InSPIRES

Ingenious Science Shops to promote Participatory Innovation, Research and Equity in Science

D2.1:
Results of the Systematic Literature Review
Analysis of the Interviews

This deliverable contains both the results of the systematic literature review (page 2 - 27) and the analysis of the interviews performed to Science Shops and participatory research key players at international and national levels (page 28 -64).

The two exercises have been undertaken as separated exercise and are hereby presented as such.

SYSTEMATIC LITERATURE REVIEW

Submission date: 31/01/2018
File name: D2.1: Results of the Systematic Literature Review
Dissemination Level: Public
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GA 741677

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ABSTRACT

Background

Science Shops facilitate participatory research projects that respond to the needs of civil society organisations and include students in the work process, thereby creating synergies between social issues and scientific development. After a period of decline, this research approach has regained attention in the last 15 years and is now seen as a facilitator of the responsible research and innovation (RRI) concept strongly promoted by the European Commission in its H2020 research and innovation programme. Since social and political contexts have changed since the model's inception, science shops have had to adapt in response to changes in societal and political environments to ensure their sustainability. With this review, our objective was to identify conceptually-driven criteria that could guide the future development and evolution of the science shop model(s).

Methods

We performed a qualitative systematic review of the literature to identify the key elements that make science shops efficient for all stakeholders. We searched eight databases (PubMed, Scopus, Web of Science, the Cochrane library, Cairn, LILACS, WHO Global Health Library, 3ie Impact Evaluation Repository) in three languages (English, French and Spanish) to gather information on the mechanisms under study in different settings. We used the thematic theory approach to extract and systematise our results.

Results

Twenty-two scientific articles met the inclusion criteria. Most were written in English, two were in French, and there were none in Spanish. The corpus was very diverse in terms of design because the authors had studied diverse aspects of the science shop mechanism in different settings and at different times. The key aspects identified that should be further explored to improve the future sustainability of science shops were classified into three meta-categories: (i) context-based dependency, (ii) evolution of organisation models (similarities in overall processes with different visions), and (iii) visibility and recognition issues.

Conclusions

The science shop model is an inspiring research approach that provides scientific evidence on social issues, involves actors from diverse sectors, and contributes to the education and training of the next generation. There is no magic recipe that will ensure the success and sustainability of these institutions. They will have to be ingenious and creative to survive in contexts in which their approach apparently does not fit the dominant paradigm. This valuable model deserves to be strengthened and further studied.

1. INTRODUCTION

Research and innovation have changed considerably in the past two decades, with the emergence of new forms of cross-sector collaboration, including participatory models in which science and society work more closely together. One example of such collaboration is the science shop, an approach that facilitates collaborative research projects based on concerns expressed by civil society organisations, which involve students and researchers and prioritise the creation of synergies between social issues and scientific enquiry. The science shop model is one of the few participatory research approaches that involves a broad range of stakeholders. Other than in science shops, it is unusual to see (i) students engaging with social issues during their training in the research process, (ii) researchers creating partnerships with civil society groups and/or disadvantaged groups, and (iii) civil society organisations (CSOs) making contact with formal academic institutions, universities, and research centres.

Furthermore, the concept of Responsible Research and Innovation (RRI) implies that societal actors (researchers, citizens, policy makers, businesses, third sector organisations, etc.) work together throughout the research and innovation process in order to better align the process and the outcomes with the values, needs and expectations of society. However, this approach is still not the norm in research and innovation projects undertaken by the public research and innovation system. In practice, RRI is implemented as a package that includes multi-actor and public engagement in research and innovation, enabling easier access to scientific results, the uptake of gender and ethics in the research and innovation content and process, and formal and informal science education.[1]

The science shop model has proved to be an effective way of incorporating almost all of the components of RRI. Science shops bridge the gap between science and society and foster the design of inclusive and sustainable research that can respond to the “great challenges” of our time. To respond to complex social demands, they usually transcend traditional disciplinary boundaries, preferring to use a multidisciplinary approach. Science shops are based on a bottom-up model, and the concept of co-creation capacitates social actors by bringing together CSOs and research institutions to foster and encourage scientific research that directly responds to the concerns and needs of the civil society actors.

The main goal of the four-year InSPIRES project (project number 741677) is to build effective cooperation between science and society by supporting the growth of science shops and

[1] https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation Accessed, 29th January 2018

supporting the expansion of responsible participatory research and innovation in Europe and abroad that can tackle the key societal challenges affecting the world population.

To achieve our main goal, the project is organised around eight work packages. The first work active package in the project (WP2) started in Month 1 and will continue to Month 14. It includes the baseline study that will lay the groundwork for the activities that will be included in subsequent work packages.

The main challenges of WP2 are to gain a better understanding of the history of science shops and to identify their strengths and limitations, enablers and barriers. The aim is to propose updated models, which we will call Science Shop 2.0 (SS 2.0), that fully integrate the requirements of RRI and the three dimensions of the European Union Open Science (OS) framework (European Commission 2016) as well as a systematic impact evaluation strategy. In this work package, we will also assess how science shops can build and capitalise on public engagement activities to strengthen the capacity of social actors in participatory research and social innovation.

To address these challenges, we designed three key complementary activities: (i) a baseline study involving interviews with key players and a systematic literature review; (ii) a deliberative exercise which will discuss the future development of science shops; and (iii) updating and strengthening the Living Knowledge database.

Our objective is to answer the following questions. What ecosystems could best support science shops to prototype and explore innovative practices and new ways of doing science? How can science shops benefit from existing good practices, develop new ones, and carry out more and better projects with civil society?

Since the beginnings of the movement in the early 1970s, we have witnessed a great interest in the science shop mechanism in many countries in Europe and worldwide. Starting in 1999, through various EU funded projects (PERARES, STACS, TRAMS, ISSNET, SCIPAS etc.),[2] the Living Knowledge Network, the international network of science shops, was consolidated. More than four hundred members are now on the mailing list of the network, which represents an innovative model emphasising the social responsibility of research that directly benefits local communities. However, the 1990s saw the closure of many European science shops and in the 2000s, even the Netherlands (the country where the movement was born) witnessed the demise of several historic science shops. There is therefore some concern about the sustainability of the model, which needs to be addressed.

[2] http://www.livingknowledge.org/resources/library/project-reports/
Accessed on 29th of January 2018.

This deliverable describes and analyses the results of the systematic literature review which was undertaken to provide answers to the following questions:

- How are science shops conceptualised in the sphere of scientific production?
- What are the key factors that could be further explored to ensure the sustainability of the science shop approach in a changing world?

2. STRUCTURE OF THE REPORT

In the following sections, we will explain the reasons for reviewing the literature. We will describe the methods used to select the corpus, including a description and justification of the inclusion and exclusion criteria as well as the databases and search strategy used. We will also discuss the limitations of our study. In section 3, we describe the process used to extract the data and an initial description of the nature of the articles selected. We explain the data collection process, the theory used to systematise the findings and we present the results organised into several analytical categories. These categories were identified in the scientific corpus according to the level of their relevance to our research questions. We discuss and assess the results and suggest how they can shed light on the next steps for the InSPIRES project in section 5. The central focus is on the science shop 2.0 models the project proposes to develop, test, and share with the community. We conclude by proposing directions for future primary research.

3. METHODS

3.1. Why perform a systematic review?

We performed this review because none was available. Our objective was to gather, review and analyse all the scientific evidence on science shops published in scientific journals. The systematic review offers a complete overview of the available evidence, which will provide some answers to our research questions and help to orient the primary research needed to address knowledge gaps (Bearman and Dawson 2013).

A systematic literature review must be comprehensive and be performed in accordance with a rigorous methodology in order to select all the scientific evidence published and present the results in the most objective way. It is a challenging and complex task that requires time and consumes resources, but it provides solid information on where you stand in the academic conversation. A systematic review differs from a narrative review in that the latter tends to be

based on a selection of articles and is therefore more subjective, providing a personal view of the literature. A systematic review is intended to reduce bias and provide a more objective description of the state of knowledge on a specific question (Wormald and Evans 2018).

3.2. Search Strategy: Selection of the Scientific Corpus

As a starting point, we prepared a detailed protocol in accordance with the PRISMA checklist (Liberati et al. 2009, Shamseer et al. 2015), which clearly defined each step of the process. These steps are listed in the following sub-sections.

Five indexing terms were used in the search: “Science Shop” OR “Science Shops” OR “Boutique des Science” OR “Boutique de Science” OR “Bazar de la ciencia”. The choice of the keywords was intentionally broad because we wanted to look at both the science shop structures and the projects arising from the dialogue between civil society, the scientific community and science shops.

3.2.1 Inclusion Criteria

The scope of this literature review was limited to scientific articles on science shops published in peer-reviewed journals. We considered research papers published before 31 December 2017. All the articles included were written in English, French or Spanish.

3.2.2 Exclusion Criteria

Scientific articles identified by the search that were either out of scope or did not mention the science shop approach were discarded. Scientific articles not published in peer-reviewed journals were also excluded from the review.

We also excluded all documents written in other languages and grey literature (statements, policy reports, conference abstracts, reviews, and opinion statements, operational and programmatic reports).

3.2.3 Databases

We searched eight databases: PubMed, Scopus, Web of Science, the Cochrane library, Cairn, LILACS, WHO Global Health Library, and 3ie’s Impact Evaluation Repository. These are the largest and most important databases in the social sciences and health research fields, the

scientific entry points for InSPIRES. They are also representative of the three languages selected for the review. One of the databases searched is dedicated to impact evaluation studies.

3.2.4 Limitations

It could be said that limiting the review to scientific peer-reviewed journals might limit the information on key elements in different settings. The exclusion of grey literature might to some extent be a limitation because, for example, we have excluded reports dealing with previous European science projects. However, these European project reports are frequently cited in the selected articles (i.e. INTERACTS, TRAMS, SCIPAS). This exclusion could give rise to shortcomings and this concern will be discussed below. Nevertheless, one of the main purposes of this literature review was to assess how science shop practices have been conceptualised in the sphere of scientific production. Furthermore, we hope to engage with key players from the Living Knowledge International Network of Science Shops to discuss the findings of this review in the context of their expertise, knowledge and vision.

Another limitation of our work is the selection of only three languages, and particularly the exclusion of Dutch, the language with richest scientific tradition on the subject of science shops. However, since English is the main language of science, we consider that we still get a reasonably good overview of science shops in the European and International context. By adding French and Spanish, our aim was to understand how the concept was taken up, implemented, communicated and evaluated in different traditions and settings.

3.3. Systemising results

3.3.1 Data Collection

The selected articles were summarised using a search extraction form with the following sections: article title; date of publication; date the research was conducted; authors; study design; other stakeholders involved; theoretical/analytical – primary/secondary data; research question; research objectives; country of research; research population; principal research methods used; main results; main conclusions and comments.

We designed the form before processing the search strategy. After a preliminary review at the articles selected, we kept the categories due to the heterogeneous character of the corpus. However, when reading the article, we had in mind our research questions and organised the synthesis accordingly.

3.3.1 Data Synthesis

In order to make the review as systematic as possible by minimising researcher bias to achieve the most accurate possible view of the evidence, we used the thematic analysis method. In general, this is a process involving reading the texts and grouping the findings into key themes (Dixon-Woods et al. 2005) that represent ways of understanding the combined meaning of the data (Bearman and Dawson 2013). Notwithstanding the highly heterogeneous nature of the corpus, several cross-cutting key themes emerged. Some topics were grouped together under a single section because of their interlinked nature. These categories can of course be debated, but the organisation used was designed to follow a coherent and logical order, starting from a macro viewpoint of the situation and narrowing down to results intrinsic to meso and micro levels.

4. RESULTS OF THE SEARCHES

4.1. Results of the search

Figure 1 shows the results of the search based on the process described by the PRISMA Statement. This process has been developed by a group of 29 review authors, methodologists, clinicians, medical editors, and consumers (Liberati et al. 2009).

