SciShops

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

D6.1 Community specific research questions report

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Universidad Carlos III De Madrid, Spain
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Universiteit Leiden, Netherlands
International Center for Numerical Methods in Engineering, Spain
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Authors:	**Marco Hasselkuß,** WI **Markus Kühlert,** WI
Contributors:	All SciShops.eu partners
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Executive summary

Gathering research questions from the community is a key challenge for implementing community-based participatory research (CBPR) activities within the SciShops.eu project. The aim of this report is to provide a conceptual framework for gathering and developing research questions from local communities. A brief theoretical discussion underlines the emergence of developing research questions in co-creation between local stakeholders and Science Shops' researchers in order to implement CBPR. In many cases community-based challenges will not be available as "ready-made" research questions that can directly be answered by Science Shops. Therefore, an interactive and co-productive research design is required to break real-life problems down, translate them into research questions and answer and/or develop solutions in co-creation between the Science Shop's staff and respective stakeholders.

In this regard, the report outlines communication approaches to reach the target groups identified in earlier work of the SciShops.eu project. Furthermore, approaches for selecting and distributing research questions are introduced. Specific examples of research questions developed in the SciShops.eu project so far are integrated into a matrix to demonstrate a systematic approach for categorising and selecting research questions. As a best practice approach, it is identified that newly established Science Shops should interact with at least 3-5 or more Civil Society Organisations (CSO)/Non-Governmental Organisations (NGOs) or companies within their regions and develop a convenient co-research design.

In conclusion, interactive research activities that bring researchers and community members together become ever more important to co-produce meaningful and robust research results. This report offers guiding approaches for developing an interactive research setting to identify community challenges and transfer them into a task for Science Shops.

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List of Acronyms

CBPR – Community-Based Participatory Research

CSO – Civil Society Organisation

CY – Cyprus

D – Deliverable

EU – European Union

ESGI – European Study Group with Industry

GDPR – General Data Protection Regulation

KPI – Key Performance Indicator

NGO – Non-Governmental Organization.

NPO – Non-Profit Organisation

RRI – Responsible Research & Innovation

SME – Small and Medium Enterprise

WI – Wuppertal Institute

WP – Work Package

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1 Introduction: Deliverable 6.1 in the context of SciShops.eu

SciShops.eu (Enhancing the Responsible and Sustainable Expansion of the Science Shops Ecosystem in Europe) is a Horizon 2020 project on *participatory research and innovation via Science Shops* that involves in total 18 institutions in 13 European countries. The overall goal of SciShops.eu project is to enlarge community based participatory research and innovation by building on and expanding the capacity of Science Shops in Europe and beyond. The project is exploring how different institutions (e.g. small-, medium- and large enterprises; research institutes; non-governmental organisations; non-profit organisations, universities) can develop and establish sustainable Science Shops. SciShops.eu aims to engage local stakeholders and actively integrate them in community-based research activities of Science Shops. The project runs from September 2017 until February 2020.

The overall aim of WP6 is to establish new science shops and twin them with experienced ones for effective knowledge exchange. At least 10 new sustainable Science Shops within different types of organizations will be established, knowledge transfer activities will be implemented as well as mutual learning events for sharing lessons learned from Science Shops staff will be organized. The ***aim of Task 6.1*** *is to gather research questions from local communities, based on the expertise of the future mother-organization of science shops*.

Moreover, WP6 encompasses the following three tasks in order to answer the gathered research questions in an appropriate scientific setting:

Task 6.2: *Through partnerships and twinning with well-established Science Shops, partner organizations start their own Science Shops*

Task 6.3: *Run first rounds of knowledge transfer from new Science Shops to the community and gather feedback from all involved groups (2 iterations)*

Task 6.4: *Organize mutual learning exchange events to further train the new science shops staff*

For WP6, the following **key performance indicators (KPIs)** have been set by the project consortium:

- *New Science Shops established within the project* — *>10*
- ***Research questions collected by each new Science Shop in the 1st year from establishment*** — ***>25***
- ***Research questions answered by each new Science Shop in the 1st year from establishment*** — ***>25***
- *New organizations establishing Science Shops twinned with SciShops.eu partner Science Shops* — *>5*
- *Research institutes outside the consortium partnered with science shops for support* — *>10*

2 Concept for gathering research questions

The concept for gathering and developing community-specific research questions builds the fundament for implementing CBPR (community-based participatory research) activities within the SciShops.eu project. This is in line with the vision of the SciShops.eu project „to satisfy stakeholders' needs for knowledge through participatory research", developed in Deliverable 3.2 "Stakeholder and engagement strategy on participatory community-based research" (Groó-Nagy et al. 2018). Based on the results of Deliverable 2.2 "Existing RRI tools and successful participatory community-based research case studies report" (Garrison et al. 2018) and Deliverable 3.3 "Stakeholders' insights on participatory community-based research" (Casado et al. 2018), key target groups can be derived and a convenient communication approach can be developed in order to ensure a wide engagement of the community in proposing research questions. Moreover, we suggest developing research questions in a co-creation process between the target groups and researchers. Moreover, an identification, selection and, where needed, a distribution process for specific challenges/research questions should be established at an early stage of the Science Shop establishment in order to ensure a high-quality standard for all CBPR activities undertaken by the SciShops.eu consortium. The distribution process should encompass a strategy for specific research questions identified by a Science Shop, which however cannot be answered by "in-house" means at the time being for whichever reason. This could e.g. be due to a different professional focus of the Science Shop, time or resource constraints. In this case a system to redistribute the presented research questions/challenge to another Science Shops in the ecosystem can be established. The process of developing a concept for gathering research questions has been organized according to the following steps:

1. Task lead (WI) develops a draft concept
2. Discussion of the draft concept within WP6 team
3. Task lead (WI) presents draft concept at the 2018 SciShops.eu summer school in Spain
4. Co-creation workshop at the 2018 SciShops.eu summer school in Spain with the following questions:
    - *Which communication channels do you apply for gathering research questions (in line with specific target group)?*
    - *What are opportunities and risks of each communication channel?*
    - *Which criteria would you change and/or add in selecting research questions?*
    - *How should a distribution process be organized via the SciShops.eu platform?*
5. Task lead (WI) develops a revised concept in line with the results of the co-working workshop
6. All SciShops.eu members have the opportunity to provide comments on the revised version
7. WI develops a final concept and report of D6.1

2.1 Engaging with stakeholders to generate research questions: Transdisciplinarity

In the SciShops.eu project a CPBR approach has been developed[1]. For the purpose of this D6.1 report we take a deeper look at some ideas behind involving stakeholders already in the process of developing research questions or framing research problems.

Research and innovation processes in general underlie a tendency to get more and more opened up, integrating stakeholders, other businesses and end-users in the process of developing new products or services, already at early stages of development. This is reflected by the ideas of "Open Innovation" (Chesbrough 2003), "Wisdom of Crowds" (Surowiecki 2004) or the "Lead-user"-concept (von Hippel 1986), which have promoted research in co-creation. Thereby, also new business models and management tools to integrate users into innovation processes have been developed. By Open Innovation the purposive in- and outflow of knowledge across an institution's borders to accelerate internal innovation (Chesbrough 2006) is meant. This aspect has for example been researched and applied for user integration in sustainability innovations and research in recent years (e.g. Liedtke et al. 2015; Schäpke et al. 2018; Wanner et al. 2018). Results show that these concepts can, for example, significantly reduce the risk for innovations to fail at the market, especially for radical innovations under uncertain market or technological conditions (Clausen et al. 2011: 35). Different methods of interaction have been developed, e.g. Non-/ Lead-User involvement in innovation workshops for sustainability innovations around the home (Diehl 2011) or web 2.0 tools to use collective intelligence (Leimeister 2010). Therefore, knowledge transfer from newly established Science Shops to the stakeholders/community can be promoted by providing answers to the developed research questions in a co-creation setting. Such an approach can also draw on insights from the methodology of action research (Lewin et al. 1953). Action research assumes that scientific findings can only be achieved if professional researchers take up concrete social problems in reality and actively involve 'laymen' into their research, in order to try and intervene in existing social structures. Thus, users and stakeholders can be involved at all or at specific stages of research, i.e. in the phases of *defining a problem*, *designing a research strategy*, *creating results* or *application of results* (Talwar et al. 2011). Especially the stage of defining a problem is interesting for the report at hand. Therefore, citizens and other stakeholders are proactively integrated in research activities as experts of their own lifestyle settings.

