Shop established within a university • Centralised Science Shop • Faculty specific Science Shop • Regional Science Shop	• Pop-up science shop / pilot project • Science Shop established within an NPO • Independent legal entity	• Pop-up science shop / pilot project • Science Shop established within a company
Funding	• Mother organization • Project grants • Social entrepreneurship • Other	• Mother organization • Project grants • Social entrepreneurship • Charitable grants • Other	• Mother organization • Project grants • Other
Infrastructure	• Mother organization • Online platform	• Mother organization • Private building • Renting office space • Sharing with other organization • Online platform	• Mother organization • Online platform
Coordination Staff	• Part-time university staff • Hired staff • Students	• Part-time NPO staff • Hired staff • Student interns • Volunteers	• Part-time SME staff • Hired staff • Student interns
Implementation Staff	• Lecturers/researchers • Students: thesis, course-work, internship • Volunteer researchers or students • Other	• NPO staff • Students: internship • Volunteer researchers or students • Other	• SME staff • Students: internship • Volunteer researchers or students • Other
Project types	• Research projects • Services/products • Citizen debates • Educational activities	• Research projects • Services/products • Citizen debates • Educational activities	• Research projects • Services/products • Citizen debates • Educational activities
Thematic scope	• Multidisciplinary • Specialised	• Multidisciplinary • Specialised	• Multidisciplinary • Specialised

3.2 Interdependencies

In the previous sections, little attention was devoted to the interdependence between different operational characteristics and key developments of the Science Shop. In this section, we want to elaborate on how certain changes in one key aspect will have important consequences for other organisational aspects. Figure 8 depicts the most important relationships between the key aspects. Of

course, not all possible relationships are included in this figure. Yet we want to highlight some important relationships that will provide insights for people who are interested in running Science Shops. For reasons of parsimony in the graphical representation, coordination staff and implementation staff are combined under one heading.