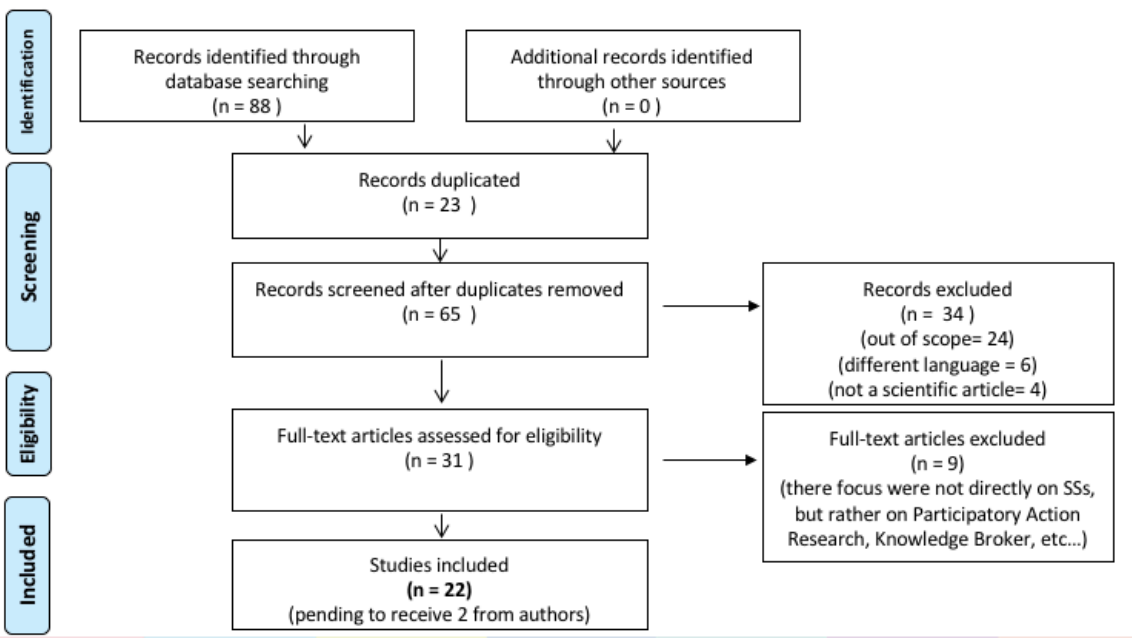
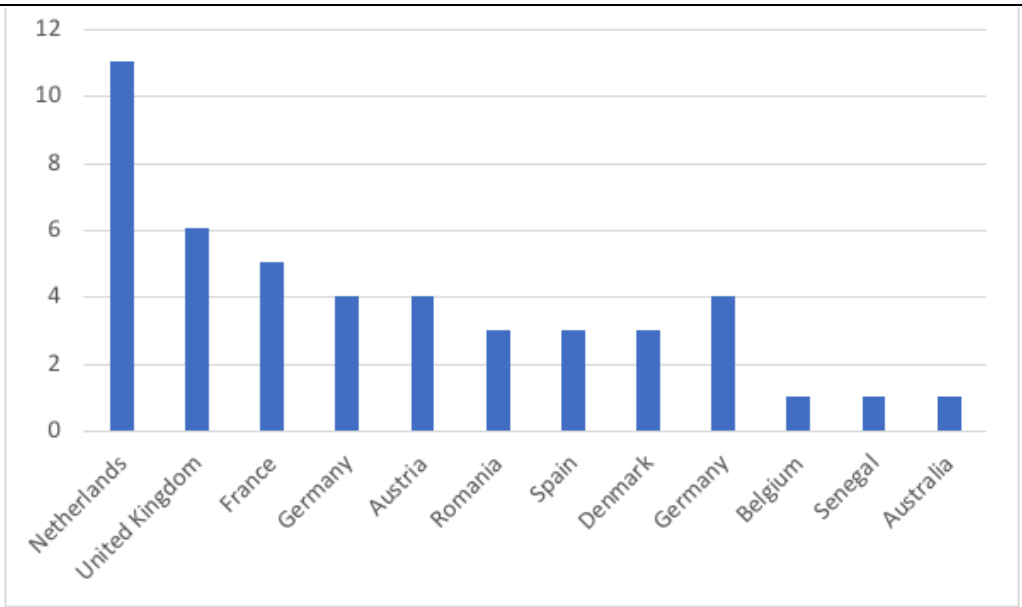


Figure 1. Flow diagram of the systematic literature review.

The search strategy identified 88 articles. Following a preliminary screening, 23 duplicates were discarded. On the basis of an initial review of the titles, abstracts and in some cases the full texts, we selected all the articles that fulfilled the inclusion criteria. In total 34 articles were excluded because they were either outside of the scope of this study, written in a language other than those specified in the inclusion criteria, or did not meet the criteria for a scientific paper. After a complete reading of the 31 remaining articles, 9 more were excluded because they did not deal with the structures or projects of science shops. Finally, a thorough analysis and data extraction was performed on the remaining 22 articles.

4.2. Description of articles

Over half (13) of the articles were published before 2008. There were no articles in Spanish, only two in French (2), and the rest were in English. The Dutch experience was the subject of most of the articles (11), followed by the UK (6), France (5), Germany (4), Austria (4), Romania (3), Spain (3), Denmark (3), Senegal (1), and Australia (1) (Graph 1).



Graph 1. Science shop case studies by country.

Other references, which only briefly cite science shop activity, refer to experiences in other places, including Northern Ireland, Finland, Sweden, Belgium, Portugal, Italy, the United States, Canada, and China. Almost half of the articles (11) were descriptive studies based on the literature or analysis of case studies. The rest were mainly based on in-depth interviews, workshops and surveys. More than half of the articles (13) focused on the organisational and structural aspects of science shops. Less than a quarter (5) investigated the impact of the mechanism. One article

dealt with an actual science shop project (Van der Windt et al. 2014) and one focused on participatory methodologies that could potentially open up the research process (Jellema and Mulder 2016). Finally, less than a third (7) of the entire corpus was published in open-access journals.

The corpus was very heterogeneous in terms of the design, setting, focus and time frame of the studies. The articles deal with different aspects of science shops: their organisational structure, the role of researchers, sociological theorisation about the structure. While dealing with diverse scientific and academic cultures, most of the articles are about the Dutch experience. There are also a few impact evaluation studies relating to both the science shop structure and the resulting scientific projects. With just 22 articles, our corpus is relatively small, a reflection of the scant scientific publication generated by these projects. The lack of publications generated by science shop projects over the four decades of their existence is probably one reason for the low impact of the approach in the scientific world.

The articles in the corpus can be categorised into several disciplines: philosophy and history of science, sociology, science communication, evaluation studies, and research management. The only article describing an actual science shop project could be categorised as belonging to the field of energy study.

4.3. Key results

After a thorough reading of all of the articles selected, we identified three main categories as key for the implementation and sustainability of science shops, each one with several linked sub-topics. The three categories are not independent one from another, but rather interlinked and synergetic. In this section, we will show how science shops are highly context-based in that they tend to be very dependent on the political, economic, social, and higher education systems in which they operate. We will explain how they evolved over time, focusing on the diverse organisational models that have emerged and the fact that the internal processes have persisted over time in different structures and geographical settings. Finally, we will discuss the lack of visibility and recognition of science shops and the hypotheses proposed in the literature as possible causes for this weakness.

4.3.1. Understanding the Context-Based Dependency of Science Shops

Our initial findings show that science shops are subject to their political and institutional contexts and that changes in government and higher education institutions have a strong influence on their priorities, work focus and sustainability. Institutions relying entirely on public or institutional

funding are more vulnerable because they depend on decisions taking by people or entities outside of their sphere of control. As a result, science shops can end up in critical situations with little or no structural funding to maintain their activities when institutional support is withdrawn. Furthermore, it is essential to ensure the participation of civil society members, the students and researchers needed to create the mechanism that sustains science shops. Once again, this support depends mainly on external factors, such as the level of citizen participation in public life in their country or region and whether the regulations of higher education institutions facilitate the participation of students and academic staff in participatory research projects.

4.3.1.1. Political and Institutional Climate

The first wave of science shops created in the Netherlands in the 1970s was strongly supported by a positive political and institutional climate. During this period, a significant portion of the country's university budget was allocated to funding their activities, with a plan for the Amsterdam science shops to receive 15% of the university budget from 1986 (Dickson 1984). At that time, almost all Dutch universities had science shops that were fully integrated into the university structure (Dixon 1988). This integration afforded them great stability, but only lasted for a short period. In 1998, the University of Leiden Science Shop, after performing very well for many years, was suddenly closed. At the time, the closure was attributed to cutbacks, but the reality was that community-based activities of this kind no longer fit the government's agenda (Wachelder 2003). The well-established University of Amsterdam science shop met the same fate when, after more than 20 years working efficiently to close the gap between research and society, its university funding was cut. For a short period, the institution attempted to survive by changing its organisational structure and funding model, but it finally closed during the period of the early 1990s (Wachelder 2003). By contrast, in France science shops tended to be independent of the universities (Dixon 1970), but they nevertheless relied heavily on public funding. In the 1980s, a drastic cutback in financial support from the French government led to a precarious situation for the existing science shops and eventually they were all forced to close (Stewart 1988). De Bok et al (2008) have observed that when governments and universities prioritise market-oriented knowledge transfer activities, they prefer to fund translation structures, such as Science Parks and Knowledge Technology Transfer Units, rather than science shops, which are generally more focused on the social impact and democratisation of science.

4.3.1.2. Level of Maturity of Civil Society

Another important factor discussed in the literature is the role and maturity of the local civil society. In the late 80s and early 90s, Dutch NGOs started to achieve a high level of professionalisation (Fischer et al 2004). As a result, they began to recruit specialists who were able to answer simple

research questions and no longer needed the help of the science shops (Wachelder 2003). The science shops adapted to these changes creatively by adopting new organisational models and proposing new services. Some of them specialised in specific topics and adopted a consultancy model, charging for their services. However, this approach was somewhat inconsistent with the social activism that underpinned the movement in the 1970s. The aim of the first wave was to democratise science by working with voiceless CSOs on low-visibility and under-researched topics without charging for their work. Two prerequisites often cited in the literature as criteria for science shops projects are that the client does not have the financial resources to pay for the research and that it has no commercial interests.

Besides, a weak civil society would hinder the functioning of science shops and could lead to the failure of this research mechanism. In Spain, for example, association membership is among the lowest in Europe: only one third of the adult population belongs to a civil association and only 7% of adults report regularly discussing politics compared to 21% in Denmark (Leydesdorff and Ward 2005). Bottom-up research practices are still uncommon, although several European projects have worked to set up science shops in different contexts. This current situation may also be due in part to the low level of involvement of civil society organisation in science and the continued domination of the traditional academic paradigm of research in the university setting.

In the 1980s, civil society participation in associations in France was also quite fragmented, and clients were no longer interested in investigating research questions (Stewart 1988). Stewart explains that when clients found out that there was no easy way to fix to their problems, they tended to lose interest. He argued that clients were generally not sufficiently aware of the difficulty of obtaining reliable data about specific questions. Good management of expectations is therefore crucial to ensuring client engagement. This was also the view of Beunen et al (2012), who explained that citizen organisations would sometimes ask researchers to defend a certain position because their opinion would carry more weight with decision-makers. A rejection of such a request by the scientist could lead to unforeseen negative repercussions within the citizen organisation. The structure of science shops must be clear from the beginning. Their role and commitment to each of the parties involved in the project must be explained in full to avoid later misunderstanding and disappointment.

4.3.1.3. The Capacity of Researchers and Students to Participate in Science Shop Projects

The involvement of students is a core element in science shop research. The mechanism relies on the support and involvement of students. However, strict university models can make it difficult for students to participate in such projects. University pressure on academic faculty could also make them reluctant to engage in participatory projects (Fisher 2004). However, Le Crosnier et

al (2013) argue that researchers would gain from opening up their research process, particularly in view of publish-or-perish pressure. This conclusion is, however, debatable because participatory research processes are complex, time-consuming (Bammer et al. 1992) and still not recognised by most evaluation and publication academic systems. Today, only a small number of researchers are working in this context and only a small active minority are willing to go beyond classical research practices.

Territorial embeddedness and the influence of all the actors involved was a recurrent theme in many of the articles in our corpus. Seeing the territory through a multi-level lens appears to be a prerequisite for defining the best model and maximising the science shop's chance of success. The choice of a specific model is highly dependent on local circumstances (Wachelder 2003). A thorough preliminary analysis of the political and institutional landscape and a good understanding of local networks could afford valuable insights when a science shop structure is being designed (Savoia et al. 2017). However, economic, social, institutional and political environments, as well as sector-dependent issues, such as health and the environment, are constantly changing, so that the gap to fill is never the same (Meyer 2010). The inherent mediating role of a science shop is under pressure to change because the relations between the two sides of the equation are constantly changing over time (Leydesdorff and Ward 2005). As argued by Wachelder (2003) and Leydesdorff & Ward (2005), the ability to adapt to these external changes and adapt the model along the way is what will permit these structures to survive. Today we face a very different situation than the people who were involved in the birth of the science shop movement in the 1970s. Science shops, when at a crossroads, may have to rethink their focus and alliances (Debok 2008).

4.3.2. Evolution of Organisational Models: Similar Overall Processes but Different Apparent Visions

In the Netherlands, the science shops movement was initially based on a university-based structure in which students supervised by senior researchers undertook research free of charge for under-served and voiceless CSO's. Since then, however, we have seen in the literature that models have changed and evolved to survive difficult political conjunctures. The chemistry shop at Universiteit van Amsterdam started to undertake paid research for larger CSOs and fully commercial companies sometimes doing the work without the support of students (Wachelder 2003). However, an important constant remained. The science shops always follow a bottom-up approach; they responded to the demand for answers formulated by members of civil society. The movement's underpinnings now reflected a variety of viewpoints and different aspirational motivations. The need to adapt in order to survive may, in some cases, have taken precedence

over the strong free-of-charge community-based position that had once been an essential component of the science shops movement.

4.3.2.1. Organisational Models and Criteria for Choosing Clients

Most of the traditional organisational models had three basic criteria for implementing a science shop: the client CSOs had to have (i) no financial resources to execute the research by themselves, (ii) no commercial interest (iii) and the capacity to push the research results forward (Ades 1979; Le Crosnier et al 2013; Zaal and Leydesdorff 1987). The first two of these requirements now appear to apply only in certain cases.

The traditional approach comprised three main types of organisational models for science shops: university-based, non-university-based, and a hybrid model (Savoia et al. 2017; Fischer et al 2017). This has now given way to the creation of a more market-oriented consultancy type of science shop and even the model of a professional broker existing outside of academia (Wachelder 2003). In both of these cases, it would appear that science shops have abandoned (i) the student training component and (ii) the influence of research policies in the universities that other structures defended and still defend.

4.3.2.2. Similarities in Internal Procedures Among the Models

Despite all the changes in the organisational models, science shops are still characterised by the same internal process. They all begin by engaging in a dialogue with civil society members to identify their needs. They then formulate the appropriate research questions, carry out the research project, publish and evaluate their work (Savoia 2017). Nonetheless, the question of who can or should be the client of the science shops has changed. Some organisations now accept requests from larger CSOs and commercial companies, whereas in the early years of the movement these clients would probably not have been considered. These changes highlight the existence of divergent views on the democratisation of science (Wachelder 2003). Wachelder argues that there is a great disparity in the way the concept of the democratisation of science is understood and a great need for more concrete ideological foundations to further this process.

4.3.2.3. Expanding the Role of Science Shops

In line with the expansion we have witnessed in science shop institutions, additional opportunities have also arisen in terms of bridging the gap between different spheres, such as business and science, and research and practice (Fischer, Leydesdorff, and Schophaus 2004; Diouf 2017). While some science shops are already working with companies, these are still isolated initiatives

(Fischer, Leydesdorff, and Schophaus 2004). These science shops could pilot new forms of knowledge mediation and position themselves in different spheres of work, such as knowledge brokering, thereby exploring their potential as actors who can bridge the gap between research and practice. They could capitalise on their social capital and find a way to work together to push forward the application of research results and contribute to the realisation of innovation projects.