Moreover, interactive and transdisciplinary research can lead to socially robust, actionable knowledge for societal and/or community problems such as e.g. sustainability issues as it generates a deeper understanding of transition processes (e.g. Schneidewind/Singer-Brodowski 2013; Liedtke et al. 2015; Wanner et al. 2018). Hence, transdisciplinary research aims at increasing societal capacity for reflexivity with regard to complex societal transition processes and counter the dysfunctional effects of increasing differentiation and dis-embedded science sub-systems (Schneidewind/Singer-Brodowski 2013).

The following figure shows related concepts for involving users and stakeholders into research and that can be used to conceptualise real-world laboratories.

[1] For further information see Deliverable 2.1 "Baseline research and best practice report on participatory and community-based research" (Kontić et al. 2018)

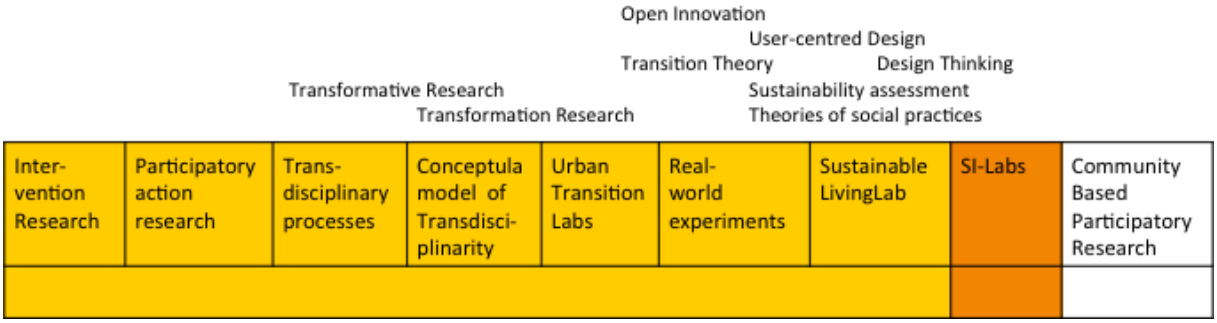

Figure 1: Concepts related to involving users and stakeholders. Own depiction based on the overview in Wanner et al. 2018 as well as Schäpke et al. 2017; Schäpke et al. 2018; further approaches by Schneidewind/Singer-Brodowski 2013; Liedtke et al. 2015.

Also involving stakeholders at the early stages already by developing research questions together with Science Shops or researchers engages them to rethink their routines and induces changes that can contribute to solve their problems in practice. In this sense it can induce social innovations. Howaldt and Schwarz (2010) describe **social innovations** as a „new configuration of social practices in certain areas of action or social contexts prompted by certain actors or constellations of actors in an intentional targeted manner with the goal of better satisfying or answering needs and problems than is possible on the basis of established practices“ [p. 89, [i]]. In this sense, it both supports learning processes for the involved actors and promotes change of established social practices.

2.2 Target groups

In Deliverable 2.3 “Stakeholder survey summary report” (Bergman et al. 2018), Deliverable 3.2 “Stakeholder and engagement strategy on participatory community-based research” (Groó-Nagy et al. 2018), and Deliverable 3.3 “Stakeholders’ insights on participatory community-based research“ (Casado et al. 2018) a broad stakeholder analysis has been undertaken. Based on the results especially *Civil Society Organisations (CSO)/Non-Governmental Organisations (NGOs), politicians, community members*, and *small, medium- and large enterprises* were identified as main target groups for gathering community specific research questions. Examples of **CSOs** that have been indicated as relevant contain the following institutions:

- Organisations for people with a disability
- Environmental organisations
- Patient organisations
- Sports organisations
- Women organisations
- Activist / pressure groups
- Consumer groups
- Residents associations

- Trade unions
- Student associations
- Other local associations, social groups and neighbourhood clubs

Science Shops could go out to their meetings to present the Science Shop concept and have discussion with these groups (see section 2.3).

In case that research questions are developed in cooperation with **enterprises**, an ethical framework (in line with an RRI approach) should be developed within the consortium of the SciShops.eu project. For instance, the *Science Shop "Language, Culture, Communication", University of Groningen* (Netherlands) partly cooperates with for-profit business organisations if they have a research question of wider societal relevance. Furthermore, the companies need to agree that the results are published openly ("open data"/"open knowledge"). They usually pay a small fee for the research activities, depending on the nature of the company and the question to be investigated.[2] In this regard, for example providing services to companies generates income to the Science Shop and makes it more viable.

2.3 Communication approach

The overall aim of the communication approach is to establish a framework for developing research questions together with the target group in co-working settings (co-creation workshops, Science Cafes, etc.). A further goal of the communication approach is to establish a harmonized interaction process between target groups and the SciShops.eu project members for gathering and developing community specific research questions. The communication approach should consider that a majority of the target group might not be aware of the Science Shop concept.[3] Therefore additional information needs to be provided (e.g. information about CBPR and the overall research process, the project consortium, etc.). Another prerequisite is that often community problems will not be available as "ready-made" research questions that just could be taken up and answered by science shops (or typically specific scientific disciplines). Instead an interactive and co-productive process is necessary to break real-life problems down and translate them into research questions.

The following formats are considered in order to convert challenges of communities into specific research questions in collaboration (direct interaction) between researchers and the target groups (citizens, enterprises, politicians etc.):

- **Best practice**: All SciShops.eu project members who will establish a new Science Shop interact with at least 3-5 or more Civil Society Organisations (CSO)/Non-Governmental Organisations (NGOs) or companies within their regions and co-create several research questions with each organisation, for example in co-creation workshops;

[2] For further information see Deliverable 2.2 "Existing RRI tools and successful participatory community-based research case studies report" (Garrison et al. 2018, p. 9 ff)
[3] According to the results of Deliverable 2.3 "Stakeholder survey summary report" (Bergman et al. 2018), around 62% of the respondents are not aware of the Science Shop concept.

- **Interviews** for developing research questions in direct interaction. A template should be provided beforehand where the organisation or individual person can write a few words about their background and some key challenges they are facing (see filter system below). However, organisations/citizens may have difficulties in articulating their challenges into research questions or the problem at hand might consist of several research questions and be divided across "disciplinary" boundaries. Therefore, a "translation" methodology is needed by which a trained Science Shop staff member, who has extensive experience with research, "extracts" the information from the organisation/citizen and helps formulate research questions;

- **Workshops** (local or virtual) with the project partners who will establish a Science Shop and local community organisations, NGOs, etc. in order to develop a process design of gathering and answering research questions in different formats. Note that there are already various types of successful workshop formats that a Science Shop could adapt according to its needs, e.g. Sustainable Living Lab methods, European Study Groups with Industry (ESGIs[4]), Hackathons, Climathons[5], etc.;

- **Focus groups** with specific target groups to develop research questions and coordinate a transdisciplinary research methodology (integrating target group into research methodology);

Moreover, the following communication channels could be included to design **online interactions** with the target groups:

- **Best practice:** Online interaction via the SciShops.eu platform in close cooperation between WP5 and WP6 members depending on: Developing a filter system (see below). Furthermore, a system for the above-mentioned distribution process could be implemented on the platform. Specific Science Shops should be addressed and can decide on further steps.

- Websites of SciShops.eu project members

- TV and radio

- Local newspapers

- Social Media: Facebook, Twitter, etc.