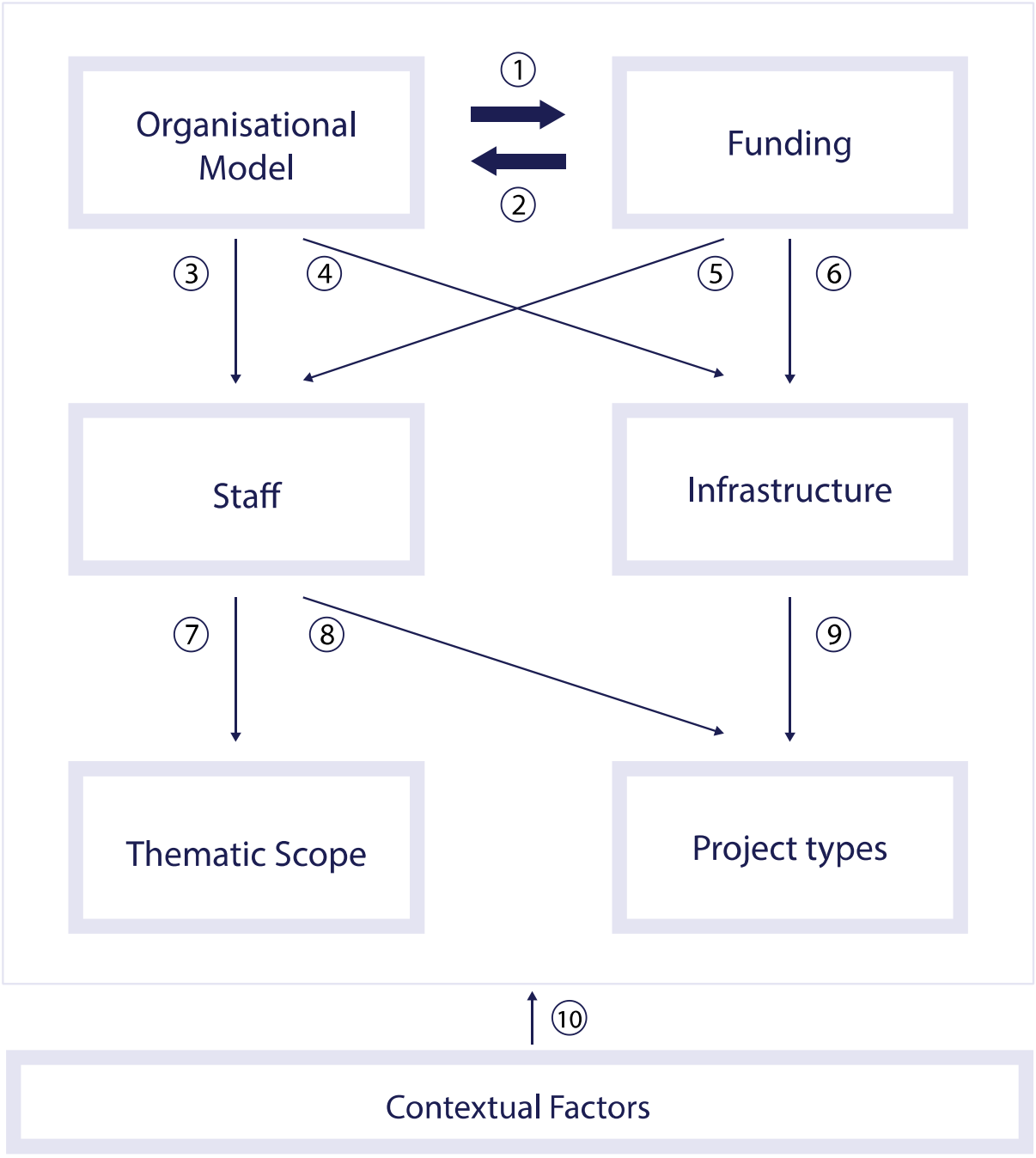

Figure 8 Dependencies between key operational aspects

Figure 8 illustrates that the most interdependent key aspects are the organisational model and funding of the Science Shop. Most other key aspects rely, at least to some extent, on these two characteristics. In addition, the figure accounts for the importance of contextual factors outside of the control of the Science Shop. These include cultural, political and economic factors in society as a whole. We briefly discuss each interdependency in more detail:

1. Impact of organisational model on funding: The organisational model has a major impact on the available funding options for a Science Shop. There are many examples of this dependency. For instance, Science Shops that are based within a mother organisation will in most cases depend partly

on the mother organisation for funding. On the other hand, the legal status of the Science Shop will sometimes make it eligible for specific types of funding. Science shops that are registered as a charity are eligible for charitable grants, while Science Shops that are registered as NPOs are eligible for donations or tax benefits in some countries. In addition, Science Shops that are based at for-profit organisations might not always be allowed to apply for publicly funded project grants.

2. Impact of funding on organisational model: Similarly, funding can also have an important impact on the organisational model of the Science Shop. One frequent example that was listed in the key developments is the decision of the mother organisation to stop funding the Science Shop. In this scenario, Science Shops either cease to exist or branch out of the mother organisation and establish an independent legal entity.

3. Impact of organisational model on staff: The organisational model has some important consequences for the staffing options of the Science Shop. Science shops based within a mother organisation have the advantage that they can be more flexible with their coordination staff, allowing them to incorporate the coordinating tasks of the Science Shop in the everyday activities of staff. In addition, they have a lot of in house expertise in terms of administrative staff. Moreover, Science Shops based at universities have access to the academic expertise of staff for the implementation of research projects and can involve students in the process as part of their coursework or master theses. Of course, independent Science Shops can also rely on students for conducting research projects, but in this case, they will have to take on student interns or collaborate with a university or other educational institution.

4. Impact of organisational model on infrastructure: Science shops based within a mother organisation often use the infrastructure of the mother organisation. This is particularly relevant in the case of Science Shops that are based at universities where they have access to laboratories, libraries etc.

5. Impact of funding on staff: The impact of funding on staff is rather straightforward. With more financial resources, the Science Shop can hire more (professional) staff for the coordination and implementation of projects and can therefore increase the quantity and quality of projects. The Science Shops that struggle with funding might have to reduce (paid) staff and rely more on the commitment of volunteers/students.