Over the last three decades, the science shops movement has faced both organisational and financial challenges. As reflected in the literature, science shops are acting in different institutional settings and have had to adapt to survive. Nonetheless, they still share common practices that foster mediation between citizen groups and the public sphere (Leydesdorff and Ward 2005).

4.3.3. Visibility and Recognition

Another central element that emerged in many articles is the lack of visibility of science shops. This weak point has been identified as a major obstacle to the recognition of their work (Fischer et al 2017; Schlierf and Meyer 2013). Improving impact evaluation will be crucial to the recognition of their achievements. However, several authors have reported on the lack of historical background and appropriate tools to perform such evaluation (Savoia et al. 2017; Schlierf and Meyer 2013). Schlierf and Meyer also mention the informal management of science shops, which tends to hinder access to shared data and information. Additionally, the information and communication technologies (ICT) tools for connecting with a wider audience are still underexploited by science shops. These common shortcomings could have contributed to the lack of visibility of these mechanisms and represent a future challenge.

4.3.3.1. The Difficulty of Evaluating the Performance of Science Shops

The difficulty of evaluating the performance of science shops is exacerbated by the invisible nature of their mediation and, to a certain extent, the diffuse social impact of their work (Schlierf and Meyer 2013). Schlierf and Meyer view science shops as a bridge between two worlds, a link that connects two cultures: knowledge producers and knowledge users. Therefore, they suggest that their performance should be assessed using criteria targeting and specially developed for both of these worlds. They argue that science shops' work has added value if they generate knowledge recognised as valuable by the scientific community and effect positive social change or achieve relevant outcomes for practitioners (Schlierf and Meyer 2013). They suggest reconciling the two worlds' perspectives and evaluating the work from both standpoints. The approach should also take into account the importance of recognising the value of the science shop process (Leydesdorff 1980).

All science shops are supposed to assess their own performance in terms of work and the outcomes achieved. However, very few published scientific articles discuss this aspect of their work, and when they do, they only do so in terms of quantitative indicators, such as the number of questions received by sector, bottle necks, scientific impact, etc. (Zaal and Leydesdorff 1987). Some authors have reported positive effects, including improved access to highly relevant data, improved research methods, development of material for educational purposes, and reinforcement of lines of research that were not firmly established (Zaal and Leydesdorff 1987). However, the small number of studies published reflects the fact that the evidence is limited. Furthermore, these studies are cross-sectional and do not inform long-term effects on the civil society members, students, researchers and other parties involved.

Evaluations can also be partial and fragmented and, in most cases, focus on the organisation's priority interest. University-based science shops will focus on the students' learning process and changes introduced into the curricula (Fischer et al 2004), while non-university-based or market-oriented structures may focus more on client satisfaction (Van den Berg 2003). Follow-up research could have provided more information on the impact of the mechanism, but follow-up studies were performed in only 14% of projects (Zaal and Leydesdorff 1987). The evaluation of this type of structure and project does not conform to the prevailing methodology for assessing knowledge production. Science shops aim to engage in a more complex form of knowledge circulation and exploration, for which the existing assessment is yet not prepared (Schlierf and Meyer 2013).

Fischer et al (2004) also mention the inlformality of design and the use of different data formats among science shops and discuss the challenge this represents for data collection. They go on to report that the work is often poorly documented or difficult to access, shortcomings they attribute to the informality of the work methods. These shortcomings could also be a factor in the small number of academic publications being produced by science shops.

4.3.3.2. The Potential of ICT Tools for Increasing Visibility

ICT and the internet revolution have changed the way we work together, but science shops have not yet taken much advantage of the opportunities they offer. The possibility of communicating with the world via the internet represents a great opportunity for science shops to reach a wider audience, to shape public demand for science and technology, to strengthen the knowledge-based economy, and to open up possibilities for innovation collective action (Leydesdorff and Ward 2005). The movement needs to find ways to use technology to better communicate and coordinate their work and to report on their achievements. As these authors suggest, science

shops could use an internet-based database to make available reports on their work and ensure their long-term visibility.

4.3.3.3. Publication: The Limitations of Research Carried Out by Science Shops

To date, science shops have mainly produced grey literature. Indeed, the tendency to produce only grey literature, mostly in the form of master theses and reports to CSOs, is a constant across all the different organisational models. Only 14% of science shop reports become scientific publications (Zaal and Leydesdorff 1987). However, such reports have only limited visibility and recognition within the dominant world of scholarly publication (Hervé Le Crosnier et al 2013). It is therefore important to make them available over the long term in an archive. The Loka Research Institute attempted to create such an archive, but the initiative failed because the archive was never used by the science shop community to store their reports and make them more widely available (Leydesdorff and Ward 2005). Leydesdorff and Ward suggested that universities could officially certify the value of the work carried to invigorate these best practices, for example by awarding certificates to the best student paper, best report, best advice, etc.

Our findings show that there is a great need to develop effective evaluation tools, share them among the different structures and existing networks and to archive the data generated in a common central database. Scientific publications on both the structures and the projects would ensure the long-term impact of the scientific production (Wachelder 2003; Leydesdorff and Ward 2005). Taking advantage of ICT tools could help science shops to gain visibility, allowing them to standardise the data collection process, communicate their results, carry out comparative studies, and ensure better social capital. These tools could also help them to capitalise on their resources, work and experiences. Assessments of science shop performance has to take into account many factors and a wide range of point of view because of the number of different stakeholders engaged in the research process. These actions would only contribute to increasing visibility among civil society actors, the scientific community, and higher education and research systems.

5. DISCUSSION

This systematic review of the literature revealed a number of interesting findings, providing many topics for discussion and uncovering gaps for future research. This section will discuss several aspects of the three main findings and how future InSPIRES activities could further explore these.

As science shops are inherently subject to changes in their context, they should continuously monitor the political and institutional landscape and anticipate changes. They should also try to diversify their funding sources and minimise their dependency on public funding.

We have seen that the science shop model has evolved towards a greater diversity of organisational and business models. In the current context, in which public spending on higher education and research has plateaued or is declining and the standardisation and commodification of science has become the dominant paradigm, science shops must adapt and explore new ways to sustain their structures, while at the same time not losing sight of the social values that are (or should be) part of their DNA. Could we imagine a mixed model for science shops in which both approaches, responsible consultancy and free of-charge research work, could coexist? Could/Should a science shop 2.0 offer highly specialised research by charging some clients while making free-of-charge research available to under-served and marginalised groups?

Furthermore, in the case of university-based science shops, advocacy work could be done to push higher education institutions to comply with their threefold mission, not just superficially, following the usual deficit model, but taking the next step and supporting these bottom-up, demand-driven, participatory research projects. We could imagine a virtuous circular wherein the three missions would follow and complement one another, as represented in Figure 3.[3]

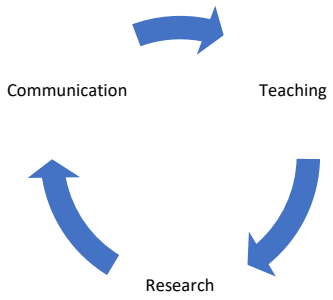


Figure 3. The three missions of HEI

As we have seen, scant involvement and lack of interest from civil society actors are barriers to the success of the model. In countries where civil participation is generally low, science shops will have to invest energy in fostering social demand. InSPIRES will explore how science shop activities can be linked to and make use of other public engagement methodologies, such as Science Cafés, World Cafés, Photovoice, etc. For example, a safe space for dialogue, such as a Science Café, could potentially be a place for communicating research results and, at the same time, gathering information on new social demands. The science shop process could move from a linear to a circular approach, as shown in Figure 4 .

[3] http://www.revistac2.com/la-ciencia-entre-comunicacion-y-participacion-en-italia/

Figure 4. Possible circular process for science shops 2.0

The science shop 2.0 model could also include additional activities aimed at identifying and gathering civil society demands to inform the process of setting research priorities.

The lack of visibility apparent in the literature is also documented by past European project reports (Millot 2014; Jørgensen and Hall 2004). As can be seen from the corpus of scientific articles we extracted, science shop projects have resulted in surprisingly few publications. This lack of publication has a negative impact on the evaluation of their performance. Similarly, the research projects and processes have not been the subject of many scientific publications. We did not find any articles on any aspect of science shop research projects, including the formulation and implementation phase, protocol elaboration, data collection or analysis. Only one article discusses and presents participatory methodologies that could be used to open up the research process (Jellema and Mulder 2016). Articles in journals discussing such projects and the stages involved in their implementation would further nurture the debate on RRI and how to open up the research process to non-academic actors while maintaining the quality of the science. It would be extremely useful to know what types of participatory methodologies are used to engage the public in science shop research. This information could shed light on the answers to many questions: what is working and under what circumstances, how the research question is negotiated and co-designed with the civil society actors, whether the protocol is co-created and how this is done, who is in charge of the data collection, whether there is any co-creation in the data analysis process? Making the research process more transparent would facilitate the response to the

challenges posed by RRI and OS. Major journals like the BMJ,[4] and publishing companies, such as SpringerOpen,[5] are calling for the publication of protocols.[6] Science shops could potentially take advantage of that situation by publishing their research protocols. Finally, another important step would be to systematically publish science shop research in open-access peer-reviewed journals, a step that would certainly ensure greater visibility of their processes and results within the scientific community. Other innovative communication models targeting citizen groups could also be explored, such as the "my research in 180 seconds" format, which consists in explaining the research in plain language and a limited amount of time. In the area of evaluation, we suggest that science shops would gain from using a joint tool to collect information on their processes and outcomes using both quantitative and qualitative indicators for all the spheres involved. InSPIRES will explore all these aspects in the coming months.

Another question we want to raise is the possibility that science shop could better bridge the gap between research and practice with an impact-seeking approach. In this research to practice innovation gap, other intermediation structures are already working, such as knowledge brokers, living labs, etc. Consequently, better coordination among these structures could only benefit both the science shops and the community. In countries where these innovative intermediation structures are rare or do not yet exist, science shops could directly absorb and propose these new functions. This proposal is illustrated in Figure 5.

[4] http://bmjopen.bmj.com
Accessed on 6th february 2018.
[5] https://www.springeropen.com/about/open-access
Accessed on 6th february 2018.
[6] http://theconversation.com/what-counts-as-an-academic-publication-34549
Accessed on 6th february 2018.

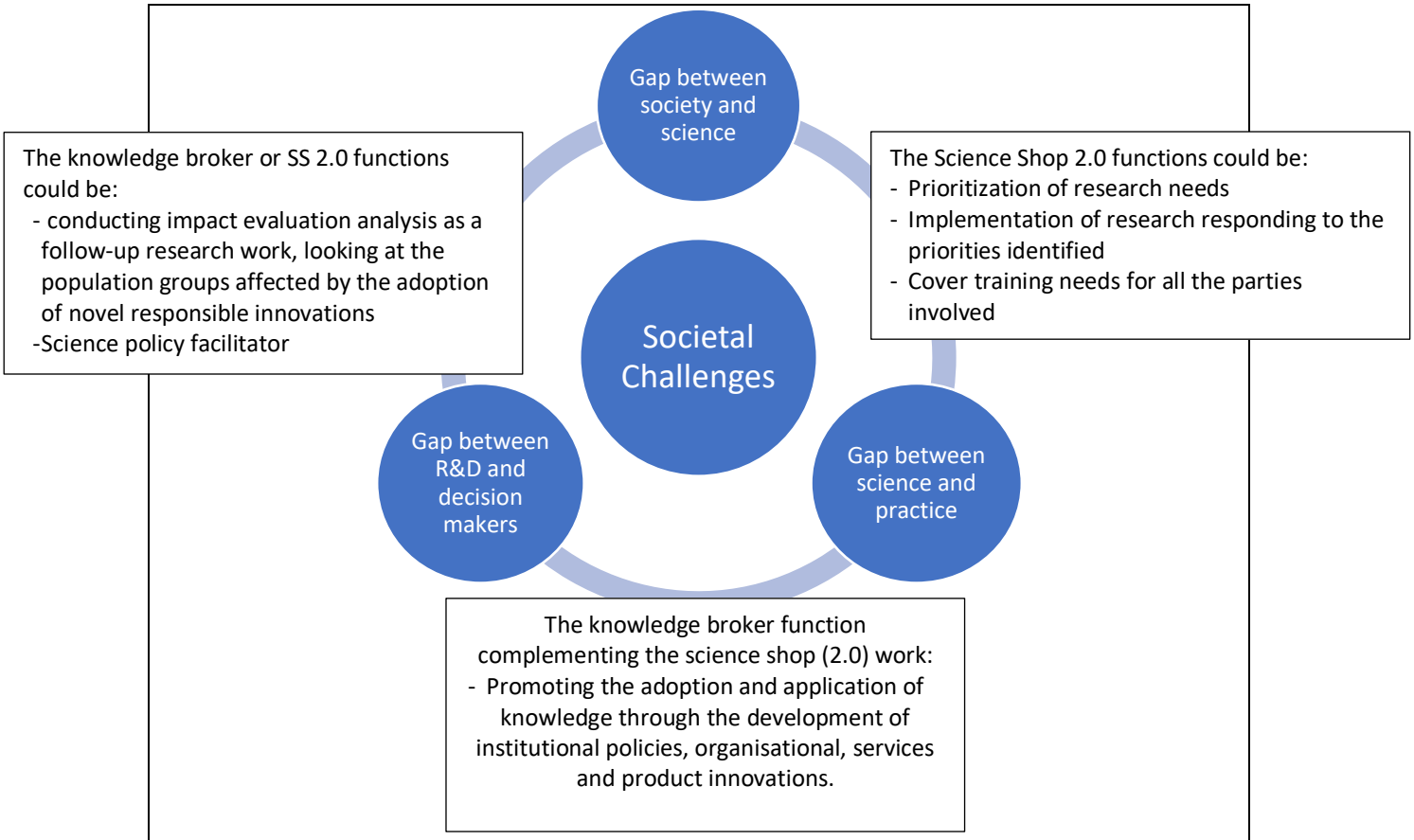


Figure 5. Bridging the gap between society and science, and science and innovation.