[4] In SciShops.eu an ESGI will take place in Dec. 2018 in CY where 4 societal challenges will be identified and solved by intensive teamwork of the researchers and the civil society organisations. ESGIs originated in Oxford in 1968 and since then they were organised in 6 continents. Info: https://ecmiindmath.org/study-groups/.

[5] Connected to SciShops.eu a Climathon has taken place in DE October 26-27, 2018 in Wuppertal: hosted by Neue Effizienz (local NPO), University of Wuppertal, Climate KIC, and Science Shop at the Wuppertal Institute: https://climathon.climate-kic.org/en/wuppertal

Target group	Communication Channel	Comments
Local communities	Face to face interaction and co-creation via "Science Cafés", "Researchers' Night" and other co-creation events Participation of events of local organisation Media: TV, Radio, Newspaper Social Media (Facebook, Twitter) Direct approaching	They might not be aware of Science Shops. Therefore, more information needs to be included in communication. For example, there are Science Shops that have read about a local issue in a local newspaper. They recognized a possible research need and actively contacted the CSO or group of citizens to see whether they were interested in collaboration.
Politicians	Face to face public and one-to-one consultations	There is a possibility of getting funding.
Internet community	Digital channels, social media (Facebook, Twitter)	A filter system needs to be developed that guides the users and ensures a harmonized distribution process of requests.
Enterprises	Face to face interactions (e.g. meetings, speed-dating events[6]) and co-creation workshops "Business breakfast"	A sponsorship model could be applied.
NGOs/CSOs	Face to face meetings and co-creation workshops Events of the NGO/CSO	It demands a lot of efforts to establish new contacts to NGOs/CSOs and to invite them. There is the possibility to present Science Shops' activities and engage in discussion on research request of NGOs/CSOs.

Table 1: Target group specific communication channels (based on co-creation workshop at SciShops.eu summer school 2018 in Spain)

[6] https://een.ec.europa.eu/content/events-0

Communication channels	Opportunities	Threats
Website, online platform	Open and free access Broad access to high variety of target groups Inexpensive Less resources High visibility	Less interaction Less engagement Website may not be identified Takes high effort, since someone needs to manage and ensure that the website is always up to date.
Social media	Very large audience Open and free access High visibility High variety of target groups	Takes high effort, since someone needs to manage and ensure that the social media channel is always up to date. All questions and comments need a response. Information and suggested solutions need to be well compiled in order to be understood by the whole variety of target groups.
Co-creation workshops	Intensive co-creation of research questions based on target groups' specific challenge(s) Active engagement	It may take high efforts (organisation of facilities, moderation, etc.). Funds need to be available to organize the event.
Local newspaper	Free access High visibility	Inclusive, In terms of reaching a broad range of people / local population No interaction Information must be clear
Public consultation	Specific communities are engaged.	Difficult to implement in big cities.
Direct approaching	Quick finding phase Inexpensive	No visibility

Table 2: Opportunities and threats of single communication channels (based on co-creation workshop at SciShop.eu Summer School 2018 in Spain)

In order to gain more insights into the participants' background and motivation, some further information could be gathered on a voluntary basis, such as, gender, age, occupation, and willingness for active participation in the research process (in line with GDPR and RRI measures).

However, it is important that a response guarantee will be implemented with a satisfying answer to the sender. Moreover, an autoreply to senders should be implemented saying that the question was

received and that the Science Shop will come back to them as soon as possible (in a defined period of time, e.g. two weeks) with suggestions on how to proceed and which Science Shop they can interact with etc. Against this background, a responsible shop for each question must be determined in advance.

In conclusion, a wide range of communication channels can be applied. However, they should be designed according to specific characteristics of each Science Shop's environment. Moreover, it is important to use established communication channels of the mother organisation and further organisations that are related / part of the Science Shop's environment (networks and cooperation).

Some best practice examples for gathering research questions in the Science Shops landscape

In order to introduce some already proved methods of gathering research questions, the following section will state recent best practice cases selected from Deliverable 2.5 "Existing Science Shops Assessment" of the SciShops.eu project (Kleibrink et al. 2018). Further detailed examples about gathering/developing research questions can be found in Deliverable 2.2 "Existing RRI tools and successful participatory community-based research case studies report" (Garrison et al. 2018).

As the first example the sponsorship model of the Science Shop Innsbruck, named "Patenschaftsmodell INNsbruck (PINN)", is described. It combines scientific acquisition with the request of various interest groups. The specialty about their way to generate research questions is the process of application by interested actors and the following mediation to an interested group of students. In short, companies or organisations can assume a sponsorship engagement. The sponsorship partner will be able to propose a subject, which will be addressed by the potential scientists/students. The individual projects are limited over a defined period of time.

Another strategy to come in touch with the potential interest group is to integrate participatory elements like repair cafés or science cafés. A German Science Shop model (Wissenschaftsladen Potsdam) made that possible. People can actively walk in and share their questions. This kind of participatory approach can help to enable eye-level selection of questions instead of hierarchical consultation. Although the actual research questions are solely formulated by scientists and stakeholders during the last step.

In contrast, the Adam Michiewicz University's Science Shop in Poland uses a multi-stage procedure to collect questions with NGOs/CSOs. They make use of CSO-meetings with various participants in which ideas are discussed to turn them into research questions. In a second meeting scientists/organizers activate their scientific community to outsource questions, which are already explored and to identify research studies. A platform (MatchThesis), which is integrated into the science shop webpage, collects questions from organisations.

Quite similar is the communication approach used by the Spienta Hungaria University of Transylvania. The Science Shop collects research ideas with the help of get-togethers with different stakeholders (policy makers, civil society, students). That way, in contrast to the model in Poland described above, scientific as well as other actors are involved in the process of brainstorming at the same time.

SciShops.eu in the context of conceptualising new co-creation events (T3.4) is co-organising in Dec. 2018 a European Study Group with Industry (week-long workshop) in collaboration with the EU Mathematics for Industry Network[7]. This ESGI (146th in Europe) will also be a co-creation event and will take place in Dec. 2018 in Cyprus. Four societal challenges will be identified (prior to the workshop, utilising the communication methods outlined in Table 2 above) and tackled by intensive teamwork of

[7] For further information see https://mi-network.org.

about 30-40 researchers and the civil society organisations (NPOs and companies). A roadmap on further steps to convert these projects to long-term collaborations is also provided, and a detailed report is delivered to the CSOs. Further co-creation events can be arranged after the workshop. ESGIs originated in Oxford in 1968 and since then they were successfully organised in 6 continents, tackling more than 600 academic and societal challenges.

2.4 Selection approach / filter system

How should the process of selecting the gathered research questions be designed? The following table displays crucial aspects for gathering and selecting research questions.

Aspect	Guiding questions and comments
Aspects for the target group	
Lead institution(s)	Which Science Shop and/or other organisation is/are in charge of the research process?
Name / Institution of proposer	Who has proposed the research question?
Region	Is the research question limited to a specific region (e.g. Berlin, Germany)? Drop-down menu with predefined countries (all countries should be covered) and short space for description of the region.
Topic of the Challenge/need (max. 200 words)	What is the main topic of the challenge and related needs? Some space for description and drop-down menu with predefined topics in line with Science Shops profiles.
Main question (optional)	How could the challenge be translated in a research question? Some space for description.
Motivation and expertise of person who poses research question	Is the person who poses research question interested in getting actively involved in the research process? What expertise (skills, ideas to address the challenge, etc.) would the person like to share?
Timescale	When does the organisation/person submitting the research question require an answer?
Intended application	What will the beneficiary will do with the results? Is the intended application in line with the Science Shop's ethical framework? Short space for description.
Expected Impact	Who benefits from answering the research question? Are the results published with open access?
Optional aspects for researchers who propose a question	
Required scientific methods	Which research methods need to be applied in order to appropriately answer the research questions (e.g. qualitative and/or quantitative empirical analysis, life cycle assessment). Short space for description and drop-down menu.