6. Impact of funding on infrastructure: Funding has an impact on infrastructure in several ways. Access to infrastructure is in many cases part of the funding agreement of a Science Shop. For instance, Science Shops based at a mother organisation will in most cases rely on the infrastructure of the mother organisation. Similarly, independent Science Shops sometimes reach agreements with other organisations that include the use of office space and infrastructure. Science shops that do not have an agreement with another organisation can rent or acquire office space for themselves. However, this option can be quite expensive. Without sufficient financial resources, Science Shops can choose to work from home offices. It can be noted here that even online platforms, though they are in some respects less resource intensive than physical (office-based) infrastructures, still need resources for maintenance and technical support, in addition to other staff.

7. Impact of staff on thematic scope: The thematic scope of a Science Shop is always reliant on the expertise of the implementation staff working with the Science Shop. The Science Shop can only coordinate research projects on a particular topic if they can find someone with the required expertise for the supervision/implementation of the project.

8. Impact of staff on project types: Similarly, the competencies of staff will also have an important impact on the types of projects that the Science Shop can undertake. For example, research projects require a lot of research experience and knowledge of methodology. On the other hand, organising citizen debates or knowledge cafés requires skills related to event management and facilitation. These two activities require very different skill sets.

9. Impact of infrastructure on project types: The type of projects undertaken by a Science Shop will also depend on the available infrastructure. For example, Science Shops that are based at a mother organisation can organise events (knowledge cafés, citizen debates, etc.) more easily because they can often use the facilities of the organisation free of charge and the host organisation often has experience of organising events. Similarly, Science Shops based at universities usually have access to the required resources for the implementation of research projects (most notably laboratories needed for certain research projects or access to subscription-based academic publications).

10. Impact of contextual factors on the operations of the Science Shop: To conclude, it should be stressed that any Science Shop will also experience the influence of external factors. For example, Science Shops tend to thrive in societies where civil society is relatively strong and well organised. Similarly, public funding opportunities will vary from country to country. Moreover, the Science Shop methodology (and CBPR in general) may be less known or less of a priority in some countries or universities.

3.3 Future outlook

When thinking about the future of Science Shops, there are at least three groups of changes in Science Shops' environment that have to be discussed: the changing nature of the universities and the increasing demand for the impact of research; the shift towards online collaboration and engagement; and an environment of increasing distrust in science, expertise and research.

First, there is increasing emphasis in university policy on the impact of research, which means that knowledge generated in the universities should have relevance to and play a transformative role in society. Examples (mentioned previously) include the 'impact' score in the United Kingdom Research Excellence Framework, the 'third mission' of universities and similar criteria in other countries. The increasing demand for the impact of research can be seen as an opportunity for the rationale for Science Shops.

Second, a number of trends are pushing towards research and engagement with research taking place more in the online context. For example, the field of citizen science provides successful examples on almost exclusively online efforts such as Galaxy Zoo[91]. Apart from online collaboration and mobilisation, the public is also increasingly engaging with science and research online.

Third, the recent financial crisis, success of populist movements, concern about the spread of misinformation online and a rising distrust of traditional media have changed the environment for public engagement in science. For example, about half of Europeans do not trust scientists[92], and there is a limited trust in science, among some parts of population and for some issues at least, in the USA[93]. There is also evidence that there is a growing distrust of experts[94]. In this changing environment, it will be crucial to consider how the objectivity and autonomy of scientific expertise can be maintained.

One point to note is that, despite the changing climate for science, it could also be seen as opportunity. For example, in recent years there have been large protest marches for science, organised by scientists and civil society groups, around the world. These marches, and other mobilisations on behalf of environmental and community issues, have shown that calls for reliable research and a well-informed public are also getting stronger, and this could provide fertile ground in support of creating and sustaining Science Shops.

What do all these changes mean for future scenarios of Science Shop development, in terms of the options discussed in this deliverable?