Finally, Figure 6 is a schematic summary of the possible evolution of the science shop model, showing elements that can be considered for future development, piloting, analysis and assessment in real life settings. These elements could potentially inspire the science shops 2.0 model.

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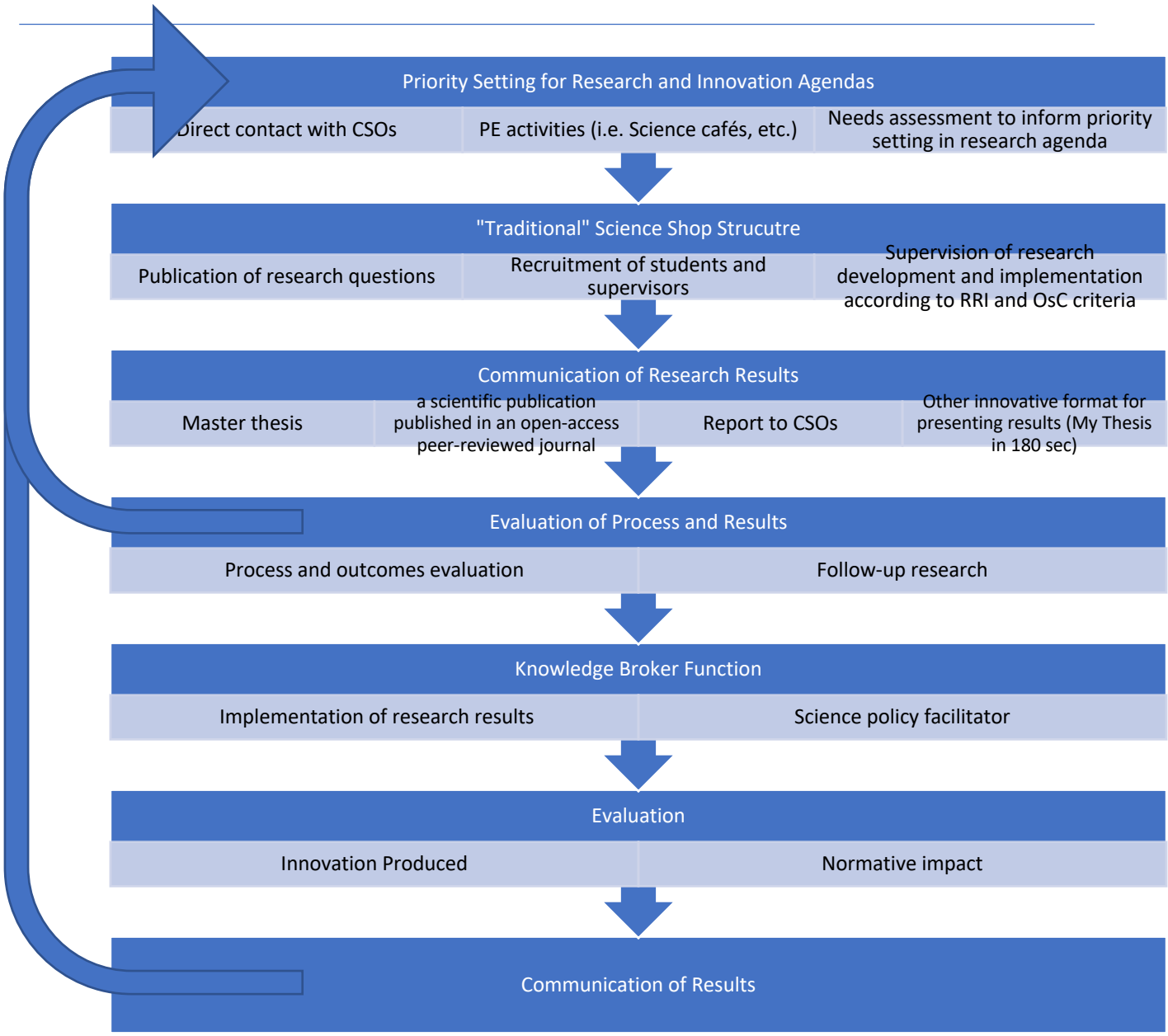

Figure 6. Potential processes for new models of science shops.

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6. CONCLUSION

The systematic literature review was a positive exercise that provided a clear picture of the scientific evidence on science shops. It also yielded sufficient information to provide answers to our research questions: providing ten key elements. On the basis of these ten elements, we were also able to provide ideas for our new InSPIRES science shops 2.0 model.

Science shops must lobby for stable public funding and at the same time diversify their funding sources by exploring alternative business models to reduce their dependency on institutions. They should not lose sight of their social values, maintain a bottom-up, demand-driven, co-creation approach for the prioritisation and elaboration of research demands, and involve students and senior researchers in the research process. Science shops should publish more systematically in peer-reviewed, open-access journals to gain greater visibility and recognition within the scientific community. They should also work together to develop an efficient centralised evaluation tool to gather data and assess and value their work. They should study the methods they use to initiate the research process and publish the results to bridge the gap between research and practice and ultimately promote social innovation. Finally, they should use innovative communication tools to reach out to non-academic actors. In the discussion section, we have proposed several lines of action that the InSPIRES consortium could explore in the coming months.

Finally, as a broader theoretical reflection on the model, in line with what Wachelder (2003) has said about the personnel directly involved in science shops, there is a need for historians, and social scientists in general, to engage with the process, debate the model, and explicitly theorise about the process of exploration and the model in general (Schlierf and Meyer 2013).

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ANALYSIS OF THE INTERVIEWS

WP Leader: Environmental Social Sciences Research Group (ESSRG)

Partners involved:

- Barcelona Institute for Global Health (ISGlobal), and Clinic Hospital (HCPB) as third party of ISGlobal
- Fundació Privada Institut de Recerca de la Sida-Caixa (IrsiCaixa)
- Université de Lyon (UdL)
- Stichting VU-VUMC - VU Institute for Research on Innovation and Communication in the Health and Life Sciences (VU)
- Universita degli Studi di Firenze (UNIFI)
- Institut Pasteur de Tunis (IPT)
- Ciencia y Estudios Aplicados para el Desarrollo en Salud y Medio Ambiente (CEADES)

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Index

Present report was carried out as part of InSPIRES work package 2. Its objective is to provide analysis of the interviews conducted with emerging and established science shop, and further science-society initiatives across and beyond Europe. The involved partners of the InSPIRES project conducted all together 80 interviews: 54 in the countries of the European Union and 26 beyond Europe. In the report we describe how these interviews were conducted and analysed and what are the key findings of the qualitative interview analysis. We create a concept map of the "science shop at its best", identify leverages for the success of the future science shops and describe possible future pathways.

1 INTRODUCTION

The main challenges of WP2 are **(i) to understand the past and history of Science Shops** from a transformative social innovation point of view, **(ii) to identify their strengths and limitations** in nurturing transformative social innovation, and **(iii)** to assess how science shops can **build and capitalize on further public engagement activities**, such as Science Cafés, in order to contribute to capacity building in social innovation.

Through these WP activities, we aim to answer the following questions: What learning ecosystems could best support science shops to prototype and explore new ways of science practices? How science shops can benefit from the best-valued practices to do more and better projects with civil society?

The objectives of the interviews were multiple:

- To understand various institutional contexts and framework conditions.
- To assess scenarios (pathways) for further development.
- To synthetize the understanding of science shops by interviews with key informants.
- To get information of most relevant Science Shops projects.

More specifically, **the interviews provide insights on:**

- Current profiles of Science Shops (most established and most promising ones);
- Success stories; and
- Qualities for the future.

The InSPIRES proposal argued that science shops have been good at coming into existence but not so good at sustaining. Therefore, it is vital to identify models, inspiration and desirable future paths for the science shops.

2 METHODOLOGY

Present section provides methodological background information for the interview analysis. It describes the sampling method, the conduct and the analysis of the interviews.

2.1 Sampling

All together 80 interviews were carried out, 54 in the countries of the European Union and 24 beyond Europe. A comprehensive list of the conducted interviews is provided in **Annex 1.** In line with the origin countries of the involved partners and the objectives of the work package the largest number of interviews were conducted in Hungary, France, Spain, The Netherlands, Bolivia and Tunisia.

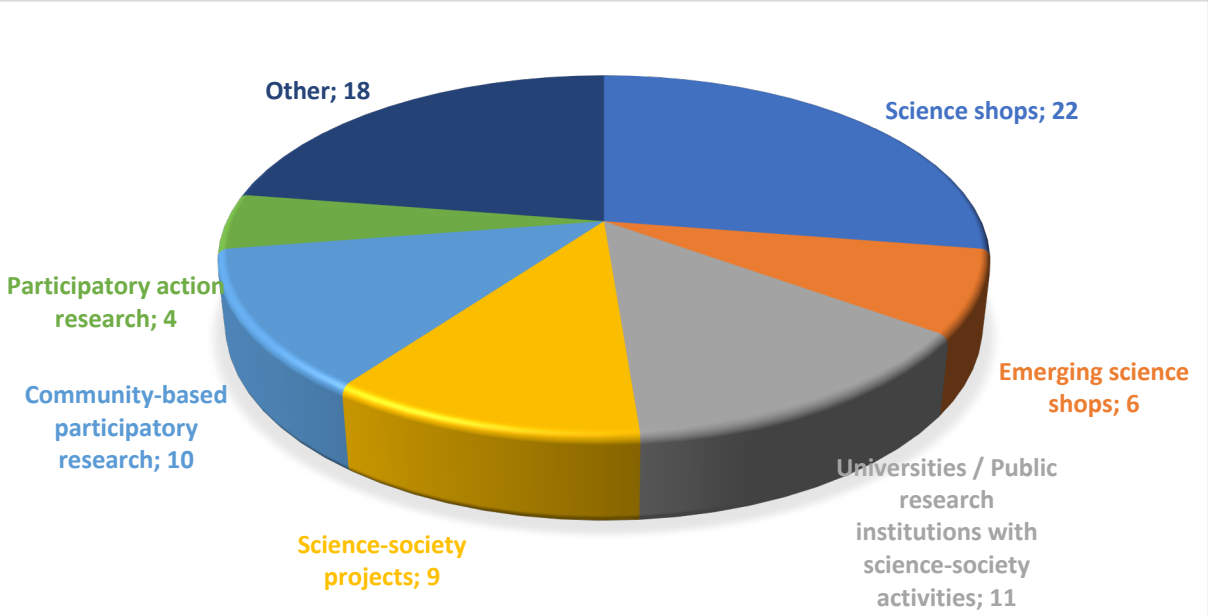
Table 1. The distribution of conducted interviews across countries

EUROPE	**54**
Austria	1
Belgium	3
Denmark	1
France	6
Germany	2
Hungary	15
Ireland	2
Italy	3
Lithuania	1
Romania	1
Spain	10
The Netherlands	7
United Kingdom	2
OUTSIDE EUROPE	**26**
Bolivia	9
Cameroun	1
Canada	5
Niger	1
Tunisia	9
USA	1
ALL TOGETHER	**80**

The interviews aimed to address science shops and further science-society initiatives. Therefore, the largest share of interviews was conducted among established (22) and emerging science shops (6). Further elements of the sample consist of universities and public research institutions with science-society initiatives (11), various science-society projects (9), community-based participatory research initiatives (10), participatory action research activities (4). The remaining 18 interviews embrace various related initiatives, such as: service learning, citizen science,

science café, science education, Citilab, Fablab, Living Lab, knowledge transfer programme, platform for dialogue, funding mechanism, and consultancy and intermediary organizations.

Figure 1. The distribution of interviews among types of initiatives



We used a dual sampling method. The objective of **sample 1.** was mapping the scene in each participating countries, excluding science shops from sample 2. Each partner focused primarily on their own countries in order to map the science shop type of activities. The following recruitment criteria were used for this purpose:

- Organisations or researchers who start participatory action research or engaged scholarship;
- Community offices with research activities;
- University service learning course leaders;
- Organizers of science café events;
- Professional and public institutions who build on citizens' knowledge;
- Hubs for social innovation;
- Top beneficiaries granted in H2020;
- Partners in H2020 projects that implement community-based approaches.

The objective of **sample 2.** (top interviews) was mapping the scene in the European Union**.** Partners of the InSPIRES project were asked to nominate the “top science shops or like-minded initiatives” (community-based research, participatory action research, engaged scholarship, etc.), supplemented by justifications why these science shops are considered to be the most relevant cases. As a result, the consortium agreed on a list of 19 interviews to fall into the category of “top interviews”. These initiatives are considered to be the most relevant for the purposes of the projects, the respondents are considered to be our key informants.

Out of these 19 initiatives 15 are establishes and 1 is an emerging science shop. The remaining three are service learning, Living Lab initiatives and an international development charity. 17 of these initiatives are located in the countries of the European Union, 1 in Canada (Accès savoirs) and 1 in Niger (Science shop of Abou Moumouni University). 13 are university based initiatives, while the remaining 6 are run independent from (though sometimes linked to) the academic sphere.

