TORCH

TRANSFORMING OPEN RESPONSIBLE RESEARCH AND INNOVATION THROUGH CHARM

TORCH

DELIVERABLE D4.2 – TORCH: COMMON SCIENCE AGENDA CHALLENGE LIST

Project Acronym	**TORCH**
Grant Agreement	101017229
Project Title	**Transforming Open Responsible Research and Innovation through CHARM**
Coordinator	University of Barcelona
Consortium	University of Barcelona
	Trinity College Dublin
	Utrecht University
	University of Montpellier
	Eötvös Loránd University Budapest
Website	https://www.charm-eu.eu/torch

Deliverable	**D4.2**
Title of Deliverable	**Common Science Agenda Challenge List**
Work Package	WP4
Work Package Leader	Prof. Albert Diaz (Director of the Institute of Complex Systems, UB)
Deliverable Type	Report (R)
Dissemination Level	Public (PU)
License	CC BY
Document Version	V8 (FINAL)
Due Date	January 2022
Submission Date	31 January 2022
Authors (Main Beneficiary)	University of Barcelona
Other Contributors	All Consortium Partners

DOCUMENT HISTORY

Date	Revision No	Prepared By	Description
15-11-2021	V1	Prof. Albert Diaz, Prof. Raul Ramos, Dr. Jaime Llorca (UB)	First version of the content
3-12-2021	V2	Teams of Researchers	Researchers input (challenge proposals)
22-12-2021	V3	WP4 Group Members	Discussion and review comments. WP4 approval
11-01-2022	V4	Project Management Team	Discussion and review comments. PMT approval
19-01-2022	V5	Quality Committee	Discussion and review comments. QC Approval
20-01-2022	V6	Prof. Albert Diaz, Prof. Raul Ramos, Dr. Jaime Llorca (UB)	Content revision
31-01-2022	V7	Vice Rectors Committee	VRs approval
31-01-2022	V8	Dr. Jaime Llorca (UB)	Final version

TABLE OF CONTENT

LIST OF FIGURES & TABLES

EXECUTIVE SUMMARY: COMMON SCIENCE AGENDA CHALLENGE LIST

TORCH's WP4 ('Common Science Agenda') aims to put forward a list of research challenges, based on the joint strengths of the CHARM-EU Alliance institutions, and connected to its Thematic Areas (Table ES1), to be developed further as pilots during the second half of the Project. The R&I transformative agenda acknowledges the diverse strengths and specialization of its partners, and relies on their complementarities to put the focus on some relevant challenges clearly connected to the UN SDGs. In addition, it will reflect on the state of the art, the financing mechanisms, barriers and common infrastructures needed to implement them.

Table ES1. TORCH Thematic Lines and correspondence to UN SDGs.

TORCH Thematic Lines	UN SDGs
1. Food, Water, Life & Health	SDG2 - Zero Hunger
	SDG3 - Good health & Well-Being
	SDG6 - Clean Water & Sanitation
2. Biodiversity, Environment, Climate Change	SDG13 - Climate Action
	SDG14 - Life Below Water
	SDG15 - Life on Land
3. Inequality, Economic Growth, Governance, Migration	SDG1 - No Poverty
	SDG5 - Gender Equality
	SDG8 - Decent Work & Economic Growth
	SDG10 - Reduced Inequalities
	SDG16 - Peace, Justice & Strong Institutions
(4. Big Data, Artificial Intelligence)	Transversal

This report lists some research challenges the Alliance could develop further as pilots during the second half of the project, from a multi-disciplinary, multi-university and gender-balanced perspective, combining curiosity-driven and utility-driven research, with a clear view on their societal impact. The methodological approach to find common research strengths among the five universities, and ultimately leading towards the formulation of the challenges, is described in detail. A multi-step participatory process was carried out, which was supported with a bibliographic analysis that helped establish the current state of authorship networks among the Alliance. The participatory process involved 389 researchers in its first phase (Figure ES1), and led to the definition of three target SDGs, considering each partner research priorities:

· SDG3 - Good health & Well-Being

· SDG10 - Reduced Inequalities

· SDG13 - Climate Action
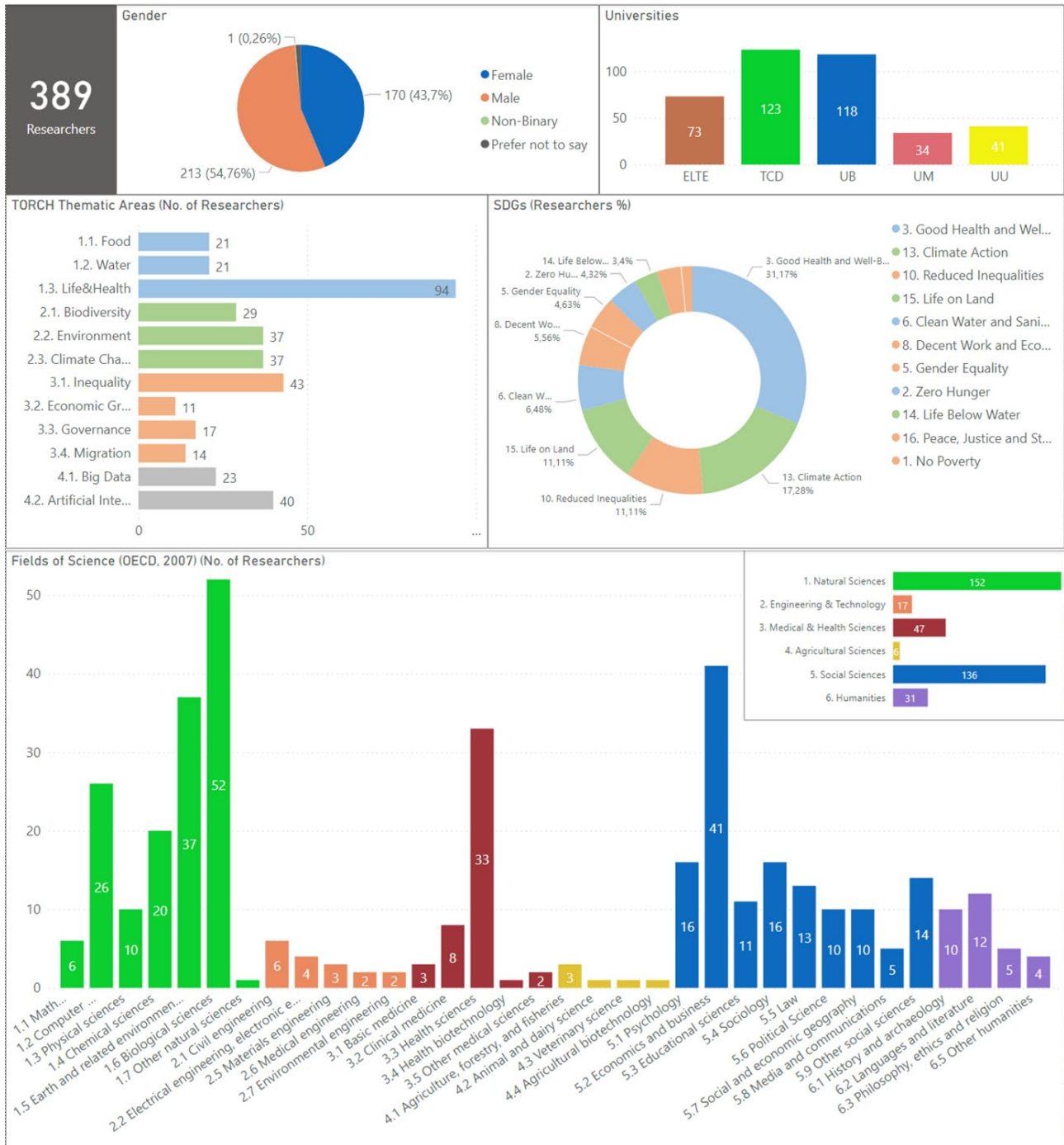
Figure ES1. Research Areas Questionnaire summary. Researchers participation regarding: Gender, University, Preferred TORCH Thematic Area, Preferred SDG, Scientific discipline (OECD, 2007).