Increasing emphasis on impact of research level and need to build trust in science in society indicates an opportunity for Science Shops to demonstrate their value. Thus, potentially it means a more

[91] http://zoo1.galaxyzoo.org/

[92] Special Eurobarometer "Science and Technology" (2010)

[93] http://www.pewinternet.org/2017/12/08/mixed-messages-about-public-trust-in-science/

[94] Mounk (2018)

favourable environment in terms of funding and sustainability, which were identified as the two main challenges in this project's literature review, survey and case studies, as well as this deliverable. However, harnessing of these opportunities will depend on the ability to demonstrate the impact (this relates to the question of impact assessment, analysed in other deliverables) and networking, which would allow maximising the benefits of EU policies and engaging more efficiently in marketing and lobbying.[95]

The more networked future has already been demonstrated by a number of regional and international initiatives which are also becoming more institutionalised. In existing Science Shops networks (e.g. Living Knowledge, which also has online presence) Science Shops share knowledge, best practices, methods and tools for activities, participation in mutual visits, projects, etc. Another benefit, particularly for regional networks, can be the transfer of civil society requests from one Science Shop to another, following the example of the Science Shop Network in Flanders, which allows organisations to submit any question to a centralised database, which subsequently is allocated to the Science Shop with the relevant expertise. None of these efforts entail that the problems of funding and sustainability have been overcome, but Science Shops will need to adapt to a changing external environment.

The increasing shift towards online research collaborations and public online engagement in science means that resources for Science Shops will likely increasingly be located online and communities sustained with an online presence. This possibility was already in our scenarios under the key aspect of infrastructure. Although there could be an objection to this shift, based on the assumption that Science Shops are mainly offline, rooted in specific places or face-to-face communities (as the collocation in the phrase 'community based participatory research' implies), this should not be seen as dichotomy, as online and offline typically go hand-in-hand rather being mutually exclusive. Moreover, successful examples of exclusively online engagement efforts and initiatives in our analysed scenarios make it possible to imagine Science Shops that are entirely online in the sense that the demand comes via an online channel (like a website) and this demand is met by an online response (answering questions or providing online tools for organising).

Of course, there are risks in moving towards online Science Shops: the involvement of malicious actors, actors that seek to spread misinformation or uncertainty (a strategy that has been adopted by climate change sceptics[96]), and 'clicktivism' or shallow involvement. Nevertheless, these risks must be weighed against the advantages, which include low cost and large-scale and geographically far-ranging involvement, as well as opportunity of wider implementation staff involvement. Thus, the online option offers opportunities for Science Shops that could be harnessed if they manage to balance risks in online information environment with opportunities for mobilising networks for collaboration and engagement.

Finally, Science Shops have to address the issues of trust in science by maintaining neutrality and objectivity of expertise in an environment of distrust. This is particularly relevant for company-based Science Shops, a model that was explored in this deliverable and where the SciShops.eu project aims to innovate. In this case, there is potentially distrust in science when there is dependence on industry and private funding.[97] Thus, while company-based Science Shops could be a good opportunity for businesses to exercise social responsibility, they will have to be particularly sensitive when dealing with Science Shop projects and put great effort into establishing trust both in the community and with the Science Shop community. At the same time, in this case the rewards can more than justify overcoming this challenge.

In general, these trends indicate that we can expect only a growing variety of Science Shop scenarios, as the concept becomes further differentiated and adapted to a changing environment, as new ways of collaboration and stakeholder involvement emerge, and also as new organisational models are explored and lead to new forms of adaptation.

[95] Fisher, Shophaus and Leydersdorff (2004)
[96] Oreskes and Conway (2011)
[97] Special Eurobarometer "Science and Technology" (2010)

4. References

Fischer, C., L. Leydesdorff, and M. Schophaus (2004). Science shops in Europe: the public as Stakeholder. *Science and Public Policy, 31* (3), 199-211.