Table 2. The list of "top interviews"

Name of the Science Shop	City	Country
Section on Sustainable Design and Transition at Aalborg University	Aalborg	Denmark
Bonn Science Shop	Bonn	Germany
INASP: research and knowledge at the heart of development	Oxford	UK
LicaLab	Turnhout	Belgium
Accès savoirs	Québec	Canada
Vrije Universiteit Brussel (VUB) science shop	Brussel	Belgium
Science shop of Abou Moumouni University (Niamey-Niger)	Niamey	Niger
Bèta Science Shop Groningen	Groningen	The Netherlands
Sciences citoyennes	Paris	France
Wageningen University & Research (WUR) Science Shop	Wageningen	The Netherlands
INTHUM cooperative	Sassari	Italy
Vilnius College Science Shop	Vilnius	Lithuania
Students Learning with Communities (SLWC)	Dublin	Ireland
CARL (Community-Academic Research Links)	Cork	Ireland
Queen's University Science Shop, Belfast	Belfast	Northern-Ireland, UK
Science Shop Brussels, Vrije Universiteit Brussel (VUB)	Brussels	Belgium
Wilabonn	Bonn	Germany
Wageningen University and Research (WUR) Science Shop	Wageningen	The Netherlands
InterMEDIU Bucharest Science Shop at University Politehnica of Bucharest	Bucuresti	Romania

2.2 The conduct of the interviews

After collecting publicly available information about the interviewees' organization, semi-structured, 60-90 minutes long personal interviews were conducted in English or in their native language. Interviewees were provided an information sheet **(Annex 2.)** and signed an informed consent **(Annex 3.)**. They were assured that the conversations are anonymous, but the data that we produce from the interviews are not confidential; stories and quotes will be shared in an anonymized way.

The interviews followed the approach of **"Appreciative Inquiry"** (AI). The AI approach puts focus on strengths and opportunities. We attempted to learn about science shop at its best. The

interviews intended to create conversations where the interviewees talk about successful stories, pointing out factors that make things work and focusing on the way forward instead of revolving around potential pitfalls and hindrances.

2.3 Data analysis

The text of the interviews was restructured, summarized (and if needed translated) by the interviewers alongside a provided template **(Annex 5.)**. The first part of the restructured and summarized interviews provides basic information, e.g.: date, name of organization, name and position of the interviewee, name of interviewer. The second part is structured alongside the following broad topics:

- Current profile;
- Success strategies;
- Qualities for the future;
- The most compelling story;
- The most quotable quote;
- Most valuable lesson.

These restructured interviews served as a basis for the analysis. In line with the aim of the interviews and the approach how we conducted them (AI), the analysis took its departure from the texts and not from a pre-defined theory or model. The analysis followed the approach of the so called **grounded theory** in the sense that we let the texts to define the interesting topics and factors. The characteristics of the "science shop at its best" appeared from the interviews and then we structured them and composed a concept map. However, in a strict sense our approach was not grounded theory since we analysed the restructured (and translated) interviews and not the word-by-word transcripts.

The analysis was carried out using "NVivo 11 Pro" qualitative data analysis software. As a **preliminary analysis** we used the algorithms of the software to identify topics: (1) we ran word frequency queries and (2) used auto-coding to identify themes. The purpose of this preliminary analysis was to get a first insight of the text and help the analyser not to overlook potentially interesting topics.

The **analysis was based on manual coding**. The codes were identified on the basis of the text (and not derived from a model or a theory), therefore all the codes we used were **"in vivo" codes:** words or short phrases that appeared word-by-word in the texts. These codes (or nodes as called in the NVivo software) symbolize essential attributes of the data; link the data to ideas and other attributes.

During the analysis of the interviews we identified 27 different codes that capture important attributes of the interviewees' thoughts. Most of the topics the codes refer to appear in many

interviews and emerged repeatedly in the conversations. Table 2. provides and overlook of the codes and their meaning.

Table 3. In vivo codes identified during the manual coding

Name	Description (text referring to…)
Uni management	… the influence of the university context
Improve	… the possible ways of improving the interviewee's science shop (or science shops in general)
Business model	… the business model of the science shop
Impact	… the ways of having impact
Commitment	… the commitments of the actors
Network	… the network of the science shop
Students	… the role of students in science shops
Question	… the questions the science shop deals with
Community	… the role of communities for science shops
Fields of interest	… the science shop's field of interest
Co-creation	… co-creation processes
Inspiration	… actors being inspired
Learning	… the learning process taking place in science shop activities
Motivate	… the challenge of motivating actors
Commissioner	… the commissioners of the science shop activities
Skills	… the skills required in a science shop
Evaluation	… the evaluation process of science shop activities
Role	… perceived / desirable role of the science shops
People	… the role of particular persons
Open the door	… opening up science
Publication	… scientific publications as outputs
Participatory research	… doing research in a participatory way
Vulnerable group	… vulnerable groups
Flexibility	… the flexibility of science shops
Obligation	… the obligation of science shops and researchers
Comfort zone	… the comfort zone of actors
Empower	… the process of empowering actors

Limitations of this interview study derive from the qualitative and exploratory nature of this research. The interview process itself requires careful planning and needs time to reach out to and make appointments with the participants. Important issues that can shape the future success of science shops may remain unnoticed. As part of a qualitative study, our results much depend on the personal experience, knowledge, and interpretative capability of researchers which are again limited.

3 RESULTS

Present section first briefly describes some key results of the preliminary analysis. Then it demonstrates the concept map we developed, the leverages we identified, and suggest possible future pathways for science shops.

3.1 The results of the preliminary analysis

The sole purpose of the preliminary analysis was to get a first insight of the text and help the analysers not to overlook potentially interesting topics. First we ran a word frequency analysis to identify the most frequent words used by the interviewees. We did not search for exact words but instead “stemmed words” (all words falling into a category with the same root, e.g. network, networks, networking). We selected out irrelevant words (e.g. good, well, know…). The following word cloud depicts the 25 most frequent words appearing in the interviews, thus providing a preliminary insight on the topics (Figure 2.).

Figure 2. Word cloud of the 25 most frequent words appearing in the interviews

We also used the built-in algorithm of NVivo to auto-code themes. This also allowed us to gain an insight on the frequency the given themes appearing in the texts. The software came up with the following categories of themes in decreasing relative weight: (1) research, (2) project, (3) questions, (4) community, (5) university, (6) engagement, (7) work, (8) open, (9) groups, (10) students and (11) societal.

The vast majority of these themes appear in our manual codes as well. However, the manual coding allowed for a more detailed picture, and also let us identify themes that did not appear too frequently, but still represent essential attributes of the texts.

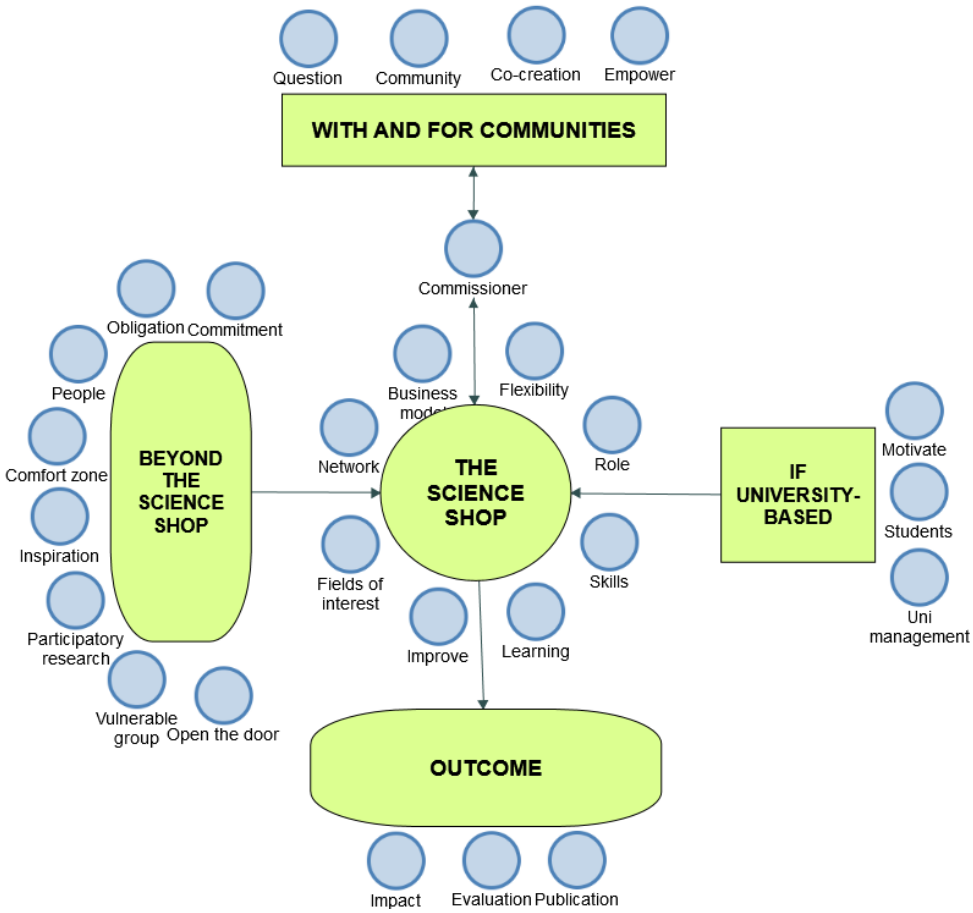
3.2 Towards a concept map

The purpose of the coding was to capture important attributes of the interviewees' thoughts. These codes link the data to certain ideas and to further attributes. This allowed us to identify patterns and to arrange the codes into a concept map.

In the following we first describe the concept map that emerged as a result of the analysis, then we provide detailed information alongside certain codes. Certainly, the logic of the analysis was just the opposite. But if we presented the result in line with the logic of the process, it would make it very difficult to understand for the readers.

This **concept map** tells us about the factors that lie behind the success of science shop initiatives, and provides us an understanding about "science shop at its best". The concept map emerges from the text, but it is inevitably shaped by the interpretation of the analyser. Therefore, it should be considered as a tool that helps in understanding and structuring, but it is also subject to discussion.

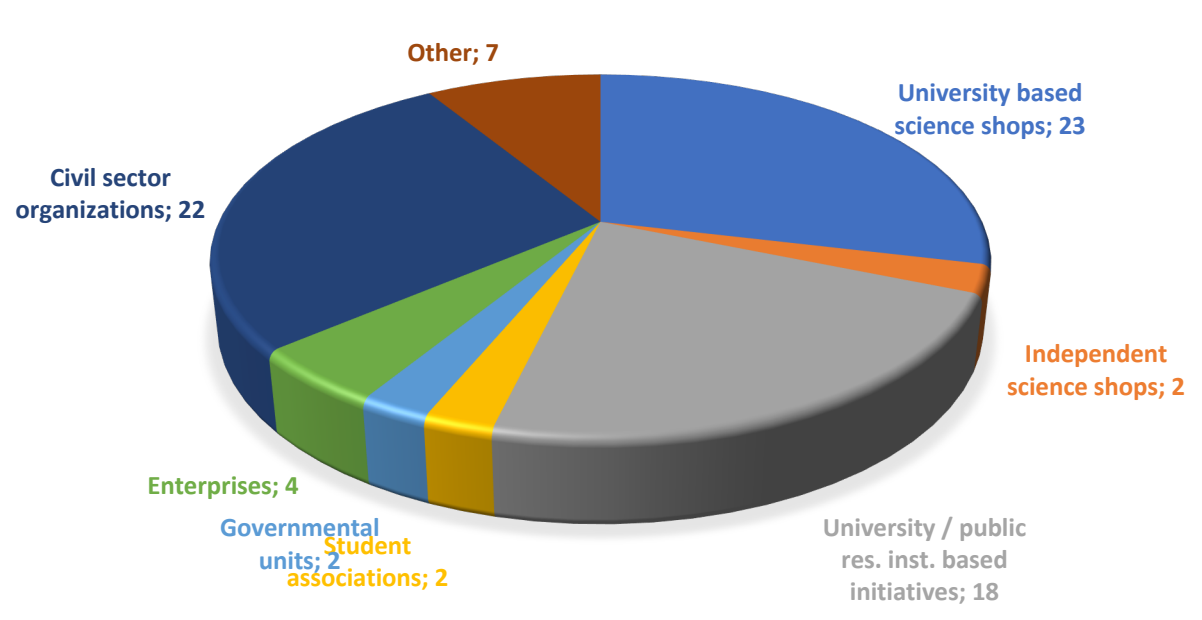
Figure 3. The concept map of "science shop at its best"



In the middle of the concept map lays **the science shop** (or like-minded initiatives). The science shops are manifold. There are numerous characteristics that define them and in the same time serve as potential factors for their success. These factors are:

- their business model (their ability to cover their cost in the long run);
- their flexibility (their ability to react to changes);
- their network (which can be used when fulfilling their tasks, may provide inspiration and funding possibilities, and be sources for learning);
- the role they serve (how they perceive it and what are their objectives in this respect);
- their special fields of interest (what issues they work with);
- the skills their team members possess;
- the channels they have for learning; and
- the perception on the possible ways of improvement.

Figure 4. The distribution of the organizational solutions of the analysed initiatives



One of the most important factors that influence the operation of science shop is whether they are **university-based** or independent. The university context may serve as a factor that lies behind success, but it can also be something from which the science shop must be "protected". Nevertheless, it has influence of most of the abovementioned factors. It affects the business model, the flexibility (mostly negatively), the role the science shop serves, the network it has access to, the fields of interest, the available skills and learning channels, and also the strategies for the future (fields to be improved). The university context may be a strong success factor and ensure long-term sustainability in case:

- the university top management is supportive;

- the science shop is successful in motivating the actors (both researchers and students);
- the science shop finds meaningful ways to involve students into its activities.

The science shop is not solely the compilation of the factors that characterize its operation and the context in which it works. There is more **beyond the science shop**. Science shops (and like-minded initiatives) always have a vison about the desirable role of science in society, they aim to serve the common good and base their operation on values. What we found beyond the science shops are:

- commitments to certain values and visions;
- a mind-set in which researchers and research organizations have obligations towards the community;
- particular people (with visons, skills and values);
- people who are eager to step out of their comfort zones and motivate others to do so;
- people who are inspired and provide inspiration for others;
- particular ways to approach research and to think about the beneficiaries of research: being committed to participatory methods, having focus on vulnerable groups or trying to "open the doors".