A subsequent participatory step facilitated the organization of three SDG-driven focus groups, in which around 100 researchers participated, to settle on the topics that could be developed further as challenges, as well as to find small sub-groups of experts to draft the different proposals. Six

potential research lines, the outlines of which are reproduced in full in this document, emerged as the CHARM-EU research challenges at this stage:

· 'ACTIVE: **A**dult **C**hild and **T**eenage participation **I**n physical acti**V**ity across **E**urope' (SDG3-C1).

· 'Prevention and preparedness of negative effects of climate change on vector-borne infectious diseases' (SDG3-C2).

· 'Coping with digitalization and the transformation of the world of work as a new source of inequalities' (SDG10-C1).

· 'Designing better universities to fight against inequalities' (SDG10-C2).

· 'Preventive Water Sustainable Management of Freshwater resources within a global change frameset (PWSM)' (SDG13-C1).

· 'Mapping Risks, Joining Funds, Taking Actions – Fostering Nature-based Solutions to Mitigate Climate-related Hazards' (SDG13-C2).

These proposals will be shared with the Alliance's academic community (and general public via the appropriate Project's communication channels), and discussed during the first TORCH Annual Forum (Budapest, March 2022), to incorporate the non-academic actors insight. Subsequently, they will be submitted for the consideration of the CHARM-EU Vice-Rectors Committee and Rectors Assembly, in order to establish which of them will be developed further during 2022 as pilots, as described in TORCH WP9 (Action Plans and Pilots). The teams of researchers responsible for their formulation will be encouraged to apply for international and national funding opportunities that will allow implementing them as research projects from 2023 onwards.

1. INTRODUCTION

CHARM-EU represents a Challenge-Driven, Accessible, Research-based and Mobile model for the co-creation of a European University aligned with the European Values and the UN Sustainable Development Goals (SDGs). It is an initiative formed by five research-based universities (University of Barcelona –UB, Trinity College Dublin –TCD, Utrecht University –UU, Eötvös Loránd University Budapest –ELTE, and University of Montpellier –UM). The Alliance was created to become a world example of good practice to increase the quality, international competitiveness and attractiveness of the European Higher Education landscape.

The TORCH Project enhances CHARM-EU's academic and research networks, as it builds up the R&I dimension of CHARM-EU, promoting a challenge-driven transformative agenda with a transdisciplinary and intercultural vision laying its foundation in three Cross Cutting Principles of RRI (Interdisciplinarity; Gendered Innovation; Ethics and Integrity), and four Transformational Modules (Common R&I Agenda; Cooperation with Non-Academic Actors; Open Science Practices; Citizen Science and Public Engagement).

The future R&I dimension, based in three interconnected stages, represents three open questions: What, How and With Whom. The "What" focuses on the challenges at which CHARMEU will drive its efforts, covering three thematic areas: Food, Water, Life & Health; Biodiversity, Environment, Climate Change; and (In)Equality, Economic Growth, Governance, Migration (plus a transversal area on Big Data and Artificial Intelligence). The "How" encompasses the principles of Responsible Research and Innovation and Open Science. Finally, the "With Whom" fosters transdisciplinary and interculturality through Cooperation and Engagement with other sectors (Table 1).

Table 1. TORCH Open Questions and Target Thematic Areas.

Questions	Thematic Areas & Challenges
What	Food, Water, Life & Health
	Biodiversity, Environment, Climate Change
	(In)Equality, Economic Growth, Governance, Migration
How	Responsible Research and Innovation
	Open Science
With Whom	Cooperation and Engagement between Universities and other sectors
	Transdisciplinarity and Interculturality

TORCH's WP4 ('Common Science Agenda'), for which this report is the second step, aims to develop a list of research challenges the Alliance could tackle in each Thematic Area, which could be developed further as pilots during the second half of the Project. The CHARM-EU R&I transformative agenda acknowledges the diverse strengths and specialization of its partners, and relies on their

complementarities to put the focus on some relevant challenges clearly connected to the UN SDGs. In addition, it will reflect on the state of the art, the financing mechanisms, barriers and common infrastructures needed to implement them.

A preliminary analysis on specialization and complementarities (deliverable D4.1 'Strengths & Complementarity Report)[1], mainly based on bibliometrics, was carried out within the initial task of WP4, as a first step to identify potential strengths of each institution and past collaboration across the Alliance. This previous analysis helped identify some main research trends within the five universities, and provided a valuable insight on their scientific output during recent years. However, it is essential to consider the bibliometrics intrinsic limitations (regarding databases coverage, as well as publication, citation and authorship practices among different scientific fields) as an exclusive method to establish research priorities, complementarities, and/or strategies.

This second report of TORCH's WP4 specifically deals with the challenges the Alliance could develop, from a multi-disciplinary, multi-university and gender-balanced perspective, combining curiosity-driven and utility-driven research, with a clear view on their societal impact. The main objective is to determine and outline a list of research challenges that could be developed further as pilots within TORCH'S WP9, based on the partner expertise and the critical research mass the collaboration will reach that could not be reached by each institution by itself. However, the aim is not only to come up with a few possible challenges, but also to explore ways to: 1) find common research interests among the five universities, combining a bottom-up perspective and the diverse institutional research strategies; 2) bring researchers together around some priority scientific topics with a transdisciplinary and SDG-driven approach.

This document focuses on describing the methodological procedure leading to the challenges production (Section 2), as well as on establishing the status of authors networks and past collaborations across the Alliance (Section 3). The results, in terms of participation along the process, are presented in Section 4.1; while the final detailed list of research challenges is shown in Section 4.2. To conclude, Section 5 sums up the main findings and outlines the next steps.

---

[1] Deliverable D4.1 - Strengths & Complementarity Report is classified as confidential, and as such is only available for the members of the consortium and the EC services.

2. METHODOLOGY

This section describes the methodological steps taken throughout the WP4 task 4.2 in order to reach the aforementioned goals, resulting in the assemblage of different teams of researchers to develop a series of SDG-driven research challenge proposals.

The TORCH Project, as established in its Grant Agreement, defined four priority Thematic Lines in which the CHARM-EU Alliance will focus when developing its research dimension:

1. Food, Water, Life & Health.

2. Biodiversity, Environment, Climate Change.

3. Inequality, Economic Growth, Governance, Migration.

4. Big Data, Artificial Intelligence.

Given the formulation of the challenges aimed to combine a curiosity- and a utility-driven approach, with societal needs as its focal point, a preliminary step was to link the TORCH Thematic Lines with different UN Sustainable Development Goals (SDGs)[2], as shown in Table 2. This way, both the process and outcome of the challenges production is steered by and organized around the diverse SDGs.

Table 2. TORCH Thematic Lines and correspondence to UN SDGs.