Garrison, H., I. Gečienė, L. Nevinskaitė, and J. Kleibrink (2018). *ENHANCING THE RESPONSIBLE AND SUSTAINABLE EXPANSION OF THE SCIENCE SHOPS ECOSYSTEM IN EUROPE D2.2 Existing RRI tools and successful participatory community-based research case studies report.* SciShops.eu project deliverables, p.1-93. Available at https://project.scishops.eu/wp-content/uploads/2018/03/SciShops.eu_D2.2-Existing-RRI-Tools-and-Successful-Participatory-Community-Based-Research-Case-Studies-Report.pdf

Hende, M. and M. S. Jørgensen (2001). *The impact of Science Shops on university curricula and research.* SCIPAS report nr. 6.

Jung, S., and J. Kleibrink (2018). *ENHANCING THE RESPONSIBLE AND SUSTAINABLE EXPANSION OF THE SCIENCE SHOPS ECOSYSTEM IN EUROPE D2.4 Existing Science Shops Taxonomy*. SciShops.eu project deliverables, p. 1-162.

Mounk, Y. (2018). *The People vs. Democracy: Why Our Freedom Is in Danger and How to Save It.* Cambridge MA: Harvard University Press.

Oreskes, N. and Conway, E. M. (2011). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. Bloomsbury Publishing USA.

Sijbrandij, J. S. (2017). *Counter-research: A history of Science Shops in the Netherlands.* Utrecht: Universiteit Utrecht, p. 1-77. Available at *https://dspace.library.uu.nl/bitstream/handle/1874/357885/3865916.pdf?sequence=2*

Special Eurobarometer "Science and Technology". 2010. Available at: http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_340_en.pdf

Stanescu, R., C. S. Ionescu, H. Garrison, J. Kleibrink, S. Jung, I. Gecience, and L. Nevinskaite (2018), *ENHANCING THE RESPONSIBLE AND SUSTAINABLE EXPANSION OF THE SCIENCE SHOPS ECOSYSTEM IN EUROPE D2.5 Existing Science Shops Assessment.* SciShops.eu project deliverables, p. 1-110. Available at https://project.scishops.eu/wp-content/uploads/2018/06/SciShops.eu_D2.5-Existing-Science-Shops-assessment.pdf

Websites

www.cesinstitute.ca
retrieved on 14.06.2018

www.qub.ac.uk/sites/ScienceShop
retrieved on 14.06.2018

www.wetenschapswinkel.be/Homepage
retrieved on 14.06.2018

www.transitsocialinnovation.eu/sii/living-knowledge-4
retrieved on 14.06.2018

www.transitsocialinnovation.eu/sii/living-knowledge-1
retrieved on 14.06.2018

www.wetenschapswinkel.be/Homepage
retrieved on 14.06.2018

www.scishops.eu
retrieved on 14.06.2018

www.livingknowledge.org/fileadmin/Dateien-Living-Knowledge/Dokumente_Dateien/Toolbox/LK_D_Blueprintbudgetproposal.pdf
retrieved on 14.06.2018

www.rug.nl/society-business/science-shops/taal-cultuur-en-communicatie/contact
retrieved on 14.06.2018

https://www.kuleuven.be/duurzaamheid/archief-1/greenofficeeng
retrieved on 14.06.2018

http://greenofficeforkuleuven.be/#projects
retrieved on 14.06.2018

www.vub.ac.be/onderzoek/wetenschapswinkel#onderzoeksrapporten-
retrieved on 14.06.2018

www.wur.nl/en/Education-Programmes/science-shop/Testimonials/Show/Concrete-dietary-advice-for-hemochromatosis-patients.htm
retrieved on 14.06.2018

edepot.wur.nl/210766
retrieved on 14.06.2018

www.livingknowledge.org/science-shops/faq/faq-fragen/faq-frage-3
retrieved on 14.06.2018

www.wilabonn.de/projekte/786-gewerbegebiete.html
retrieved on 14.06.2018

www.irsicaixa.es/en/livinglabhealth
retrieved on 14.06.2018

www.kuleuven.be/duurzaamheid/living-lab-green-office
retrieved on 14.06.2018