Required research disciplines/sectors	Which research disciplines/sectors should be integrated in the inter-, and transdisciplinary research approach (e.g. social science, economic science, sustainability science, mobility). Short space for description and drop-down menu.
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	Does the Science Shop have sufficient resources and skills to answer the questions?
Research effort (to be assessed by the Science Shop)	How much research effort is required in order to develop an appropriate answer to the research question in line with RRI approach[8]? Did other institutions answer the research question?

Table 3: Aspects for selecting research questions

A filter system/matrix should be developed in order to sort research questions according to their complexity (can be answered based on existing studies, would require new studies, is it a question that can be answered by science as it is or is a „translation" process necessary, can only be solved together with local communities etc.), regional specifics, disciplines that could answer the question most likely, the region they affect etc.).

2.5 Distribution process

In line with the defined selection process the following key questions need to be considered:

- *Who will gather the research questions?*

Every SciShops.eu project member who will establish a Science Shop is responsible to gather and develop research questions in a co-creation setting with the target group in line with the defined filter system described above.

- *How do we gather/develop research questions?*

Every Science Shop can decide independently which communication channels they will apply and how they will develop research questions on the basis of previous experience in involving target groups.

- *Who will answer the gathered research questions?*

Based on the profiles and regions of the established Science Shops, research questions can be distributed to and answered by the staff of suitable Science Shops.

- *How should the distribution process be organised?*

Usually, the Science Shops gathering research questions or being asked to answer a research question will answer the question by drawing on its network/resources. In case, that some research questions require high research effort that cannot be performed by the Science Shops, references to relevant resources (research groups in partnering institutions or in other universities, Science Shops, websites, projects) or other already established Science Shops outside the SciShops.eu consortium should be proposed to the sender. Therefore, an agreement on consultation offers within the consortium between partners should be adopted. It could also be possible to spread questions to the wider network of Science Shops (e.g. Living Knowledge Network).

[8] For further information about RRI see Deliverable 2.2 "Existing RRI tools and successful participatory community-based research case studies report" (Garrison et al. 2018, p.70ff).

3. Examples for research questions gathered/developed

3.1 Gender equality in higher education – Science Shop at University Carlos III of Madrid, Spain

Aspect	Guiding questions and comments
Aspects for the target group	
Name	
Institution (optional)	University Carlos III of Madrid
Region	The first study is limited to a specific University (Uc3m) but with its results is expected to have a more impact on other Universities from Spain.
Topic of the Challenge/need (max. 200 words)	The topic is related to Science and Gender in Academia: one of the main problems is the low percentage of women in STEM careers. This has been a highly debated topic and studied along several gender studies. On the University Carlos III of Madrid, the low percentage of women on those careers concern the teachers and academia staff and they are willing to understand its problem and apply the necessary tools to solve it (or at least, reduce the gender gap).
Main question (optional)	The research question is the following: How could women increase their presence in STEM careers?
Motivation and expertise of person who poses research question	The person who poses the research question is an engineering teacher, who is also working in mentoring tasks at secondary school in her leisure time. She is also interested in being active and involves in the research process because she is working with gender issues and understands the motivation and has detected the possible problems behind it. Besides, other actors such as a Gender Institute from the Library and Information Science Department and a student's Association of Gender at the University are going to be involved. Apart from this, secondary schools (teachers and students) are going to participate in the research process.
Timescale	The question is going to be answered during the on-going course, trying that on the next course more women are enrolled to STEM degrees (at least, at UC3M University). This also will lead to detecting the possible reasons why they do not and carrying out different activities at the secondary schools for promoting their participation.
Intended application	The beneficiary(ies) will use the information gathered during this research process in order to make different actions and led to a change in the enrolment on the STEM careers. The results are going to be spread into the Uc3m community (Institutes, Associations related to gender) and the correspondence ministry.
Expected Impact	The main beneficiaries will be the different agents of the University community (students, teachers) and the school system (schools, etc.). Besides, this would lead indirectly to a change in the community (town hall, society). In addition, the impact will affect organizations in the university (students' organization, Gender Institute).
Optional aspects for researchers who propose a question	
Required scientific methods	The research methods that are going to be applied for answering the research question are quantitative (survey to the students and teachers) and qualitative (interviews with teachers and experts' in gender). As well,

	different participatory activities, at university level and especially, at secondary schools are going to be conducted.
Required research disciplines/sectors	In order to make this research as much transdisciplinary, different profiles are going to be involved: not only engineering teachers in the university but also other profiles. As well, it should be highlighted the implication of secondary school teachers (from different specialities) will be an important agent on the research process.
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	The Science Shop will count with enough resources to answer the question: experts on gender field (researchers, Women Association, Women Institute) and possible affected part (students form secondary school). The tools that are going to be used for the research are available at the Science Shop. Regarding the skills, all actors involved in the research will contribute with their experience and skills.
Research effort (to be assessed by the Science Shop)	The research effort is in line with the expertise of the Science Shop staff on gender issue that the research group from the Science Shop has. The response to the research question will be aligned with the RRI approach. As far as the group knows, none any other institution have aligned this issue with a Science Shop, especially in the Spanish framework.

Table 4: Gender equality in higher education – Science Shop at University Carlos III of Madrid, Spain

3.2 Environmental and health impact of siting a transmission line – Science Shop at the Institute Jožef Stefan, Ljubljana, Slovenia

Research Questions 1: What were the weighting factors of environmental and health impact attributes in the process of siting a transmission line Divača-Beričevo? What other corridor alternatives for the transmission line were considered as feasible? How should the spatial planning process for the transmission line be modified as to effectively include citizens' participation and their opinions and arguments?

The questions were developed in face to face interactions with two citizens groups. First meetings took place during February and March 2018, recent in October 2018. The two citizens' groups are Civil Association of North Route and the civil initiative ZaščitimoOtrokePredSevanjem (transl. Let's Protect Children Against Electromagnetic Radiation).

The key concerns behind the above questions are potential health impacts of electromagnetic waves (from transmission lines) to children. In this context further research and optimization is needed associated with spatial planning and siting of electric energy infrastructure. A specific issue and confrontation is raised in relation to planned transmission line Divača-Beričevo (SW part of Slovenia) through settlements, particularly near schools and kindergartens. Since formal siting procedure of this transmission line did not provide active public participation and effective inclusion of public opinion about corridor alternatives it is expected by the members of the two civil initiatives that activities through a new Science Shop at the Institute Jožef Stefan will be more successful in this context.

Research Questions 2: These are still under development; the issue presented and tackled by the NGO CIPRA is a desire for efficient, environmentally friendly, and healthy transport to schools – walking, cycling, public transport. Mobility plans for two elementary schools are to be developed.

The topic is related to activities focused on preparing and conducting mobility management plans (including associated research) for various communities. The first phase includes elementary schools. Key stakeholders involved are:

- NGO CIPRA – the institution which carries out first phase of research;
- Schools – the formal users of results;
- Pupils/parents – the group who provided interpretation of the needs, visions, viewpoints; they are main users of the mobility management plan proposals.

Stronger voice and more effective policy responses are expected if research and consultations are done through CBPR, i.e. Science Shop at the Institute Jožef Stefan.

3.3 Climate change adaption and water management – Science Shop at the Wuppertal Institute

The research questions and challenges have been developed in the framework of the first Climathon event in Wuppertal. The Climathon Wuppertal was hosted by Neue Effizienz (local NPO), University of Wuppertal (Bergische Universität Wuppertal), Climate KIC (EU climate innovation initiative) and the Wuppertal Institute. For further information see https://climathon.climate-kic.org/en/wuppertal.