TORCH Thematic Lines	UN SDGs
1. Food, Water, Life & Health	SDG2 - Zero Hunger
	SDG3 - Good health & Well-Being
	SDG6 - Clean Water & Sanitation
2. Biodiversity, Environment, Climate Change	SDG13 - Climate Action
	SDG14 - Life Below Water
	SDG15 - Life on Land
3. Inequality, Economic Growth, Governance, Migration	SDG1 - No Poverty
	SDG5 - Gender Equality
	SDG8 - Decent Work & Economic Growth
	SDG10 - Reduced Inequalities
	SDG16 - Peace, Justice & Strong Institutions
(4. Big Data, Artificial Intelligence)	Transversal

---

[2] UN Sustainable Development Goals: https://sdgs.un.org/goals

TORCH
Transforming Open Responsible Research and Innovation through CHARM

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017229.

As shown in Figure 1, the methodological approach comprised a main path: 1) a multi-step participatory process, involving researchers from our five universities, to define some research challenges and potential teams to develop them; and the creation of a supporting tool: 2) a bibliographic networks analysis to learn on the current state of the Alliance's collaborations[3], which helped establish a knowledge base of the members of the consortium willing to join the participatory process. The following sections provide a detailed description of both methods.
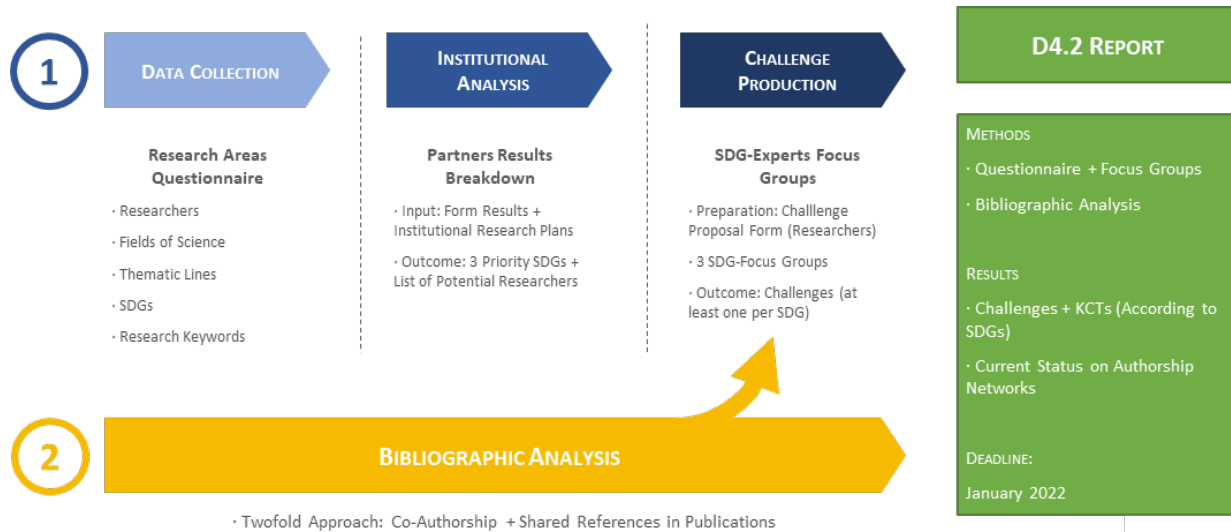
Figure 1. Methodology paths and steps: 1) Definition of research challenges through a participatory process involving researchers; 2) Bibliographic analysis to set the state of the art of past collaborations among the Alliance.

2.1. Research Challenges Formulation

The path to formulate the different research challenges comprised three main steps (Figure 1):

· A questionnaire distributed among researchers from the five universities to collect information about their scientific disciplines and interests (in relation to TORCH Thematic Lines and the UN SDGs)[4].

· An analysis of the results from an institutional point of view (conducted by each one of the Alliance partners). In order to decide the priority research areas and SDGs, considering the researchers input and the institution Research Strategic Plan.

· Several expert focus-groups to finally produce the challenge proposals, preceded by a short questionnaire focused on refining their research interests and expertise.

---

[3] For a deeper analysis on this, see deliverable D4.1 - Strengths & Complementarity Report (confidential).

[4] The form and their distribution among researchers were approved by the University of Barcelona's Bioethics Commission (CBUB), as well as by the Trinity College Dublin's Ethics Board, besides the five universities Data Protection Offices.

Research Areas Questionnaire (Data collection)

The Research Areas Questionnaire (distributed via Microsoft Forms) was intended to produce a dataset of researchers at the five universities, containing the following information: personal and professional details, scientific expertise (according to the Fields of Science Classification[5]), and research interests and keywords (according to TORCH Thematic Lines and UN SDGs). The full questionnaire can be found in Annex I, and its results regarding participation in section 4.1 (Participatory Process).

This dataset's purpose is twofold. First, it helps to find out where the participants research interests and expertise lie, as a first step to identify common interests with a bottom-up approach. Secondly, it makes it possible to establish an initial grouping of researchers according to Thematic Areas and disciplines.

Prior to distributing the questionnaire, each university determined which of their researchers were to be invited to contribute at this stage. TCD opted to circulate it among all its academic staff. UB, ELTE and UU chose to share it with a limited list of researchers (TORCH researchers, plus the CHARM-EU KCTs). UM established a core team of researchers that nominated other potential participants to expand the list. The final number of researchers invited to participate is shown in Table 3.

Table 3. Partners' number of researchers invited to fill out the Research Areas Questionnaire.

	UB	TCD	UU	ELTE	UM
No. of Researchers	160	1860	64	117	50

Institutional Analysis

Once the researchers' input was collected, the five partners analyzed its own results following the scheme below. That partial outcome was then discussed among the members of the WP4 working group to agree upon the (at least three) SDGs (linked to the three Thematic Areas) to be pursued further.

> **Q1**: What was the approach to determine which researchers from your university were to be invited to complete the form?
>
> **Q2**: How many researchers from your university received the form? (in order to calculate the response ratio)
>
> **Q3**: According to your university Research Strategy Plan (or similar), what are the priority research lines/fields/topics?

---

[5] Fields of Science Classification (OECD, 2007): https://www.oecd.org/science/inno/38235147.pdf.

> **Q4**: Are these priority research lines/fields/topics well represented among the form respondents? Which of them are and which not?
>
> **Q5**: Based on the form results (only your university's), do you consider the distribution among research fields is well balanced?
>
> **Q6**: If not, which research fields are not well covered or underrepresented?
>
> **Q7**: Based on the form responses (only your university's), which TORCH Thematic Areas we could pursue?
>
> **Q8**: Based on the form responses (only your university's), which SDGs we could pursue?
>
> **Q9**: Is there any potential way, initiative or action to include non-academic actors in the process you would like to suggest?

In addition, each partner was required to nominate a series of researchers (among those who had responded the Research Areas Questionnaire) that might potentially participate in the subsequent focus groups and the research challenges drafting, taking into account the priority Thematic Areas and SGDs. Each partner's partial analysis and results can be found in section 4.1 (Participatory Process). The final number of researchers nominated as potential participants in the focus groups is shown in Table 4.

Table 4. Partners' number of researchers nominated as potential participants in the focus groups.

	UB	TCD	UU	ELTE	UM
No. of Researchers	26	16	28	47	14

Challenges Production

The first step in the path to produce the diverse challenges was to arrange three expert focus groups, one per each selected SDG. Prior to that, each partner's nominated researchers (Table 4) were invited to fill out a second brief questionnaire (Research Challenges Focus Groups Questionnaire, see Annex II), in which they were requested to propose a research challenge linked to the SDG(s) of their interest, according to their expertise. Besides setting out the challenge, the questionnaire also asked for details to develop it, such as bibliographic references on the topic, and how transdisciplinarity, gender perspective, and involvement of non-academic actors were relevant to potentially implement it. The full questionnaire can be found in Annex II, and its results regarding participation in section 4.1 (Participatory Process).