Probably the most important relation of science shops is their relation to the **community**. All the analysed initiatives work for the society (community) and in most of the cases also works with the community. The questions addressed by science shops mostly manifest themselves as projects with commissioners. Therefore, commissioners and the particular topics of the projects serve as an interface between the challenges and visions of the communities and the science shop activities. Hence, the success of science shops is heavily influenced by:

- their ability to communicate with the community and identify relevant problems;
- their ability to convert community needs into relevant questions;
- the extent to which they co-create questions and solutions; and
- their capacity (or intention) to empower those unable to effectively articulate their needs.

What science shops are able to give back to the community (their actual ability to work with and for society) appears under the tag **outcome** in the concept map. In order to be successful the challenge is not just to arrive to the right questions and operate mechanisms that enable the science shop to answer questions in the long run. The outcomes must be converted into impact. In this respect the success may depend on:

- The ways the science shops seek for impact (how do they communicate their results for whom, and do they take on an active role in bringing about change or leave this to CSOs, community members or other actors; are they engaged in influencing policy). One

frequent dilemma in this respect is the effort that should be put into using scientific publications as tool. This is particularly relevant for university-based initiatives.

- The mechanisms the science shops operate to evaluate the results and the achieved impact.

3.3 Searching for leverages

In this section we structure the findings in line with the abovementioned concept map to identify leverages. So the aim of this analysis is not to depict everything that appeared in the interviews, we only focus on solutions and possibilities that may be useful and serve as an inspiration. We do not claim that these solutions are universal and fit all contexts.

The science shop

Field	Leverages	Selected quotes
Business model	- The university provides continuous financial support for the science shop since it acknowledges its strategic importance for achieving research & education goals. - The university and the city co-funding the science shop. - Time devoted to the projects by engaged researchers, students and CSOs. - EU/national funded projects (e.g. H2020). - Business actors as supporters of the science shop activities. - Provision of services on a market basis (as supplementary activity). - Science shop and like-minded activities gain policy importance (and support).	„Now the university and the city co-fund some staff costs and then they have EC projects and private projects. [21] „Financial support of the [university] is crucial for the success and the sustainability of the Science Shop." [27] „Need a small budget, time of researchers, time of students and time of CSOs." [37] „It might be the chance in the policy environment that will make the difference on the long term." [74] "Business companies support the science shop by donating small equipment, consumables, and reagents." [78]
Flexibility	- A non-university context allows for more freedom and flexibility (and less recognition from the university). - University context allows for less flexibility (but in case the university management is supportive more stability).	„The strengths of having the Science Shop outside the university is your freedom. You can choose your topics, your projects, nobody tells you what to do." [14] „Flexible approach, allow us to adapt to context and circumstances." [20]
Network	- Strong networks ensure the quality of the activities and the ability to deal with relevant questions. - International networks are sources of inspiration and learning and may provide funding opportunities. - Keeping in touch with various actors is an important source for learning and the identification of problems with societal relevance. - The organization of events may be a successful tool in networking.	"A strong network is needed in order to involve all relevant stakeholders." [12] „Every two years we have master's thesis award show, which is networking event among the Flemish science shops." [75] „Exchange with colleagues from the international network is very inspiring, interesting and beneficial [...] This also helped us get funded, get in partnerships internationally." [75] „We are active in a lot of networks and we see problems on the horizon, maybe earlier than local administration." [76]
Role	- A major role for science shops is mediation between the civil society and research, but	„The role of this Science Shop is slowly shifting from the mediation between societal

	there are ways to supplement this or to shift focus, e.g.: - turning towards students searching for questions; - moving from mediation to impact seeking; - turning towards the business sector.	questions and students, to students who are searching for questions." [35] „We are not social workers, that's not our expertise. In our field they have a question in which they need our expertise as independent researcher. We have to ensure the scientific quality of the results. We know how to do the research, we just try not to bulldoze over them. We explain the scientific method to them in an understandable way." [35]
Fields of interest	- A well-defined fields of interest helps to perform quality projects, to build up a business model and network. - The field of interest itself represent the commitment towards certain values (e.g. environmental issues, education). - The field of interest can be oriented towards the most marginalized.	"… the most vulnerable groups of the society" [12] „… in the health and care sector by testing and validating innovations with end users, in their own living environment." [21] „Particularly involved with very small organizations, which usually cannot afford to pay for a research project." [27]
Skills	- Being engaged and committed to the values science shops are based on. - The ability to navigate in both the academic and the civil sector is vital. - The ability to argue for the importance of the science shops in ways that fit the context (e.g. to persuade university management) is very important. - To make contact to CSOs and individuals, but to keep some distance at the same time. - To have the strength to stop processes that do not work out.	"The most important skill to work in a SS is social engagement" [27] "You need someone who knows the community and the university. […] You have to know how to make allies in different environments." [30] "The project managers are required to have certain skills, but almost more important is their mind-set. Engagement and kindness are two important competences." [37] „Someone that has that body of knowledge and can package it in a way to lobby and advocate for a science shop type model" [73] „Sometimes you need to have the strength to stop a research instead of going forward, if it's not doing well." [77]
Learning	- Science shops are connected to many potential sources of learning: stakeholders, local communities, university departments, students. - Similar initiatives are important sources of learning (e.g. citizen science, action research, science café, RRI).	"Another success strategy is making use of the knowledge of (all the) different stakeholders. Everyone has his own knowledge and expertise" [35] „We picked up the topic […] at the time when very few people talked about land use and we managed to get funding for it from the local government. We are in front of the wave rather than running with it." [76]
Improve	- Shift towards trans-disciplinary research and co-creation. - Improve communication with stakeholders, and raise awareness amongst citizens and university management. - Embed science shop activities into the curricula. - Building international networks, and involving international students.	„We want to get out of European / American models and create our own model according to our reality" [30] „Science shops has an opportunity to access business and try to get them understand what's that all about, that we face massive societal challenges and we need every voice at the table. Not just [different stakeholders] in separate micro-groups. I'd wish that science shop model re-evaluated that aspect." [73] „I'd like to see the science shop model that develops a form of dissemination or

	- Make connections with LivingLabs, RRI and citizen science advocates and further similar initiatives. - Adapt the science shop model to specific national (not Western-European) context. - Becoming more active in influencing policy. - Open up to new stakeholders (e.g. business).	platform that is more accessible for stakeholders." [73]

University context

Field	Leverages	Selected quotes
University management	- Supportive university top management. - Social responsibility, outreach to the region, students' real-life project experience as universities' main priorities. - EU projects as tools to persuade the university top management. - Social engagement as an acknowledged performance of the researcher. - Setting up interdisciplinary teams for projects. - The support of the top management may help to put some pressures on students and researchers to actually finish the projects they started to work with.	"The success of SSs is quite linked to the vision of Top-management of the university." [12] „If you manage to get together deans in the same room who come along well with each other, very nice projects can arise from that." [71] „Reports, EU projects gives them visibility, which in turn gives the support by the management." [72] „Periodically the university has to explain to the government what is does for the benefit of the communities […] and the science shop is obviously one of the clear ways." [74] „Our education policy focuses on giving students real-life project experience and science shop fits into this very nicely." [77]
Motivate	- Both students, researchers, members of the advisory board and the university management have to be motivated. - EU project and international "best practices" can be motivating for both researchers and university management. - Integrating science shop activities into the curricula helps to maintain students' motivation. - Inspiration, commitment and the possibility to have real-life impact are major motivating factors for researchers. - Acknowledging the value of science shop activities and at the same time setting performance requirements by the top management helps to maintain researchers' motivation.	"Projects should be linked to student credits, and completely embedded in the curricula." [12] „Inspire colleagues with two "catches": the Horizon2020 project, […] and the "brand" of Cambridge University that was one of the partners in the ENRRICH project. These "catches" worked." [71] "It is very important to have the support of top management who can subsequently put some pressure on colleagues to carry out projects" [71] „They really have to want to do this as it is extra work." [72] „What differentiates unsuccessful and successful projects is the motivation" [78]
Students	- Students are able to carry out quality job. - Working with students is for mutual benefits (and may also fit well into the institutional strategy). - Providing academic help for students is important both for quality output and for maintaining trust with CSOs.	„On a sensible subject (a shelter for prostitutes), students were able to perfectly adapt and find an adequate solution." [26] „Some of them become very committed and get directly involved in organizations." [27]

	- Working with students is part of having impact: they become aware of societal issues and become committed. - Working with PhD students is part of having impacts: it may initiate a shift in how research is done and evaluated. - Engaging students with different cultural background and spoken languages is challenging, but has a great potential.	„This was a profound experience for a mechanical engineer student to have this perspective in mind." [72] „, PhD students [...] start to question the meaning of the word "expert" and question themselves as experts. They realise the richness and necessity of listening to people. [...] You really see the change how they want to conduct research." [73] „Academic support is vital, when the student is stuck" [74]

Beyond the science shop

Field	Leverages	Selected quotes
Commitment	- The commitment of science shops towards social impact, democratization of science, co-creation serves as a point of reference in all of its activities. - These values can be reflected in the organizational structure of the science shop (teams where all are equal). - Not just the science shop team, but also the participating researchers and students should be committed to these values (they may become committed just because of participating).	"...commitment to democratization of research and science" [26] „The motivation behind was to do bottom up science instead of ivory tower science, to get in touch and interact with society." [75] „Everyone is equal; we don't have a formal hierarchy." [76] „For me societal impact is what really important." [77]
Obligation	- The way how the science shop and its members think about researchers' responsibility towards society helps to create strategies for the science shop (e.g. mediation or directly influencing; entering the policy field or not; being pro-active towards the marginalized).	"The researchers have an obligation to go talk to the weakest and most vulnerable groups of the society, that will not by themselves go talk to researchers and/or science shops. [...] It is necessary to go out and solve problems in society." [12] „They are therefore now entering the policy field, as there is a momentum and they feel an obligation to inform political bodies." [14]
People	- Skills, inspiration, values, motivation are embedded in people, they are at the heart of the science shop projects. - For sustaining science shops it must not rest on just one/few people.	„The science shop came to existence as [she] attended workshop on how to connect science with studies." [71] „If we were to leave, would there be a science shop or is it just a passion project of a couple of people?" [74]
Comfort zone	- It's worth to go out of your comfort zone and motivate others to do so. In order to be successful in many science shop activities this is a must.	"You have to go outside your country, your comfort zone, and talk to people." [14] „Good projects, to get students to get out of their comfort zones and go for it. You need students to becoming champions for students who come along behind them." [73]
Inspiration	- Engaging in science shop activities is not just extra work but it is also inspiring, motivating and changes societal relations. - By running a science shop, you provide inspiration for colleagues, students and researchers. - People and CSOs are not just partners, but also the main sources for being inspired.	„You have to go out, get inspired by other people and inspire other people talking about your work. This is how the opportunity will be created." [14] „Carrying an open project towards society to create other forms of relationship [...] a more egalitarian model, in our social relations." [30]

	- Being inspired and inspire others is what creates the new opportunities.	„I'm energised and inspired by my colleagues' work." [73] „We work with a lot of children here. When you see children trying to explain a phenomenon and processes with their mind, their knowledge, you forget all the bad thing around you." [78]
Participatory research	- Participatory (action) research and community-based research are important tool to open up for marginalized / vulnerable groups.	"Community-based research and participatory action research makes it possible to involve vulnerable groups in research." [35]
Vulnerable group	- Opening towards marginalized groups can be understood as an obligation and also as a form of inspiration.	"The researchers have an obligation to go talk to the weakest and most vulnerable groups of the society." [12]
Open the door	- The science shop are often the doors of large institutions, where the community can find its way in.	"They are not formally a Science Shops, but they do open the door to CSOs." [12] "A science shop is a face of the institution towards the community organisation. It's an important factor, institutions can be big, where do you go, who do you speak to? It's very useful to have that door in." [72]

With and for communities

Field	Leverages	Selected quotes
Community	- Looking at community members as knowledgeable people. - Setting clear framework for cooperation and not to raise false expectations. - Being clear about the way science shop operates, what it offers and what it requires. - Listening to and negotiating with community members in order to reconcile their interest and science shop's objectives. - Keep some distance in order to maintain independent judgement and ensure scientific quality.	"Those who are experiencing a problem have appropriate skills." [30] „Still the pitfall in a Science Shop project is to […] get too involved and therefore lose your independent judgement." [35] „We have to be very clear with communities what the nature of the resources that we are offering is, and at the same time they need to be clear what they are offering as well." [74] „It's a lot of listening to people." [76]
Question	- It is important to put a lot of effort in reformulating the original question of the commissioner and arrive to a common understanding. - Ensure the broader societal relevance and the research relevance of the question. - Involve other stakeholders (perhaps opponents and well) plus advisers / steering committee to refine the question. - Various channels are needed to collect question, the science shop can be pro-active in this respect.	„Sometimes commissioners ask a question on which they already know the answer. In that case, you have to take a step back. What do we want to know? And how can we formulate a proper research question?" [37] „We tried to cooperate with other science shops, e.g. with exchanging questions but our questions concern local issues." [75] „As project leader you contact the community organisation, you help formulate the question and check if it's relevant for the organisation, society and research." [77]
Co-creation	- Co-creation is vital for arriving to the right question, for ensuring the quality of the projects and also for having impact.	"It is not so much the question that is important but the process of co-construction." [36]

	- Co-creating may become an overarching strategy of the science shop. - Co-creation empowers the community and also improves research.	„The most important task of the Science Shop is to […] support people through research and the other way around: improve the research through co-creation." [37] „I feel knowledge co-creation is one of the most important mission of science shops, making research with and for society." [77]
Empowerment	- Supporting the community (and especially marginalised / vulnerable groups) to be able to come up with questions. - The science shop can play a pro-active role in finding relevant questions with marginalized groups through participatory research techniques.	"It's really important that the staff puts a lot of effort into encouraging community groups to come forward with questions" [73] „We support the organisations so they understand the research process and that they are clear what it is that they need and what it is that they can offer." [74]