Aspect	
Science Shop at the Wuppertal Institute	
Lead institutions	Climathon Wuppertal project consortium: Neue Effizienz (local NPO), University of Wuppertal, Climate KIC, and Wuppertal Institute
Name / Institution of proposer	Wupperverband (local NPO)
Region	City of Wuppertal, Germany
Topic of the Challenge/need (max. 200 words)	**Climate change adaption and water management** Torrential rains, extreme rains of long duration, emergency situations in many cities in Germany – also in Wuppertal. It is time to prepare for the effects of climate change and for this, citizens and traders have an important role to play. This summer, Wuppertal and many other cities in Germany have been hit by heavy rain. Roads were flooded, in many homes and shops the water was many inches high, the roof of a university building and a gas station collapsed. The costs caused by the storm are considerable. The prevention of flooding and heavy rainfall events and the resulting consequences is a communal task. It serves to protect potentially affected areas such as people, buildings, traffic, the economy, etc. and to avoid costly damages. Municipalities, water management associations and fire departments are also increasingly under pressure, as well as responsible, just like the private sector and local citizens.
Main question (optional)	How can Wuppertal motivate its citizens and traders to protect themselves from future flooding and heavy rain events?

Motivation and expertise of person who poses research question	Highly motivated expert who is willing to share knowledge and be part of the Climathon Wuppertal event, where citizens and researcher work together for 24 hours to develop solutions.
Timescale	Timescale has not been discussed so far.
Intended application	Further development of ideas that have been developed at the Climathon Wuppertal. Nevertheless, application will depend on the research results / ideas that have been developed.
Expected Impact	Increasing awareness of climate change adaption solutions and increasing prevention activities of citizens (especially owners of buildings).
Optional aspects for researchers who propose a question	
Required scientific methods	Tbd (e.g. Interviews)
Required research disciplines/sectors	Tbd
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	It is a feasible topic and necessary expertise can be provided by the Climathon Wuppertal project consortium.
Research effort (to be assessed by the Science Shop)	Tbd

Table 5: Climate change adaption and water management – Science Shop at the Wuppertal Institute

3.4 Town planning and housing prices – Science Shop in Cyprus

Aspect	Guiding questions and comments
Aspects for the target group	
Name (of proposer)	Lefkios Sergides (submitted by: Katerina Kaouri on behalf of the Cypriot Science Shop)
Institution (optional)	Terra Cypria (non-profit organisation based in Cyprus)
Region	*Cyprus*
Topic of the Challenge/need (max. 200 words)	The prices of the housing for rental and for purchases have been rapidly increasing in Cyprus in the last years. At the same time housing development is expanding outside the current developing zones using various loopholes in the Town Planning Legislation. As a result, natural areas are used for housing developments while at the same time many houses remain abandoned in towns and villages. Also, many parcels in housing zones remain unexploited. Many citizens feel this is strongly correlated with governmental policy to attract foreign investment in property in exchange for residency or passports. This has led to: a) the construction of many very tall and large buildings to sell property to the investors at prices much higher than the average salary of locals b) uncontrolled expansion of new houses all over the rural areas. Today it is not known if the available parcels of land and already built houses can serve the needs of the market and if the exploitation of natural areas for that reason is unnecessary. We would like to explore this.

Main question (optional)	a) Taking into account the current policy for foreign investment in housing in Cyprus, predict the rate of growth of housing prices (sales and rentals). Compare with the average salary of a local worker. Use results to inform recommendations for modifying governmental policy. b) Identify the housing needs of Cyprus for the next 10-20 years. Compare these with the currently available housing land (parcels in housing zones and already built houses)
Motivation and expertise of person who poses research question	*The person is the Director of the NPO and he is very actively interested in the topic. He is involved in citizen groups discussing this issue and he is well connected to policy-makers both government and parliament. He is willing to ask his team to gather data about the challenge and help, as needed, with the research process.*
Timescale	*Within the next 5-6 months*
Intended application	*The NPO want these results so that they can ask for modifications in the policy*
Expected Impact	*The results will be publicly available.*
Optional aspects for researchers who propose a question	
Required scientific methods	*Data analysis and mathematical modelling. Qualitative analysis (surveys and focus groups) may be used as seen fit.*
Required research disciplines/sectors	*Mathematical modelling* *Economics*
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	*The CY Science Shop will aim to answer this question by leveraging partnerships with academic institutions and with resources from KPMG Advisory as needed. In case of converting this into an MSc project the results will not be available before the end of the Summer 2019*
Research effort (to be assessed by the Science Shop)	*We do not know yet, if this question has been answered in a different country but this is probable. A similar situation evolved in other places, e.g. in London, which led to non-affordable housing, a big societal challenge. We will start with a literature review.*

Table 6: Town planning and housing prices - Science Shop in Cyprus

4. Conclusions

The aim of this Deliverable is to present a concept for gathering research questions from local communities, based on the expertise of the future mother-organizations of newly established Science Shops in the course of the SciShops.eu project. Moreover, examples for research questions gathered in the SciShops.eu project so far are integrated into a matrix to systematically categorise research questions as examples for using the concept.

Section 2 outlines the concept and how it was developed in the SciShops.eu project consortium. The section comprises a short theoretical discussion of why involving stakeholders and other target groups into gathering research questions is a crucial step for applying CBPR. It then presents target groups identified in earlier work of the SciShops.eu project and a communication approach is developed to reach these target groups and gather research questions. It is outlined that the communication approach should consider that a majority of the target group might not be aware of the Science Shop concept and, thus, additional information is required. Furthermore, often community problems will not be available as "ready-made" research questions that can directly be answered by Science Shops (or typically specific scientific disciplines). Much more an interactive and co-productive process is necessary to break real-life problems down and translate them into research questions. Different communication channels and methods for interacting with target groups are introduced in section 2.3. Some best practice examples for collecting research questions are derived from case studies conducted in Deliverable 2.5 "Existing Science Shops Assessment" of the SciShops.eu project (Kleibrink et al. 2018). As a best practice approach, it is identified that newly established Science Shops within SciShops.eu should interact with at least 3-5 or more Civil Society Organisations (CSO)/Non-Governmental Organisations (NGOs) or companies within their regions. In doing so, they are to co-create several research questions with each organisation, for example in co-creation workshops. Section 2.4 then outlines a matrix and filter system for selecting research questions and section 2.5 presents a distribution process for gathered research questions. Section 3 then presents several examples for how research questions can be integrated into the matrix developed in section 2 (see table 3).

The discussion shows that co-creation of research questions is one of the major challenges for implementing CBPR approaches and a success factor for Science Shops. Not only is involvement of target groups and stakeholders important to co-create solutions and socially robust knowledge, as emphasised in the current discussion on transdisciplinarity. It is also crucial to already involve these groups in formulating research problems and questions which is a task on its own. Typically, real-world problems do not come as research questions that can directly be taken up by scientific disciplines. Therefore, interactive processes between researchers and community members will become ever more important to co-produce meaningful research. The concept presented here can offer guiding principles for developing such interactive processes for the case of finding research problems and questions together and translate them into a task for researchers.