Once collected via questionnaire, all the individual challenge proposals were grouped under a few more general topics, in order to help center the discussion. The main objective of the focus groups was for the researchers involved to agree upon a challenge (or challenges) that could be developed further, as well as to find multi-disciplinary, multi-university, gender-balanced small sub-groups to

take on the task. Once the challenges and their corresponding teams of researchers were identified, these were requested to work together in a self-organized way to compose a short document explaining the research challenge, following a pre-established format. The template to elaborate on the challenges can be found in Annex III. Results regarding participation in the focus groups, as well as the final challenge list, are shown in section 4.1 (Participatory Process) and section 4.2 (Research Challenge List).

2.2. Bibliographic Analysis on Current Authorship Networks

This section provides a detailed description on the methodological steps taken to carry out a bibliographic analysis that aimed to learn on past collaboration among researchers within the five universities. To this purpose, an interactive tool was developed to be put at the Alliance's academic community disposal to uncover authors networks, based on past scientific outputs. This tool would not only surface clusters of researchers with common research interests, but also aided the decision-making process as a supplementary input to the aforementioned participatory process. Furthermore, it will be a convenient instrument to complete the diverse teams of researchers who would develop further the research challenges.

Data collection

Once collected the dataset originating from the Research Areas Questionnaire (see section 2.1. 'Research Challenges Formulation'), filled in by researchers at the five institutions[6], we made use of the following information, according to different blocks:

· Name: to be identified along the process.

· ORCID: provided mainly by the researchers, but we used Scopus AU-ID instead for completeness, since many authors do not have completed their profiles in ORCID.

· Research interests (according to TORCH Thematic Areas and UN SDGs): these fields were used to construct three different datasets[7], corresponding to the priority SDGs (see section 2.1 'Institutional Analysis').

· Professional information (University and Department) and keywords chosen by the researchers: this data was used in the final visualization.

As stated above, three independent datasets were constructed according to the SDGs. Each dataset consisted of all AU-ID of the researchers that have chosen either that SDG as an interest or the thematic lines related to that SDG. The following steps have been performed:

---

[6] Results regarding participation in the Research Areas Questionnaire are shown in section 4.1 ('Participatory Process'). The data collection described here refers to the 389 researchers who responded the questionnaire.
[7] The selected SDGs in which the research challenge proposals would be focused on are listed in section 4.1 ('Institutional Analysis'). The three datasets mentioned here correspond to those three SDGs.

Step 1: Processing the questionnaires data

Code in *complete_author_info_and_scopus_queries.ipynb* (Ipython notebook).

At a first stage, we were confident on using the authors' names (as it was provided by the researchers) to identify them, but this presented a problem regarding the correspondence between the questionnaires and the publications data (in the form of BibTeX files obtained from Scopus; see Step 3), since the form of a given author's name may vary between different publications and also because names can be repeated among researchers.

Handling this took some time. We first tried manually accounting for the variants and building a unique identifier from them, but it still left some relevant publications out. We considered making use of an already existing unique identifier (ORCID, or Scopus' Author ID –AuID from now on-), but we were missing some ORCID and all AuID in the questionnaires and publication data (and the ORCID had the disadvantage of being outdated or even non-existent for some authors, since it is its own responsibility to maintain it).

Step 2: Retrieving publication data

The data was exported from Scopus as shown in Figure 2.

Figure 2. Scopus data export scheme.

With a complete information for all the publications exported in BibTeX format, as required for the bibliographic packages used. In this format all the names of the authors are obtained, but not the AuID's. However, by using CSV format when downloading the information all the authors where identified with the proper AuID. This fact allowed for a perfect match between unambiguously identified researcher names and AuID in the next step.

Step 3: Preprocessing publication data

Code in *clean_bibtex.ipynb* (Ipython notebook).

The preprocessing consisted of making new BibTeX files by replacing name variants by unique names through the AuID (mapping between the publication CSV and BibTeX files and the questionnaires information), replacing special characters that would otherwise be removed by bibliometrix (the R package used for bibliographic analysis), limiting the affiliation names to those of the universities that are part of the alliance, and removing authors not included among the 389 that responded to the questionnaire.

Step 4: Bibliographic analysis of the publication data

The cleaned BibTeX files were then imported in the Bibliometrix package.

Step 4.1: Static analysis

For making the static analysis we used the *biblioshiny* interface (Figure 3) that provides some interactive tools as, for instance, TreeMaps, citations analysis, clustering of documents and authors according to different rules.
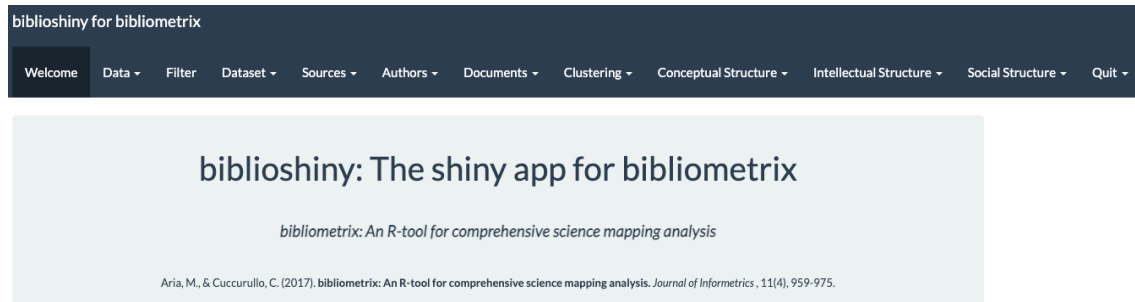
Figure 3. Biblioshiny interface.