Outcome

Field	Leverages	Selected quotes
Impact	- Moving beyond publications and project reports and seek for various ways to communicate results. - Events (award ceremonies, project closing meetings, poster presentation) and videos are useful ways to communicate results. - Choosing impact seeking instead of mediation requires shift in the science shop structure and the business model. - Science shops can play active role in shaping policy and advocating for voiceless groups. - Participating in science shop activities is an impact itself. - A non-university context may allow for more flexibility in impact seeking.	"A scientific report is never not enough to have an impact." [12] „If you are university based system, the impact will be number oriented "how many students are doing Science Shop projects? How many publications?" [14] „Sometimes social impact will only become clear after years." [35] „Everyone who is involved will benefit from it." [37] „Research funding is changing luckily. When you do a research funding application in the UK, you need to demonstrate why your research is of societal value and what organisations will be engaging with who will use the research." [74]
Evaluation	- It's worth putting effort in evaluation despite of the scarcity of capacity and time. - To co-create evaluation with advisers, stakeholders and the commissioners. - The possible impacts are manifold which calls for qualitative approaches in evaluation. - The possible impacts may emerge only in the long run; therefore, evaluations should be done months/years after the project as well. - Informal ways of evaluation may be useful as well.	"They have a monitoring and evaluation team. They do it regularly. They evaluate different aspects. Sometimes also with external researchers." [20] „At the start of every project the Science Shop makes an agreement with the project manager and the CSO including the project evaluation. Monitoring the impact of a project is still very hard." [37] It will take a while before the real impact will be visible." [37] „The project leader forms an Advisory Board that steers the project, makes sure it stays on track, helps with the input, makes sure the deadlines are met." [77]
Publication	- Publications may be useful to reach certain target groups.	"They write reports, but no scientific publication, although it might be an inspiration for the future." [14] „It is very much appreciated when a researcher will publish an article in a

	- Publications may provide inspiration (though it may not be the most important way of seeking for impact).	scientific journal about the Science Shop project, but it is the call of the researcher to make the research public." [37]

3.4 Possible future pathways

The point of departure in depicting possible future pathways for science shops is that science shop activities, contexts and objectives are manifold. **There is no single way for science shops.** However, there are some characteristic patterns that may allow us for establishing a range of possible pathways. These are "models" that highlight certain key features, shed light on possible directions, but by no means "one size fits all" solutions.

However, all science shop initiatives seem to share some common challenges and thus **turning points**. Depending on the context, the people and the specific objectives, science shop initiatives may become successful in numerous ways. There are more than one valid solutions. Science shops may have a reason to make different decisions at the turning points, but these decisions will result in different models of operation, different advantages and drawbacks.

During the establishment and the successful operation of science shops all the initiatives are likely to arrive to certain fundamental decision making points that shape their direction of development. Together with the context of operation these may add up into characteristic science shop pathways. Among these **decision making (or turning) points** are:

- **People:** Science shops are not just organizations, but collectives of engaged, inspired and motivated people. These people together with their partners (including students in many cases) and the community co-create the essence of science shops. Therefore, different teams (and thus different commitments, motivations, skills and networks) build up different science shops.
- **Value Commitments:** In close correlation with "people", science shops may differ alongside their value commitments. All initiatives need to some extent seek for social impact, work for the democratization of science and co-create their outputs. But beyond these, they may be committed towards specific values, groups or topics (e.g. sustainability, voiceless, health). These commitments result in different science shops.
- **Specialization:** In close correlation with "value commitments" science shops may choose to specialize in certain fields or issues. The smaller the organization is, the more likely this will happen. Certainly, specialization results in specific operational mode, networks, skills and methods, which again lead to different science shops.
- **Level of co-creation:** All science shops co-create their outputs to some extent with partners and the members of the community. But the extent of co-creation may largely vary. This may end up in longer or shorter term projects, constant or ever changing beneficiaries, different methods; all in all, in different science shops.

- **Networks:** Science shops do not carry out their activity alone, or in isolation. They always work as parts of networks. However, differences in the range of partners, or the focus in the networking strategies (e.g. locally, on a national or international scale; with or without business actors, with or without policy actors) will result in different science shops.
- **Impact seeking:** All science shops seek for meaningful, beneficial social impact. But the strategies they choose (in close connection to their team members, values commitments and context) are manifold. One of the core issues in this respect is either to take on mediating role, try to remain neutral; or take on an active role, seek for direct policy impact and sometimes take direct actions as well.

Again, it is important to emphasize that there are more than one good answers to these challenges. But these turning points together with the influence of the operational contexts serve as a basis for the identification of possible future pathways for successful science shops. In the following we briefly describe three such pathways: (1) successful operation in a supportive university context; (2) flexibility and impact seeking outside the university context; and (3) finding links to various science-society initiatives.

Successful operation in a supportive university context

This pathway builds on the understanding that on certain stipulations, university context may serve as a factor that lies behind success. This pathway is built on a vision in which science-society activities are highly appreciated in the academic sphere. The university top management is supportive towards science shops, since they acknowledge the value they create. It is easy to motivate both researchers and students to take part in science shop activities, because it's beneficial both for the organization and the individuals.

The legislative environment acknowledges the "science with and for society" principle. Responding to (local) societal challenges and co-creating questions and results with societal actors appears in the evaluation (and funding) schemes of universities and public research institutions. The endeavour for open science and more equal access to knowledge results in incentives that turn universities towards less solvent and voiceless actors. This is also beneficial for individual researchers, since these kinds of activities are appreciated by the individual performance assessment schemes. And this also leaves room for more researchers to discover the inspiration and learning potential these activities provide. Students are also motivated to contribute, since community-based research, service learning and similar activities are built into the curricula. This, in turn, reinforces the success of science shop, because students are able to carry out quality job, they are often eager to serve the community, and working with students is an impact in itself.

This pathway provides stability for the science shop operation. Universities provide continuous financial support for the science shops since they acknowledge their strategic importance for

achieving research and education goals. More additional support can be expected from (local) governments. And there is no need for constantly trying to persuade decision makers about the legitimacy of science shops.

The stability provides room for focusing on the internal success factors of the established science shops; to develop skills such as: navigating in both the academic and the civil sector, networking, experimenting with new methods, and new ways of communicating the results and having impact; and improving evaluation.

Flexibility and impact seeking outside the universities

This pathway builds on the opportunities provided by a non-university context. Being outside the academic operational environment allows for more freedom and flexibility. In this context science shop are more diverse. Their independence allows them to reflect more unequivocally on their specific value commitments and issues they deem to be the most important and meaningful.

Individual science shops may have more freedom for turning towards marginalized and voiceless actors, engage in longer term cooperation with groups of the community. They may also be more eager to turn towards direct impact seeking. Taking on an advocacy role and entering the policy / political debates may become integral elements of their activities.

These science shops can experiment with new sources of funding (e.g. turning towards enterprises and social entrepreneurs, or becoming social entrepreneurs), and new organizational structures (e.g. teams where all are equal). They are less restricted by certain academic constraints (publish or perish), which allows them to put more effort in effective communication.

In contrast with the first pathway (supportive university context), which is rooted in the general transformation of the research and innovation system towards “science with and for society” or “responsible research and innovation”; this pathway builds on the ability of science shops to create niches for change.

Finding links to various forms of science-society initiatives

This pathway builds on the possible synergies of various initiatives that are all based on ideas such as commitment towards social impact, democratization of science, and co-creation. It suggests that there are numerous “niche actors” already in the research and innovation landscape. The networking and joint efforts of these actors may add up to a regime shift: towards research and innovation systems that are more “responsible” and more equipped to provide systemic answers to grand environmental and societal challenges.

In this case science shops recognize that the various niche actors (science cafés, living labs, fab labs, hacker and maker spaces, participatory action researchers, citizen science, further science society initiatives and projects of universities and public research institutions, intermediary and consultancy firms, etc.) are important learning sources and partners, both in terms of methods and the pursued values.

The science shops initiate / take part in networks with these sister initiatives, and capitalize on their presence in the landscape. They may also find connection to further similar discourses and support schemes, such as the “responsible research and innovation” discourse, and even shape this discourse according to the values and commitments the science shops pursue.

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ANNEX 1. THE LIST OF CONDUCTED INTERVIEWS

Name of the Initiative	Country	City
Mano a Mano	Bolivia	Cochabamba
ASONGS association of NGOs in Cochabamba	Bolivia	Cochabamba
Faculty of Nursing, Catholic Univ of Cochabamba	Bolivia	Cochabamba
IIBISMED Institute of medical research of the Faculty of Medicine of UMSS, San Simon public university	Bolivia	Cochabamba
National Institute of Agronomy of Tunis (INAT)	Tunisia	Tunis
IDH Institute for Human Development	Bolivia	Cochabamba
CEPLAG Center of Planning and Mamagement of Fac of Econ of UMSS Univ	Bolivia	Cochabamba
Medicus Mundi International	Bolivia	La Paz
Restus IEVP project	Tunisia	Tunis
Faculty of Sciences, Bizerte, University of Carthage	Tunisia	Bizerte
AYNISUYU NGO	Bolivia	Cochabamba
Section on Sustainable Design and Transition at Aalborg University	Denmark	Aalborg
ECOSAFIMED	Tunisia	Tunis
Science shop of Yaoundey	Cameroun	Yaoundey
Citilab	Spain	Cornellà de Llobregat
InnovaFP	Spain	Barcelona
Library Living Lab	Spain	Sant Cugat, Barcelona
Societal dialogue for health	Tunsia	Tunis
INASP: research and knowledge at the heart of development	UK	Oxford
LicaLab	Belgium	Turnhout
Masters in Public Health at University Pompeu Fabra	Spain	Barcelona
Fab Lab Barcelona	Spain	Barcelona
SOHA project, University of Laval	Canada	Laval
Accès savoirs	Canada	Québec
Vrije Universiteit Brussel (VUB) science shop	Belgium	Brussels
Ecole de l'innovation citoyenne	Canada	Montreal
Boutique des sciences Hauts de France	France	Lille
Science shop of Abou Moumouni University	Niger	Niamey
Project: Comic book on leishmaniasis for kids	Tunisia	Tunis
CERTE Water Researches and Technologies Center	Tunisia	Soliman
Laboratory of venoms therapeutic biomolecules, Institut Pasteur de Tunis	Tunisia	Tunis
TATRAC	Tunisia	Tunis
Bèta Science Shop Groningen	The Netherlands	Groningen
Sciences citoyennes	France	Paris
Wageningen University & Research (WUR) Science Shop	The Netherlands	Wageningen
Athena Science Shop, Virje Universiteit	The Netherlands	Amsterdam
Social Research and Participatory Action Group; Pablo de Olavide University	Spain	Seville

Ibercivis Foundation	Spain	Zaragoza
UOC Science Shops	Spain	Barcelona
NanoGUNE is research centre	Spain	Donostia, San Sebastián
SJDD Space for Associations	Spain	Barcelona
Liu Institute	Canada	Vancouver
Leading Cities; Smart Cities Network	United Stated of America	Boston
Medicine & Public Health Science Shop Groningen	The Netherlands	Groningen
Associazione Cultura e Sviluppo	Italy	Alessandria
INTHUM cooperative	Italy	Sassari
Science Cafe' Association	Italy	Florence
Sociedad Cientifica de Estudiantes de Medicina, Faculty of Medicine of University of San Simon	Bolivia	Cochabamba
Mission Associations, Recherche et Société, INSERM	France	Paris
Projets d'intervention dans la communauté (PICOM), Université du Québec à Trois-Rivières	Canada	Québec
REPERE, Mission of Environmental Governance, Science and Society within the Ministry of Ecological and Inclusive Transition	France	Paris
Bonn Science Shops	Germany	Bonn
PICRI, Conseil régional of Île de France	France	Paris
SPARE project	France	Saillans
Bouwkundewinkel Eindhoven, University of Technology Eindhoven (TU/e)	The Netherlands	Eindhoven
Science Shop Twente	The Netherlands	Enschede
School of Public Life	Hungary	Budapest
Agri Kulti Ltd.	Hungary	Nagymaros
Eutropian	Austria and Italy	Vienna and Rome
Contemporary Architecture Centre	Hungary	Budapest
Corvinus Science Shop	Hungary	Budapest
Self Theatre	Hungary	Budapest
Corvinus Science Shop	Hungary	Budapest
Kossuth Klub Association, Society for Dissemination of Scientific Knowledge (TIT)	Hungary	Budapest
Mindspace	Hungary	Budapest
Community-based Research for Sustainability Association (CRS)	Hungary	Szeged
AKUT Association	Hungary	Szeged
Budapest Business School	Hungary	Budapest
HAKOSZ – Students Serving the Community	Hungary	Budapest
Foundation for Democratic Youth	Hungary	Budapest
CEU Civic Engagement Office	Hungary	Budapest
Debreceb Hub, University of Debrecen	Hungary	Debrecen
Vilnius College Science Shop	Lithuania	Vilnius
Students Learning with Communities (SLWC), DIT	Ireland	Dublin
CARL (Community-Academic Research Links), University College Cork	Ireland	Cork

Queen's University Science Shop, Belfast	UK, Northern-Ireland	Belfast
Science Shop Brussels, Vrije Universiteit Brussel (VUB)	Belgium	Brussels
Wilabonn	Germany	Bonn
Wageningen University and Research (WUR) Science Shop	The Netherlands	Wageningen
InterMEDIU Bucharest Science Shop at University Politehnica of Bucharest	Romania	Bucharest

GA 741677

ANNEX 2. INFORMATIVE SHEET

** To be translated to each own languages.*

Title of the study: Ingenious Science shops to promote Participatory Innovation, Research and Equity in Science (InSPIRES)

Coordinator: Barcelona Institute for Global Health (ISGlobal)

Principal Investigator: María Jesús Pinazo (Medical Doctor and Associated Researcher at ISGlobal, telf.: 0034 932275400 ext: 2182)

Project Partners:

- Environmental Social Sciences Research Group (ESSRG), Hungary.
- Fundació Privada Institut de Recerca de la Sida-Caixa (IrsiCaixa), Spain.
- Université de Lyon (UdL), France.
- Stiching VU-VUMC – VU Institute for Research and Innovation and Communication in the Helath and Life Sciences (VU), The Netherlands.
- Universita degli Studi di Firenze (UNIFI), Italy.
- Institute Pasteur Tunis (IPT), Tunis.
- Ciencia y Estudios Aplicados para el Desarrollo en Salud y Medio Ambiente (CEADES), Bolivia.