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6. Annex

6.1 Status quo research questions of the Science Shop at University Carlos III of Madrid, Spain

Aspect	Guiding questions and comments
Aspects for the target group	
Name	
Institution (optional)	University Carlos III of Madrid
Region	The first study is limited to a specific University (Uc3m) but with its results is expected to have a more impact on other Universities from Spain.
Topic of the Challenge/need (max. 200 words)	The topic is related to Science and Gender in Academia: one of the main problems is the low percentage of women in STEM careers. This has been a highly debated topic and studied along several gender studies. On the University Carlos III of Madrid, the low percentage of women on those careers concern the teachers and Academia staff and are willing to understand its problem and apply the necessary tools to solve it (or at least, reduce the gender gap).
Main question (optional)	The research question is the following: How could women increase its presence in STEM careers?
Motivation and expertise of person who poses research question	The person who poses the research question is an engineering teacher, who is also working in mentoring tasks at secondary school during she is leisure time. She is also interested in being active and involves in the research process because she is working with gender issues and understands the motivation and has detected the possible problems behind it. Besides, other actors such as a Gender Institute from the Library and Information Science Department and a student's Association of Gender at the University are going to be involved. Apart from this, secondary schools (teachers and students) are going to participate in the research process.
Timescale	The question is going to be answered during the on-going course, trying that on the next course more women are enrolled to STEM degrees (at least, at UC3M University). This also will lead to detecting the possible reasons why they do not and carrying out different activities at the secondary schools for promoting their participation.
Intended application	The beneficiary/es will use the information gathered during this research process in order to make different actions and led to a change in the enrolment on the STEM careers. The results are going to be spread into the Uc3m community (Institutes, Associations related to gender) and the correspondence ministry.
Expected Impact	The main beneficiaries will be the different agents of the University community (students, teachers) and the school system (schools, etc.). Besides, this would lead indirectly to a change in the Community (Town Hall, society). In addition, the impact will affect organizations in the University (students' organization, Gender Institute).
Optional aspects for researchers who propose a question	
Required scientific methods	The research methods that are going to be applied for answering the research question are quantitative (survey to the students and teachers)

	and qualitative (interviews with teachers and experts' in gender). As well, different participatory activities, at University level and especially, at secondary schools are going to be conducted.
Required research disciplines/sectors	In order to make this research as much transdisciplinary, different profiles are going to be involved: not only engineering teachers in the University but also other profiles. As well, it should be highlighted the implication of secondary school teachers (from different specialities) will be an important agent on the research process.
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	The Science Shop will count with the enough resources to answer the question: experts on gender field (researchers, Women Association, Women Institute) and possible affected part (students form secondary school). The tools that are going to be used for the research are available at the Science shop. Regarding the skills, all actors involved in the research would contribute with its experience and skills.
Research effort (to be assessed by the Science Shop)	The research effort is in line with the expertise of the Science shop staff on gender issue that the research group from the Science Shop has. The response to the research question will be aligned with the RRI approach. As far as the group knows, none any other institution have aligned this issue with a Science shop, especially in the Spanish framework.

Aspect	**Guiding questions and comments**
Aspects for the target group	
Name	
Institution (optional)	University Carlos III of Madrid (UC3M)
Region	Is limited to a specific region: Madrid Community (Spain) but with its results is expected to have a broader impact on Spanish Universities.
Topic of the Challenge/need (max. 200 words)	The topic is related to sustainability at the Universities and, more precisely, about their inclusion on the curriculum about this topic. This would lead into gaining 'key competencies' of sustainability in the degree programs. The need arises from a lack of this topic in the curriculum and the concern about it of experts' on the field (researchers, teachers, and staff from Environmental Office) as well as students association, which considers this topic as a necessity to be included on the present century.
Main question (optional)	The research question that arises from this topic is the following: How could the sustainability be incorporated in the curriculum at the University level?
Motivation and expertise of person who poses research question	The person who poses the research question is really interested in getting involved in the whole research process. As well, she had a huge experience in sustainability, not only in the topic (because of her background) but with their position, as leading a group of sustainability (Environment Unit inside the University). It is intended that with the results of this research a report would be presented in a policy-makers environment in order to generate debate and commit to integration and alignment of its curriculum dialogue so this could generate a breakthrough. As well, students from the association are willing to

	address this topic which they consider fundamental in the University environment.
Timescale	The initial findings of these research are expected to be done in March 2019. However, the question is going to be answered during the on-going course (until June 2019), trying to involve as much as possible all the agents in the University/Commissions in order to lead to a new change of the curriculum.
Intended application	The beneficiary will spread the research results not only among UC3M University community but also at different scales. On this sense, the information gathered during this research process will be given and discuss to a national committee (Sustainability Commission from the Spanish University Rectors' Conference (CRUE)), which comprises all the Deans of the Universities, in order to obtain a possible change. As well, the information will be sent to the Education Ministry. As well, the application will be according to the ethical framework of the project with the aim to promote research integrity and social acceptability.
Expected Impact	The main beneficiaries will be the different agents of the University community: students, students' organizations, managers, teachers, CRUE commission, etc. As well, this will have an effect on society as well. Results will be published in open access in order to make the information available and replicable to any other University and different dissemination channels will be used to reach different collectives.
Optional aspects for researchers who propose a question	
Required scientific methods	The research methods that are going to be applied for answering the research question are the following: quantitative (survey to the students and teachers in order to know their vision on this perspective) and qualitative (interviews with the managers of the Universities). Furthermore, different activities are going to be carried: panel discussion and co-creation events in order to gain insights from the different actors involved.
Required research disciplines/sectors	In order to make this research as much transdisciplinary research different perspectives are going to be considered. The surveys and the interviews are going to be carried among different disciplines (arts and humanities, social sciences, experimental sciences, biology, medicine and engineering). As well, different researchers are going to conduct the research:social science (sociologists, statistics), engineering, etc.
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	The Science Shop has enough resources to answer the question: experts on sustainability field (researchers, staff from the Environment Office, students association); Academia staff (teachers that are teaching/are involved with projects related with sustainability, management staff, etc.). The tools that are going to be used for the research are available as well on the group that is going to carry the research (LimeSurvey software for the surveys; SPSS for the data analysis, etc.). Apart from the project, no extra funds are needed. Regarding the skills, all the actors involved in the research would contribute with its own skills (research skills, communication, etc.).
Research effort (to be assessed by the Science Shop)	The research effort is in line with other ongoing sustainability projects that the research group from the Science Shop has. In addition, the response will be aligned with an RRI approach, by considering all the

	components, which it comprises. On this regard, it will imply the participation of all actors (from the research community to the government), trying to address social challenges, the results in open access and considering gender equality, etc. As far as the group knows, none any other institution answer this question yet, especially in the Spanish framework.

Aspect	Guiding questions and comments
Aspects for the target group	
Name	
Institution (optional)	University Carlos III of Madrid
Region	At the initial phase of the research, it will be limited to a specific university (University Carlos III of Madrid) but later could be expanded to other Universities. It is expected to could gain an alliance between universities from the Madrid Community or Alianza 4 U (a created alliance between 4 Universities in Spain, in the Catalonian and Madrid region) and later on, expand to other regions.
Topic of the Challenge/need (max. 200 words)	The topic is related to the lack of awareness of sustainability, focused at the Universities. One of the main problems is the lack of sustainability culture at the University, especially at the members of the Academia (teachers and students). Despite the different actions (sustainability actions, sustainability plans) and efforts (conferences, courses, etc.) that are developed in the University, it seems there is no interest in those issues.
Main question (optional)	The research question is the following: How could a sustainability awareness be created at the University environment?
Motivation and expertise of person who poses research question	The motivation of the person who poses the research question is because he has detected there is no interest in this topic at the University. Different activities that have been conducted by the University (Green week) has not have any success. The expertise of the person who poses the research question is because is a teacher of Engineering (more precisely, in Sustainability subjects) and realized about the low interest of students, even with its own students. As well, because of his background and experience, he will like to be involved in all the research process and could bring relevant input to the research as well as the different activities carried during the process. Furthermore, the students' commission will be involved in the process too: some students also belong to the students association related to sustainability. Another actor that is going to be involved is a Ph.D. student which thesis is related to sustainability and belongs to the staff of the Science Shop.
Timescale	The timescale proposed for answering the question is until June 2019. It is expected to increase the interest of the students, students association, teachers and community to this topic during the course. However, some on-going results (a report of all the activities and actions points) are going to be published in February-March 2019.
Intended application	The beneficiary will use these results in order to involve more Academia community into sustainability activities. Despite that, not only the UC3M community will be involved: the Town Hall of the University city will be