The information we generated and was provided to the focus groups of the different SDG's is summarized in the Figure 4 (for SDG 10).
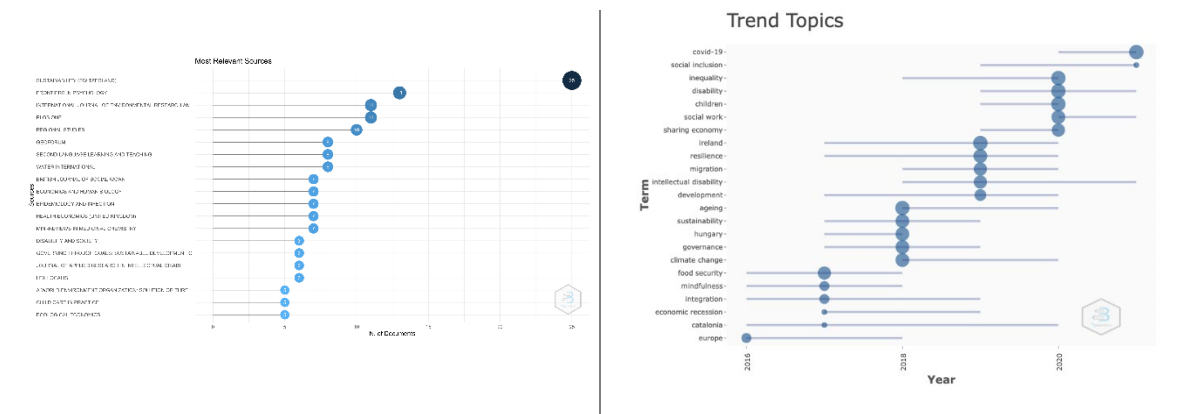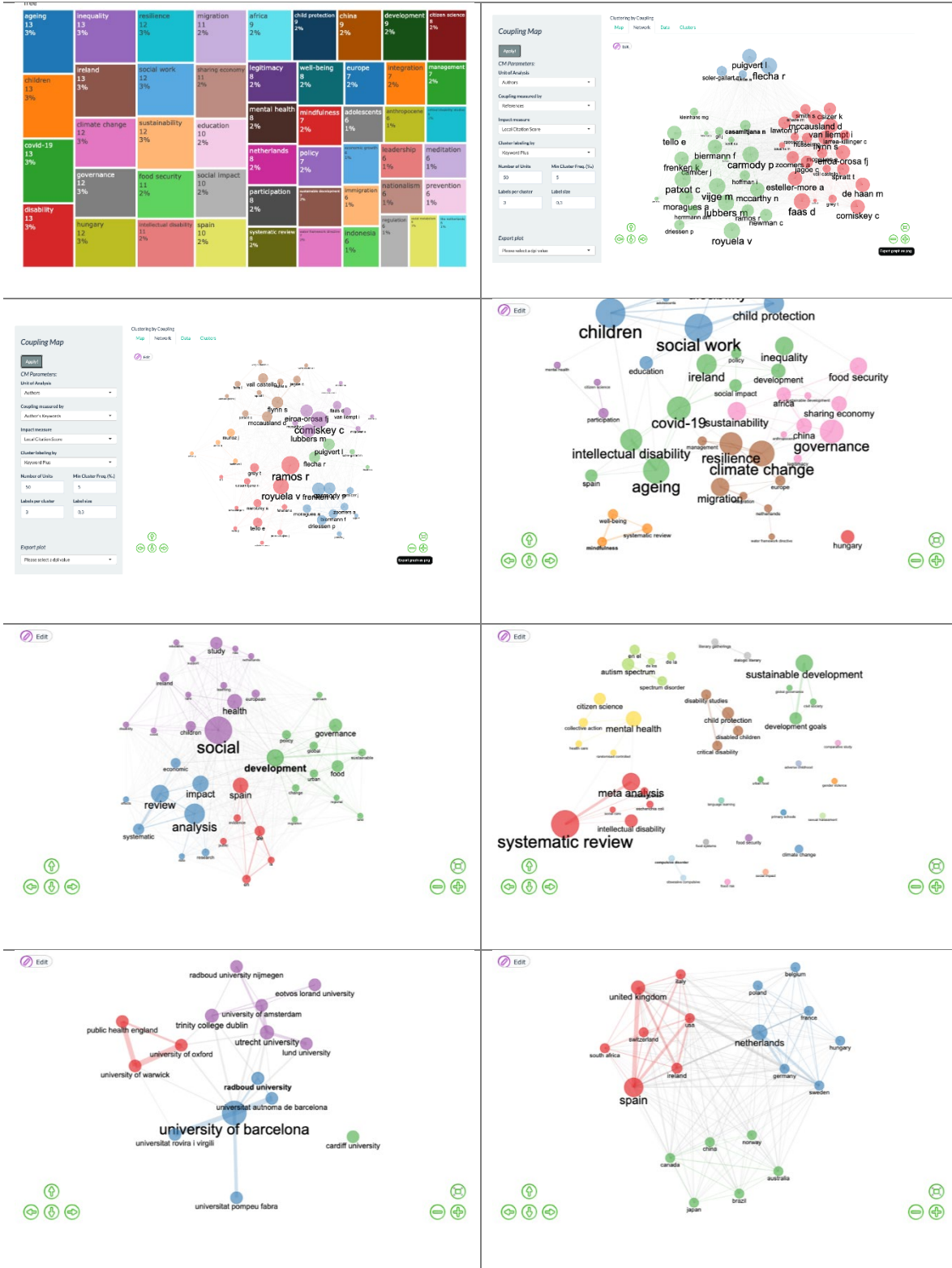
Figure 4. Summary of bibliographic network analysis.

Step 4.2: Interactive dynamical analysis

For making a dynamic analysis we provided to the focus groups with an interactive tool. We applied the scripts of the Bibliometrix package on the clean BibTeX data sets we created in the previous step. This tool enabled us to create networks according to different bibliographic criteria: collaborations between authors, coupling between authors according to shared keywords, and coupling between authors according to shared references. Once the networks have been created they are exported in json format to be used by the web application. The visualization was made with the D3 JavaScript library, a standard tool for intuitive and interactive visual web apps. It was then uploaded to the Project server, and is accessible at www.charm-eu.eu/torchlibrary/, being currently and temporarily password protected. Figure 5 shows snapshots of the three networks generated with the data of SDG10.
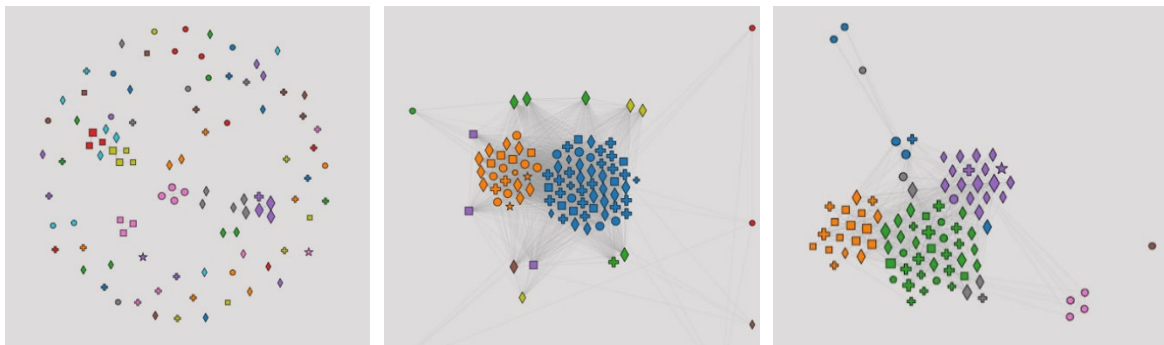
Figure 5. Summary of bibliographic network analysis. Interactive bibliographic networks from the dataset related to SDG10. From left to right: collaboration network, coupling network according to common references, and coupling network according to common keywords.[8]

The *collaboration* network shows a link between two researchers if they co-authored a paper in recent years, while in the *coupling* networks links encode a measure of resemblance based on *cited references* or *keywords used*, respectively. Similar nodes (in terms of who they are more tightly connected to and hence belong to the same topological community) are clustered and have the same color. The shape is determined by the author's university. Greater node size indicates a larger number of publications. The networks are interactive: you can click-on and drag the nodes, hover the mouse on a node to see the author's name or click on the node to see the author's info panel. The panel provides the information collected from the questionnaire (university, department, and keywords) plus the publications from Scopus; publications are linked to their DOI in such a way that when the publication is clicked a tab of the browser opens in the address providing a quick access to the publication itself. The nodes of the networks can also be filtered by picking a minimal number of connections for them to appear (default is 0). Labels can be enabled to identify researchers immediately or authors can be searched by name.

---

[8] Researchers names and data were removed in the sample images displayed here to comply with national and European Privacy regulations. However, the app can be made available for the EC services upon request.

3. NETWORKS AS A BIBLIOGRAPHIC ANALYSIS TOOL OF THE ALLIANCE'S COLLABORATIONS STATE-OF-THE-ART

Research project applications can arise from either top-down or bottom-up strategies. In the first strategy, institution research authorities promote specific lines of research according to the institutional strengths and research objectives, whereas in the latter, researchers propose projects according to their own skills and knowledge. Being CHARM-EU/TORCH the common project resulting from an alliance between different universities, we have followed a bottom-up procedure. This approach deals with a lot of academic and scientific information that needs to be put in the right context to be useful in creating a corpus of shared interests. Publication records are usually the common output indicator that allow monitoring research advances and researcher interests. This information can be extracted currently from private databases as WoS or Scopus. In the first deliverable, D4.1, a merely "paper counting" approach was used to identify the SDGs in which the universities of the alliance could be stronger. However, the next step has to identify shared (or complementary) interests and skills and therefore, more sophisticated analytic tools are required.