GENERAL DESCRIPTION OF THE PROJECT

InSPIRES is a European funded Project, consortium composed by the above listed partners and coordinated by the ISGlobal.

InSPIRES brings together practitioners and experts from across and beyond Europe to co-design, jointly pilot, implement and roll out innovative models for Science Shops .

The first science shops were set up in the Netherlands in the 1970s. These university-affiliated offices were designed to establish direct contact between scientists and citizens. These first science shops worked to mediate and facilitate ongoing interaction between researchers and society, generally through NGOs and community associations. The model later took root in other European countries —including Germany, Ireland, France and Hungary— and an international network called Living Knowledge was set up to share experiences, establish a formal structure and expand existing partnerships.

Science shops made it possible to develop research lines tailored to real needs through bottom-up, demand-driven research and innovation. Thanks to this win-win concept, the scientific agenda is no longer only decided behind closed doors; citizens and interest groups are invited to take part in the process. Science shops also guide policy decisions by meeting and communicating with various stakeholders, including political officeholders.

The inputs from systematic impact evaluation studies will be continuously integrated in order to make InSPIRES SS 2.0 models more accurate and responsive to civil society needs and concerns. Concentrating most of its efforts on Research & Innovation in the health and environmental sectors, giving special attention to gender parity and vulnerable groups (women, the elderly, adolescents, migrants and refugees), InSPIRES brings Science Cafés and other public engagement initiatives into its models together with a “glocal” international focus, for more inclusive, context relevant and culturally adapted community-based participatory research and innovation.

Building on a comprehensive communication plan, with a strong effort dedicated to the development and implementation of a sustainability strategy, InSPIRES outcomes will: a) give evidence and support political bodies and decision-makers, in order to propose changes in local, regional, national and international policies; b) nurture the debate about the place and role of society in science, encouraging the systematic and ethical involvement of civil society actors and their societal concerns in the research and innovation processes, and c) support the development of new Responsible Research and Innovation (RRI) and Open Science (OSc) strategies and guidelines, in the context of safe spaces to involve and engage civil society in the whole science process.

InSPIRES is divided into seven work packages. The present study in which we asked for your participation is a part of the work developed withinn tWP2, and the main objectives of this study are (i) to understand the past and history of Science Shops from a transformative social innovation point of view, (ii) to identify their strengths and limitations in nurturing transformative social innovation, and (iii) to assess how science shops can build and capitalize on further public engagement activities, such as Science Cafés, in order to contribute to capacity building in social innovation.
In order to reach our objectives, we will perform interviews to the top-10 Science Shops structure, and to ten emerging Science Shops in each of the regional hubs covered by our partners.

VOLUNTARY PARTICIPATION
Your presentation in this study is totally voluntary and you can decide to not participate or change your decision and withdraw your informed consent at any time.

CONFIDENTIALITY
The treatment, communication and transfer of the personal data of all the research participants are managed according to the different applicable laws of each participant countries, as listed here bellow*:

**Each country shall select the paragraph that is applicable in its own setting.*

Spain. The Spanish Personal Data Protection Law (15/1999, 13th December) and the Royal Degree that develops the Personal Data Protection Law (1720/2007, 21st December). Besides, ISGlobal has its own internal policies on personal data protection which follows the national regulations (the document could be provided upon request).

France. Lyon University certifies follow the rules on personal data protection according to the following French legislation
-Directive 95/46/CE of the European Parliament and of the Council of 24th October 1995, on the protection of individuals with regard to the processing of personal data and on the free movement of such data.
-The amended law nº78-17 of 6th of January 1978 regarding IT, files and freedoms.
- The decree 2005-1309 of 20th of October 2005 issued for the application of the law nº78-17 of 6th of January 1978 regarding IT, files and freedoms.

Italy. Italy's consolidated data protection code came into force on 1 January 2004.The Code brings together all the various laws, codes and regulations relating to data protection since 1996. In particular, it supersedes the Data Protection Act 1996 (no. 675/1996), which had come into effect in May 1997. International Data Transfers: The data protection Code has incorporated and, to some extent, updated the previous rules on data transfers (data transfers are addressed in Sections 42-45 of the Code). The rules for legitimising transfers to non-EU countries can be found in Section 43 of the Code and include consent, meeting contractual obligations, public interest require-ments, safeguarding life/health, investigations by defence counsel, use of publicly available data, processing for statistical/historical purposes. Additional provisions for legitimising transfers are laid out in Section 44 of the Code and include transfers to countries deemed adequate by the European Commission, the adoption of contractual safeguards, and the use of binding corporate rules. Data subjects are entitled to lodge claims in Italy for non-compliance with the

said contractual/corporate safeguards. According with the Italian law, the University of Flor-ence has adopted a Regulation for the treatment of sensitive and judicial data as for the Legisla-tive Decree 196/2003, covering also all acts executed for carrying out the institutional goals of the University. The university has also established an Ethical Code that has the purpose, according with the article 2, paragraph4, of the Law n. 240, of the 30th of December, 2010, to ensure that the conduct of members of the university commu-nity comply with the principles governing the activities of the University, and that it is not conditioned in any way by foreign interests to those institutional.In Italy the regulation of issues concerning privacy is devoted to an independent figure, called "Garante" (privacy authority). Similarly, the University of Florence established a per-manent organ with the same name, which ensures the respect of the freedom of teaching and researching and the rights of students, teaching and administrative staff of the University, and the respect of priva-cy. The Garante also deals with all questions concerning the application of the Ethic Code of the University of Florence.
Netherlands. The Netherlands implemented the EU Data Protection Directive 95/46/EC on 1 September 2001 with the Dutch Personal Data Protection Act ('Wbp'). Enforcement is through the Dutch Data Protection Authority ('Autoriteit Persoonsgegevens').
Hungary. The EU Data Protection Directive 95/46/EC is currently implemented in Hungary by Act No. CXII of 2011 on Informational Self Determination and Freedom of Information which came into force on 1 January 2012 ('Act'). Enforcement is through the National Authority for Data Protection and Freedom of Information ('Authority'). As-sembly in 2011 concerns all personal data control and data processing activities in Hungary. ESSRG practices on personal data protection follow national regulations.

Bolivia. The Bolivian Personal data protection law is registered in the articles 21.1, 130 and 131 of the Plurina-tional State of Bolivia Constitution.

Tunisia. The Tunisian Personal data protection law (organic law, n°2004-63, July, 27, 2004) and two decree (n°2007-3003 and 3004, November, 27, 2007) about the operating procedures of the national committee for pro-tection of personal data and procedures for the processing of personal data. Tunisia has also decree about medical ethics (n°93-1115, may, 17, 1993 and n°2014-3657 October, 3, 2014). Tuni-sia has a national ethic committee since 1993. In addition, since 1992, Institut Pasteur de Tunis has , its own IRB. This committee is registered within the Office for Human Research Protections (OHRP) in USA and is committed, according to this registration, to follow the Declaration of Helsinki.

The research data will be centralized:

- in a save repository
- anonymized
- available in Zenodo, EU data repository to comply with RRI, Open Science, Open Data criteria.

ANNEX 3. INFORMED CONSENT USED IN THIS STUDY

** To be translated to each own languages.*

InSPIRES (Ingenious Science shops to promote Participatory Innovation, Research and Equity in Science) is an EU H2020 research and innovation project that would like to learn from different participatory initiatives and activities such as yours, which address societal challenges in particular ways. Our state of the art analysis will rely on interviews with people involved in participatory initiatives and activities. Summaries of the interviews will be made available in a public report.

I, ***(first name + surname)*** ……., hereby certify that I accept to participate to the InSPIRES project through one (or several) interview(s) with one (or several) researcher(s) from **InSPIRES partner organization** ……

1. I **(encircle the answer that applies)**
   a. accept that my name and my position inside (or outside) the organization under study appears in the InSPIRES deliverables*;*
   b. prefer to be referred to as 'anonymous';
   c. prefer to have my name referred to as 'anonymous' and my position described as ……**(description of position)**.

2. I am aware of the nature and objectives of the InSPIRES project and have been informed of what is expected from me. I was given a copy of this consent form, preceded by a summary of the research objectives.

3. I am aware that the content of the interview(s) is subject to the researcher's analysis and interpretations; and that the data files contain the name and affiliation of the researcher(s) who interviewed me.

4. The interview(s) will be summarized, I accept that some parts will be made public through quotations;

5. I accept that the data might be further processed for scientific purposes, in line with the (Name of the country) law of the DATE on the protection of privacy regarding the processing of personal data.

6. I accept that the results of the study will be disseminated for scientific purposes, in compliance with the ethical standards of the scientific community.

Location: …… **Date:** ……..

Signature:

ANNEX 4. INTERVIEW GUIDELINE

Please note the formulations are just suggestions. Feel free to use your own words and alter the sequence of the questions if more appropriate.

Some parts might not be applicable for all stakeholders, so in this case just skip them. Please select the questions according to the interviewee (and his/her background) when preparing the interview.

Try to record the interview – this would ease your effort on the summary.

Q0. Getting started

- Introduce yourself (name, position, organisation, role in the project)

i.e. informative sheet to describe the project.

- So, thank you for taking the time for this interview as your inputs are highly important for the success of this project
- INFORMED CONSENT (please find in annex 3.)
- I would like to record the interview, do you agree?
- The focus of this interview is on Science Shops, and other link-minded Community based participatory research and innovation (CBPRI) initiatives. There are at the moment many Science Shops processes existing, as well as other participatory research and innovation approaches. We therefore here focus on the experiences where research questions have been co-created together with the community/civil society.
- The aim of this interview is to get a more in-depth insight in framework conditions concerning Science Shops projects and other link-minded Community based participatory research and innovation initiatives, their current profile, the success strategies and qualitied for the future.

Q1. Current Profile

The interviewer should have some knowledge about the interviewee and organisation in advance to get him/her engaged.
Depending on the interviewee's background either ask about "Science Shops" or "Community based participatory research and innovation".

- What is the role of your institution concerning **Science Shops/CBPRI**?
- What are your responsibilities, which are related to active mobility in the city and/or the implementation of active mobility measures?

- What were the **reasons for creating** this Science Shop? (What are the main aim, purpose, ambition? When did this Science Shop begin? What triggered their activity?)

- What do you find **inspiring or exciting** the most about your work here? (What attracted you to want to be associated with this Science Shop? What are the most memorable events, milestones for you that were crucial to maintaining this Science Shop?)

- What are the **key areas**, knowledge, skills in this science shop?

- Who are the primary **beneficiaries** of their activities?

Q2. Success Strategy

- Tell me a story about a time when you experienced your **science shop at its best**? (When was the most successful, most engaged period in the life of the Science Shop? What are your specific projects being developed most successfully? Tell me a story that stands out for you that best embodies your Science Shops ideal? What was most noteworthy?)

If time, ask questions on impact evaluation methodologies used

- Have you included an "impact evaluation" or "evaluation and monitoring" approach in the science shops?

- Could you describe the "impact evaluation" or "evaluation and monitoring" approach used?

- Do you know if the "impact evaluation" or "evaluation and monitoring" approach used has included one or more of these points below? See Annex 6.

- Do you know any reference or source of information describing this "impact evaluation" or "evaluation and monitoring" approach?

- If YES, Could you provide access to this information source?

- As part of the InSPIRES project, we will develop a database of Science Shops offices, and most relevant Science Shops projects. Would you be interested in contributing by sending information on the SS project that have had most impact? We can also put you in contact with our evaluation expert if you wish to perform further impact evaluation analysis.

  We will circulate by email the link to the crowdsource database where you can fill in information regarding your office and enter further information on the Science Shops projects that you consider the most relevant.

- How did you deepen your **connections** with various (civic, state, academic, business) communities?

- What skills do you nurture as crucial **factors of success**? (What is the core factor that gives vitality to your Science Shop, without which the organisation would cease to exist? What values would you say have distinguished your Science Shop? How does your Science Shop keep those values alive? Could you identify your good practices in governance, funding, organisation, networking, infrastructure?)

Q3. Best practice example or top measure
○ What other initiatives you are aware of that you judge to be **good examples** you are learning, or willing to learn, from?
○ Looking to the future, how do you see the **prospects** for these initiatives (incl. yours)? (What changes do you foresee or anticipate? What kind of new opportunities or development you sense? What kind of prospects and strategies you see for new science shops?)
○ *<for well-established initiatives>* How RRI, Open Science and Innovation could be introduced within the new models?
○ Can you provide any information regarding business model of the SS structure?
○ Are there any practices for impact evaluation? We can further develop on that point in a second interview looking at specific SS projects that you suggest.
○ The interviews will be combined into a report to be reviewed with interviewee's who can participate at the next LK conference workshop in 2018. Would you be able to take the time to take part in the workshop?
○ Any further questions or comments?

Thank you very much for taking your time. We will keep you informed. Goodbye!

ANNEX 5. FULL TEXT OF THE FORM FOR THE TRANSCRIPTION OF THE INTERVIEWS

Information category	
ID	
Name of Science Shop	
Basics, description	
Interviewee	
Interviewer	
Interviewee's Organizational Division	
Interview date	
Current profile	
Success strategies	
Qualities for the future	
The most notable quote that came out of this interview.	
The most compelling component of the story that came out of this interview:	
Most valuable lesson from this interview:	