	involved in order to broaden the impact and co-work together in the region. This pilot experience, after detecting the strengths and weaknesses, will be extended to other regions (or extend it)/alliances. The results will be published in open access and discussed with different experts/non-experts on the field and will be according to the ethical framework of the project.
Expected Impact	The impact will affect mainly to the students (or students' association) and the University community, and, indirectly, to the region. As well, it is intended the University would have an effect on the social community that surrounds the University. The results are going to be published in a report at the University, as well as a paper in a scientific journal. Also, it is intended to present the results in a Conference in order to have more impact and share experiences with experts on the field about good practices.
Optional aspects for researchers who propose a question	
Required scientific methods	The scientific methods that are going to be used are: quantitative (survey to the students in order to detect its motivation and concern on this topic) and qualitative (interviews with experts). The research process will also imply some dissemination activities as well as some activities such as knowledge café or co-creation events.
Required research disciplines/sectors	Different perspectives are going to conduct the research and work together for getting the answer to the question. On that sense, experts on the field (teachers from different areas, Ph.D. student; researchers involved in sustainability project), the view of the Association of students and the implication of the Environment Unit of the Town Hall will comprise the different agents involved on this research.
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	The science shop has the enough resources in order to do the research and solve the problem. It will have the experts on the field (researchers, staff, etc.), policy makers (Town Hall) and organizations (students' organization). Every group will contribute with its skills and expertise (research knowledge, experience, etc.).
Research effort (to be assessed by the Science Shop)	The research effort will be in the framework of an ongoing project related to sustainability and Universities of the Science Shop staff. Other institutions have no answered the research question in the Spanish framework.

6.2 Status quo developed research questions of the Science Shop in Cyprus (on behalf of KPMG Cyprus)

Aspect	Guiding questions and comments
Aspects for the target group	
Name (of proposer)	Lefkios Sergides (submitted by: Katerina Kaouri on behalf of the Cypriot Science Shop)
Institution (optional)	Terra Cypria (non-profit organisation based in Cyprus)
Region	*Cyprus*
Topic of the Challenge/need (max. 200 words)	*The prices of the housing for rental and for purchases have been rapidly increasing in Cyprus in the last years. At the same time housing development is expanding outside the current developing zones using various loopholes in the Town Planning Legislation. As a result, natural areas are used for housing developments while at the same time many houses remain abandoned in towns and villages. Also, many parcels in housing zones remain unexploited. Many citizens feel this is strongly correlated with governmental policy to attract foreign investment in property in exchange for residency or passports. This has led to : a) the construction of many very tall and large buildings to sell property to the investors at prices much higher than the average salary of locals b) uncontrolled expansion of new houses all over the rural areas. Today it is not known if the available parcels of land and already built houses can serve the needs of the market and if the exploitation of natural areas for that reason is unnecessary and we would like to know this.*
Main question (optional)	*a) Taking into account the current policy for foreign investment in housing in Cyprus, predict the rate of growth of housing prices (sales and rentals). Compare with the average salary of a local worker. Use results to inform recommendations for modifying governmental policy.* *b) Identify the housing needs of Cyprus for the next 10-20 years. Compare these with the currently available housing land (parcels in housing zones and already built houses)*
Motivation and expertise of person who poses research question	*The person is the Director of the NPO and he is very actively interested in the topic. He is involved in citizen groups discussing this issue and he is well connected to policy-makers both government and parliament. He is willing to ask his team to gather data about the challenge and help, as needed, with the research process.*
Timescale	*Within the next 5-6 months*
Intended application	*The NPO want these results so that they can ask for modifications in the policy*
Expected Impact	*The results will be publicly available.*
Optional aspects for researchers who propose a question	
Required scientific methods	*Data analysis and mathematical modelling. Qualitative analysis (surveys and focus groups) may be used as seen fit.*
Required research disciplines/sectors	*Mathematical modelling*

	Economics
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	*The CY Science Shop will aim to answer this question by leveraging partnerships with academic institutions and with resources from KPMG Advisory as needed.. In case of converting this into an MSc project the results will not be available before the end of the Summer 2019*
Research effort (to be assessed by the Science Shop)	*We do not know as yet if this question has been answered in a different country but this is probable. A similar situation evolved in other places, e.g. in London, which led to non-affordable housing, a big societal challenge. We will start with a literature review.*

Aspect	**Guiding questions and comments**
Aspects for the target group	
Name of proposer	Anna Koukkides-Prokopiou
Lead Institution (optional)	AIPFE Cyprus-Women of Europe (NPO based in Cyprus)
Region	*Cyprus (however, as similar questions are being looked at in many EU countries, we will be using EU-wide comparative indicators and data sets). The European dimension and expertise used to tackle this challenge will be further reinforced, as one of the SciShops.eu partners in Spain is, also, working on gender issues.*
Topic of the Challenge/need (max. 200 words) *'Breaking barriers for women in science'*	*Women working in Science in Cyprus, both in business and in academia are much fewer than men, especially at higher levels. Not only do fewer women choose to channel their educational and professional efforts in STEM than men, the higher you move up the career ladder, the less of them you find in the upper echelons of the business and the academic hierarchy. In addition to this, even though smaller than what is applicable for other professions in Cyprus, there is still a sizable gender pay gap. We would like to identify the causes for both these phenomena (quantitative and qualitative divergence), pinpoint the detrimental effect they have in the economy and suggest recommendations for policy-makers to remedy this situation.*
Main question (optional)	*Predict the pay gap between men and women in academia and in business in Cyprus and identify remedial measures*
Motivation and expertise of person who poses research question	*Ms Koukkides Prokopiou is the President of the NPO and she is very actively interested in the topic. She is a gender expert, a political analyst and researcher herself. She is involved in citizen groups discussing gender issues and she is very well connected to policy-makers. She is willing to gather data and be actively involved in the research process, involving other people from AIPFE as needed. Her most recent, government--funded, research work includes policy briefs on gender mainstreaming and the political and economic inclusion of women, based on the premises and the implementation of the UN SDG5 on gender equality in Africa.*
Timescale	*Within the next 5-6 months*
Intended application	*AIPFE in collaboration with the Cypriot Science Shop will use the results of the research project to formulate modifications to the current policy to suggest to the government*

Expected Impact	*Yes, the results will be publicly available.*
Optional aspects for researchers who propose a question	
Required scientific methods	*Data analysis and mathematical modelling. Qualitative analysis (surveys and focus groups) may be used as seen fit.*
Required research disciplines/sectors	*Which research disciplines/sectors should be integrated in the inter-, and/or transdisciplinary research approach (e.g. social science, economic science, sustainability science, mobility). Short space for description and drop-down menu.* *Mathematical modelling* *Economics* *Gender Studies*
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	*The CY Science Shop has partnered up with the CY Study Groups with Industry (which are led by Dr Kaouri, the other member of SciShops in Cyprus). Therefore, within the next European Study Group with Industry in Cyprus which will take place 3-7 December 2018 a team of 6-8 modellers and data analysts will work closely with Ms Koukkides Prokopiou in getting some quick-win results for this challenge. (The ESGI is co-funded by SciShops.) A report will be written within three months after the end of the workshop which will be developed into a white paper for informing governmental policy. An Aspect of the project may also be written as an MSc project that can be absorbed by an academic institution in Cyprus or elsewhere. (The results for the MSc project will not be available before the end of the Summer 2019.)*
Research effort (to be assessed by the Science Shop)	*We do not know as yet if this question has been answered in a different country but it is highly probable, we are conducting a literature survey.*

6.3 Status quo research questions of the Science Shop at the Institute Jožef Stefan, Ljubljana, Slovenia

Research Questions 1: What were the weighting factors of environmental and health impact attributes in the process of siting a transmission line Divača-Beričevo? What other corridor alternatives for the transmission line were considered as feasible? How should the spatial planning process for the transmission line be modified as to effectively include citizens' participation and their opinions and arguments?

The questions were developed in face to face interactions with two citizens groups. First meetings took place during February and March 2018, recent in October 2018. The two citizens' groups are Civil Association of North Route and the civil initiative ZaščitimoOtrokePredSevanjem (transl. Let's Protect Children Against Electromagnetic Radiation).