In this context, many disciplines have made a wide use of networks to visualize different kinds of interactions between the parts that form a complex system, even in an interactive manner. Bibliographic analysis of publications has also used this kind of approach, which uncovers unexpected patterns of collaborations among researchers, and reveals common interests by identifying shared references, or keywords to define their work.

To illustrate our point, below there is two recent examples of what has been called by some authors as "Science of science", namely the issue celebrating the 150 years of Nature journal (Figure 6, top), and the December 2021 issue of Nature Reviews Physics (Figure 6, bottom).
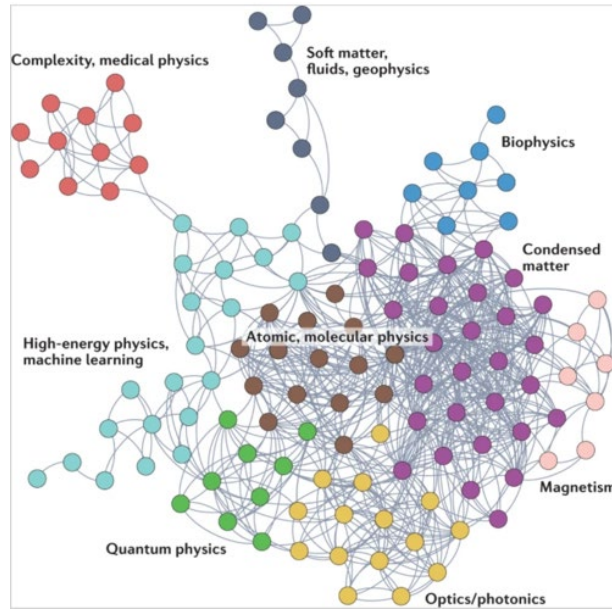
Figure 6. Top: 150 years of Nature, capture of the web of the journal. Bottom: Network of papers published in Nature Reviews Physics.

In the first case, a team of complex network scientists elaborated an impressive visualization of all the publications in Nature interconnected by their citations. Figure 6 (top) shows see a capture of the Nature web site. The interactive application can be found online[9].

In the second case, the editors of Nature Reviews Physics made a qualitative analysis of all the papers published during the three years of "life" of this journal. The network constructed using the similarity of the paper's keywords enables the identification of communities and highlight the areas that are poorly connected to the rest of the fields in the network and therefore deserve further impulse in the years to come. In Figure 6 we show this network and the editors' comments are available online[10].

The analysis performed in the TORCH project covers:

· The common corpus of knowledge of the researchers by means of a network in which the authors are connected in terms of the similarity of the references used in their papers, which could be considered metaphorically "the past".

· The direct collaborations among the researchers in the last years by means of co-authorship, and this network reflect "the present".

· The network based on similarities of paper's keywords, which indicates the common interest of the researchers for "future" collaborative work.

---

[9] https://www.nature.com/immersive/d41586-019-03165-4/index.html
[10] https://www.nature.com/articles/s42254-021-00399-y

20

In Figure 5 of the previous section we have presented snapshots of these networks, which are interactive, searchable and provide complete information on the researchers, their publications, their interactions, and their common features.

This interactive tool was made available to the SDG-driven focus groups when discussing the definitive proposal of the challenges, as it allows to identify the relevant authors according to their position in the network. By clicking on the node, it shows a menu that includes all the details of the affiliation of the researcher, a list of keywords, and an interactive list of publications related to the topic. In this list, every line provides the publication URL, so by clicking on the link a new tab opens with the URL of the publication.

Highlighting the "hubs", that is, the more central authors –which provide the strongest links among research interests– allows to identify shared areas of growth. Moreover, the description of research communities, identified by different colors in the application, allows to uncover researchers working on common goals, who are yet unknown to each other, but can contribute to future collaborations. We are convinced that further analysis in search of more researchers will prove also useful when the challenges are developed in the second half of the project. This approach is also scalable to include other universities or if merging several university alliances. Finally, even when the project is over, the application itself and the data it represents could be eventually made publicly available as a representation of the strengths and skills of the teams. Finally, we would like to highlight that for the sake of the project transparency, all the code will be posted and made publicly available in open repositories, as GitHub, for external use for other scientists.

4. RESULTS & RESEARCH CHALLENGES LIST

This section presents the results in terms of participation across the aforementioned methodological steps, as well as their outcome, in the form of a list of potential research challenges CHARM-EU could face, given the diversity and complementarity of the Alliance strengths, with a focus on trans-disciplinarity and with a clear view on their societal impact. The participatory process involved close to 400 researchers within the five universities, and encompassed three successive steps leading to the research challenges formulation:

· Researchers contribution to the Research Areas Questionnaire.

· Results analysis from an institutional perspective, in order to determine the priority Thematic Areas and key SDGs to be pursued.

· Researchers participation in SDG-oriented focus groups to settle on the main research topics to be addressed, as well as to identify sub-groups that could formulate the diverse challenges (considering all the individual challenge proposals previously received via a second short form).

4.1. Participatory process

Research Areas Questionnaire (Data collection)

The Research Areas Questionnaire was distributed among researchers at the five universities, and produced a dataset with 389 individual responses[11] (Table 5), covering personal and professional details (affiliation), scientific expertise (based on the OECD Fields of Science classification), and research interests regarding TORCH Thematic Lines and the UN SDGs. A summary of the results is shown in Figure 7. From a gender-balance perspective, the ratio was 43.7% female, 54.7% male respondents. All TORCH Thematic Areas (and subareas) were represented, being the most prominent "1.3. Life & Health", followed by "3.1 Inequality", "2.2 Environment" and "2.3 Climate Change". The five broad scientific fields were also present, with a stronger representation of the Natural Sciences (specially, Biological Sciences, Earth Sciences, and Computer Sciences among others), Social Sciences (particularly, Economics and Business, Psychology and Sociology, among others), and Medical and Health Sciences. The Humanities, Engineering and Technology and Agricultural Sciences disciplines were also represented to a lesser extent (Figure 7).

Table 5. Research Areas Questionnaire. Partners' number of researchers invited to participate and final number of respondents.

	UB	TCD	UU	ELTE	UM
No. of Researchers Invited	160	1860	64	117	50
No. of Respondents	119	123	41	73	33

---

[11] In order to comply with national and European Privacy Regulations, the full list of researchers is not published in this document. It could however be made available for the EC services upon request.
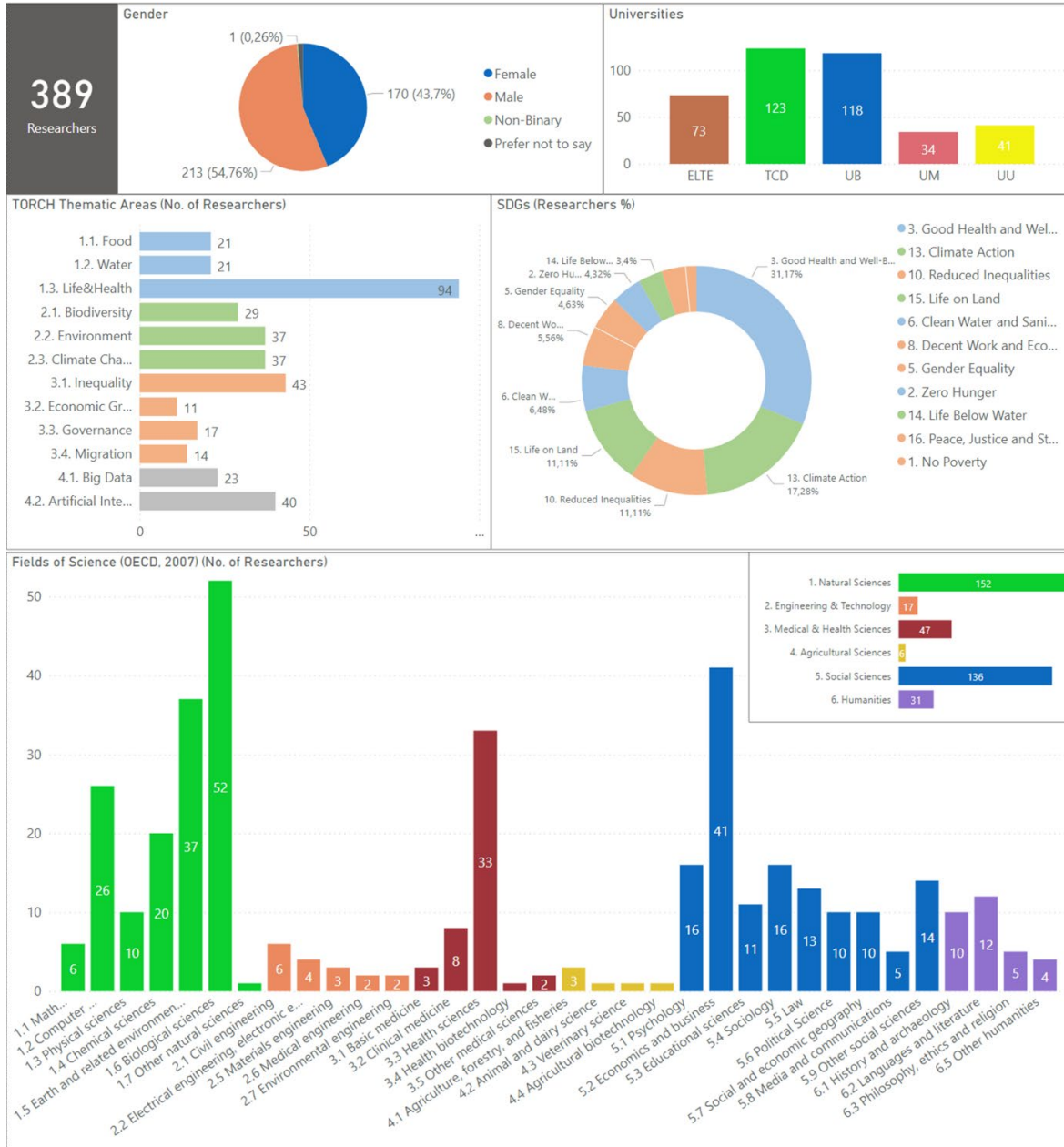
Figure 7. Research Areas Questionnaire. Participation summary regarding: Gender, University, Preferred TORCH Thematic Area, Preferred SDG, Scientific discipline (OECD, 2007).

Institutional Analysis

After closing the Research Areas Questionnaire, each partner examined the results, incorporating also the institutional perspective, to determine which of the TORCH Thematic Areas and SDGs could be developed further. Table 6 summarizes the partners' standpoint at this stage. This partial analysis was discussed within the WP4 working group, to settle on the three SDGs the research challenges would be linked to:

· SDG3 - Good Health & Well-Being.

· SDG10 - Reduced Inequalities.

· SDG13 - Climate Action.

Table 6. Partners' analysis on the priority Thematic Areas and SDGs.

	UB	TCD	UU*	ELTE	UM
Approach	Selected researchers (TORCH + CHARM KCT)	All academic staff	Selected researchers (TORCH + CHARM KCT)	Selected researchers (TORCH + CHARM KCT)	Senior staff defined the core researchers. Those nominated potential candidates to expand the team
Response Ratio	119/160 (74%)	123/1860 (7%)	41/64 (64%)	73/117 (62%)	34/50 (68%)
Priority Research Areas (University Strategic Plan)	n/a	(1) Climate Change, Environment, etc. (2) Cancer (3) Infectious Diseases (4) Law (5) Policy	(1) Dynamics of Youth (2) Institutions for Open Societies (3) Life Sciences (4) Pathways to Sustainability	(1) Application and IT Solutions (2) Astrophysics and Particle Physics (3) Culture and family (4) Diagnostics and therapeutics (5) Material science (6) Problem solving sys. (7) Chemistry and biochemistry	MUSE priority areas (Feed-Protect-Care)
TORCH Thematic Areas	1.1. Food 1.2. Water 1.3. Life & Health 2.1. Biodiversity 2.2. Environment 2.3. Climate Change 3.1. Inequality 3.2. Economic Growth 3.3. Governance 3.4. Migration	1.1. Food 1.2. Water 1.3. Life & Health 2.1. Biodiversity 2.2. Environment 2.3. Climate Change 3.1 Inequality 3.2. Economic Growth 3.3. Governance 3.4. Migration	1.1. Food 1.2. Water 1.3. Life & Health 2.1. Biodiversity 2.2. Environment 2.3. Climate Change 3.1. Inequality 3.2. Economic Growth 3.3. Governance 3.4. Migration	1.1. Food 1.2. Water 1.3. Life & Health 2.1. Biodiversity 2.2. Environment 2.3. Climate Change 3.1 Inequality 3.2. Economic Growth 3.3. Governance 3.4. Migration	1.1. Food 1.2. Water 1.3. Life & Health 2.1. Biodiversity 2.2. Environment 2.3. Climate Change 3.1. Inequality 3.2. Economic Growth 3.3. Governance 3.4. Migration
SDGs	2. Zero Hunger 3. Good Health & W… 5. Gender Equality 6. Clean Water & Sani… 8. Decent Work & Eco… 10. Reduced Inequalit… 13. Climate Action 14. Life Below water 15. Life on Land 16. Peace, Justice & S…	2. Zero Hunger 3. Good Health & W… 5. Gender Equality 6. Clean Water & Sani… 8. Decent Work & Eco… 10. Reduced Inequalit… 13. Climate Action 14. Life Below water 15. Life on Land 16. Peace, Justice & S…	2. Zero Hunger 3. Good Health & W… 5. Gender Equality 6. Clean Water & Sani… 8. Decent Work & Eco… 10. Reduced Inequalit… 13. Climate Action 14. Life Below water 15. Life on Land 16. Peace, Justice & S…	2. Zero Hunger 3. Good Health & W… 5. Gender Equality 6. Clean Water & Sani… 8. Decent Work & Eco… 10. Reduced Inequalit… 13. Climate Action 14. Life Below water 15. Life on Land 16. Peace, Justice & S…	2. Zero Hunger 3. Good Health & W… 5. Gender Equality 6. Clean Water & Sani… 8. Decent Work & Eco… 10. Reduced Inequalit… 13. Climate Action 14. Life Below water 15. Life on Land 16. Peace, Justice & S…
Nominated Researchers	26	16	28	47	14

Approach: Partners' way to select researchers to be involved in the next phase. Response Ratio: No. of respondents/no. of researchers invited to participate. TORCH Thematic Areas (colored): Priority areas per university (considering the questionnaire results and the institutional priorities). SDGs (colored): Priority SDGs per university (considering the questionnaire results and the institutional priorities). Nominated researchers: no. of researchers invited to participate in the subsequent focus groups (considering the selected Thematic Areas and SDGs).

*UU opted not to pick any priority specific Thematic Area or SDG, under the viewpoint that all of them could be pursued.