The key concern behind the above questions are potential health impacts of electromagnetic waves (from transmission lines) to children. In this context further research and optimization is needed associated with spatial planning and siting of electric energy infrastructure. A specific issue and confrontation is raised in relation to planned transmission line Divača-Beričevo (SW part of Slovenia) through settlements, particularly near schools and kindergartens. Since formal siting procedure of this

transmission line did not provide active public participation and effective inclusion of public opinion about corridor alternatives it is expected by the members of the two civil initiatives that activities through a new Science Shop at the Institute Jožef Stefan will be more successful in this context.

Research Questions 2: These are still under development; the issue presented and tackled by the NGO CIPRA is a desire for efficient, environmentally friendly, and healthy transport to schools – walking, cycling, public transport. Mobility plans for two elementary schools are to be developed.

The topic is related to activities focused on preparing and conducting mobility management plans (including associated research) for various communities. The first phase includes elementary schools. Key stakeholders involved are:

- NGO CIPRA – the institution which carries out first phase of research;
- Schools – the formal users of results;
- Pupils/parents – the group who provided interpretation of the needs, visions, viewpoints; they are main users of the mobility management plan proposals.

Stronger voice and more effective policy responses are expected if research and consultations are done through CBPR, i.e. Science Shop at the Institute Jožef Stefan.

6.4 Status quo research questions of the Science Shop at the Wuppertal Institute

The following research questions and challenges have been developed in the framework of the first Climathon event in Wuppertal. The Climathon Wuppertal was hosted by Neue Effizienz (local NPO), University of Wuppertal (Bergische Universität Wuppertal), Climate KIC (EU climate innovation initiative) and the Science Shop at the Wuppertal Institute.

Aspect	
Science Shop at the Wuppertal Institute	
Lead institutions	Climathon Wuppertal project consortium: Neue Effizienz (local NPO), University of Wuppertal, Climate KIC, and Science Shop at the Wuppertal Institute
Name / Institution of proposer	Aufbruch am Arrenberg (local NPO)
Region	City of Wuppertal, Germany
Topic of the Challenge/need (max. 200 words)	**Buying local food without plastic packaging** Plastic packaging allows easy and safe shipping, as well as storage of various products and is widely used. But the consequent amount of packaging waste is a danger to the environment. So how can plastic waste be reduced or even avoided from packaging? In order to operate a sustainable farm, the solutions for the following three fields need to be climate-friendly and as garbage-free as possible: 1. Sales packaging of various fresh foods for selling in a shop 2. Outer packaging for storage and preservation of food by production surplus 3. Transport packaging of food for climate-neutral transport systems The legal regulations for foods such as hygiene and cooling and the possibilities of climate-neutral logistics have to be considered.

Main question (optional)	How can an aquaponic farm pack, store and transport its produced foods in a climate-friendly and low-plastic way?
Motivation and expertise of person who poses research question	Highly motivated expert who is willing to share knowledge and be part of the Climathon Wuppertal event, where citizens and researcher work together for 24 hours to develop solutions.
Timescale	Timescale has not been discussed so far.
Intended application	The registered association Aufbruch am Arrenberg e.V. wants to build a city farm that enables food production in the city. For this purpose, an aquaponic farm will be created, which ensures a sustainable production through closed resource cycles. Products will be fish, vegetables, herbs, shellfish and insects. In order to operate a sustainable farm, besides a sustainable production process, it is important to develop and establish sustainable solutions for packaging as well. Further development of ideas that have been developed at the Climathon Wuppertal event.
Expected Impact	Reduction of plastic use in packaging.
Optional aspects for researchers who propose a question	
Required scientific methods	*Tbd*
Required research disciplines/sectors	*Tbd*
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	It is a feasible topic and necessary expertise can be provided by the Climathon Wuppertal project consortium
Research effort (to be assessed by the Science Shop)	*tbd*

Aspect	
Science Shop at the Wuppertal Institute	
Lead institutions	Climathon Wuppertal project consortium: Neue Effizienz (local NPO), University of Wuppertal, Climate KIC, and Wuppertal Institute
Name / Institution of proposer	Wupperverband (local NPO)
Region	City of Wuppertal, Germany
Topic of the Challenge/need (max. 200 words)	**Climate change adaption and water management** Torrential rains, extreme rains of long duration, emergency situations in many cities in Germany – also in Wuppertal. It is time to prepare for the effects of climate change and for this, citizens and traders have an important role to play. This summer, Wuppertal and many other cities in Germany have been hit by heavy rain. Roads were flooded, in many homes and shops the water was many inches high, the roof of a university building and a gas station collapsed. The costs caused by the storm are considerable. The prevention of flooding and heavy rainfall events and the resulting consequences is a communal task. It serves to protect potentially affected areas such as people, buildings, traffic, the economy, etc. and to avoid costly damages. Municipalities, water management associations and fire departments are also increasingly under pressure, as well as responsible, just like the private sector and local citizens.

Main question (optional)	How can Wuppertal motivate its citizens and traders to protect themselves from future flooding and heavy rain events?
Motivation and expertise of person who poses research question	Highly motivated expert who is willing to share knowledge and be part of the Climathon Wuppertal event, where citizens and researcher work together for 24 hours to develop solutions.
Timescale	Timescale has not been discussed so far.
Intended application	Further development of ideas that have been developed at the Climathon Wuppertal. Nevertheless, application will depend on the research results / ideas that have been developed.
Expected Impact	Increasing awareness of climate change adaption solutions and increasing prevention activities of citizens (especially owners of buildings).
Optional aspects for researchers who propose a question	
Required scientific methods	*Tbd (e.g. Interviews)*
Required research disciplines/sectors	*Tbd*
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	It is a feasible topic and necessary expertise can be provided by the Climathon Wuppertal project consortium.
Research effort (to be assessed by the Science Shop)	*Tbd*

Aspect	
Science Shop at the Wuppertal Institute	
Lead institutions	Climathon Wuppertal project consortium: Neue Effizienz (local NPO), University of Wuppertal, Climate KIC, and Wuppertal Institute
Name / Institution of proposer	ACMS Architekten (local architectural firm)
Region	City of Wuppertal, Germany
Topic of the Challenge/need (max. 200 words)	**Mobility and sustainable urban district development** E-Mobility, Car-Sharing and sustainable energy supply - these are the challenges that urban planning must face today in order to make our cities fit for the future. However, rigid structures that stand in the way of the further development of a neighbourhood are often maintained. The decisions taken in urban planning and the resulting land use and development plans often follow outdated urban planning principles. In many cities, for example, proof of one car parking space per housing unit is still required. What happens to these areas if the requirements in our neighbourhoods are completely different after the switch to e-mobility and car and bike sharing? How can the use of parking areas be adapted to the changing requirements of society and the neighbourhood in the areas of mobility, energy supply and social services? What can a concept for the flexible use of parking spaces look like and how can it be implemented in planning law? Such a redesigned parking space should, for example, be

	- gradually adapted to the needs of users in the neighbourhood, - modular, based on the technological development of the vehicles and types of mobility, - the coupling point of a sustainable, decentralised energy supply for the neighbourhood, - an area for alternative, social use.
Main question (optional)	How can parking spaces in the neighbourhood be used better and more flexibly?
Motivation and expertise of person who poses research question	Highly motivated expert who is willing to share knowledge and be part of the Climathon Wuppertal event, where citizens and researcher work together for 24 hours to develop solutions.
Timescale	Timescale has not been discussed so far.
Intended application	Tbd
Expected Impact	Tbd
Optional aspects for researchers who propose a question	
Required scientific methods	Tbd
Required research disciplines/sectors	Tbd
Aspects for the Science Shop	
Feasibility (to be assessed by the Science Shop)	It is a feasible topic and necessary expertise can be provided by the Climathon Wuppertal project consortium
Research effort (to be assessed by the Science Shop)	tbd