Each university also provided a list of researchers that could potentially participate in the SDG-focus groups and be part of the sub-groups drafting the challenges (Table 6).

Challenges Production

Once the priority SDGs were defined, 131 researchers at the five universities were invited to fill a questionnaire (see Annex II), in which they were requested to briefly outline a key research challenge, based on their expertise and interests, linked to (at least) one SDG of their choice. The distribution across universities and final number of respondents is shown in Table 7. The resulting dataset was used to assign researchers to three different focus groups, according to their choices, linked to the three selected SGDs: SDG3 (Good Health & Well-Being), SDG10 (Reduced Inequalities, SDG13 (Climate Action). Figure 8 summarizes the questionnaire responses concerning SDG choices.

Table 7. Research Challenges Focus Groups Questionnaire. Partners' number of researchers invited to participate and final number of respondents.

	UB	TCD	UU	ELTE	UM	Total
No. of Researchers Invited	26	16	28	47	14	131
No. of Singular Responses	14	12	12	31	12	81
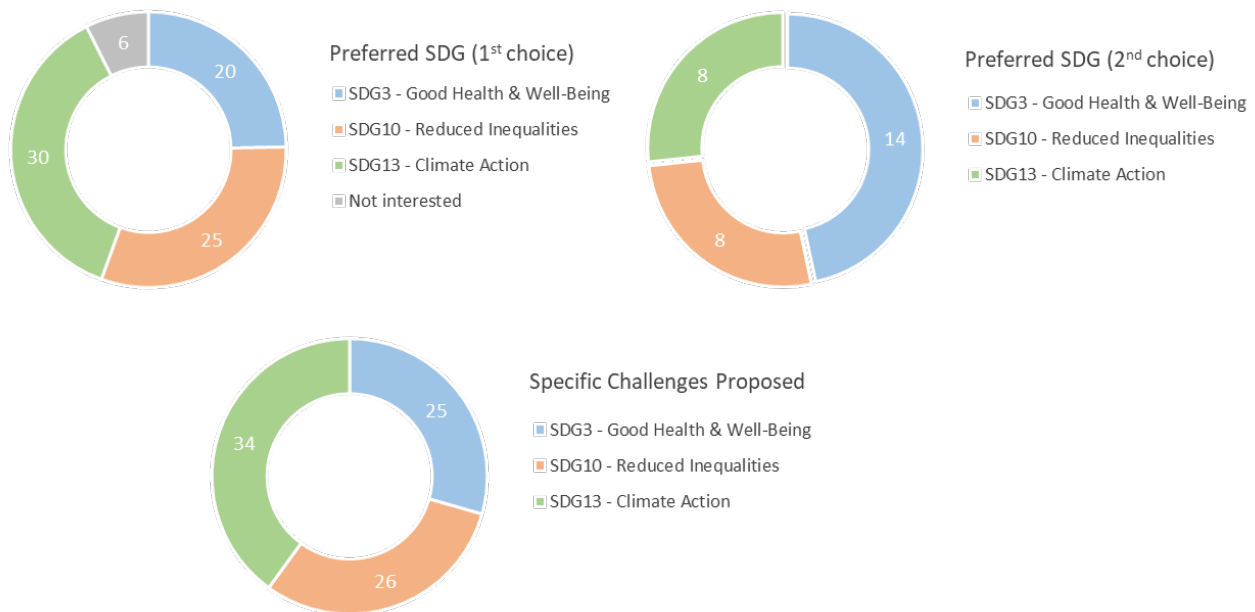
Figure 8. Research Challenges Focus Groups Questionnaire. SDG choices and proposed specific challenges.

The individual challenges proposed via questionnaire were grouped into more broad topics that helped steer the discussion within the focus groups. Participation in the focus groups is summarized in Figures 9-11 and Tables 8-10.

As shown in Figure 9, 34 researchers with diverse backgrounds picked SDG3. Twenty-five individual research challenges were received and grouped into three broader proposals (Table 8).
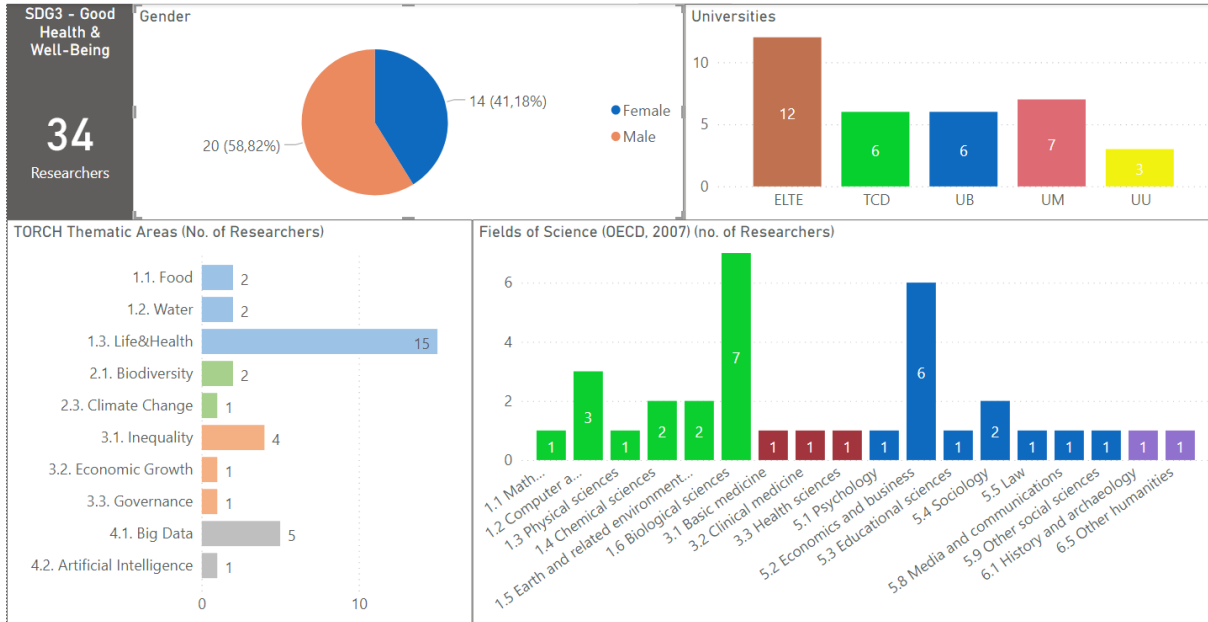
Figure 9. SDG3 focus group preparation. Summary of researchers input via questionnaire.

Table 8. SDG3 Focus Group. Participation and research proposals.

Participants (Researchers)	
34	Responded the form and picked SDG3 (1st or 2nd choice)
34	Invited to the focus group (+ all researchers nominated to participate, up to 131)
25	Attended the session

SDG3 Research Proposals	
25 specific research challenges received, grouped under three broader proposals	
P1. Promotion on healthy lifestyles	(proposal selected)
P2. Prevention and preparedness for diseases (including mental health)	(proposal selected)
P3. Inequalities and health	(proposal discarded)

Proposals P1 ('Promotion on healthy lifestyles') and P2 ('Prevention and preparedness for diseases') emerged as the options to be developed further as research challenges upon agreement of the experts' group. Small sub-groups of researchers were identified to develop each one of them. Proposal P3 ('Inequalities and health') was discarded at this stage (Table 8).

Focus Group on SDG10 - Reduced Inequalities

Thirty-three researchers chose SDG10 (as summarized in Figure 10), and provided 26 specific challenges, that were grouped under four broader proposals (Table 9).
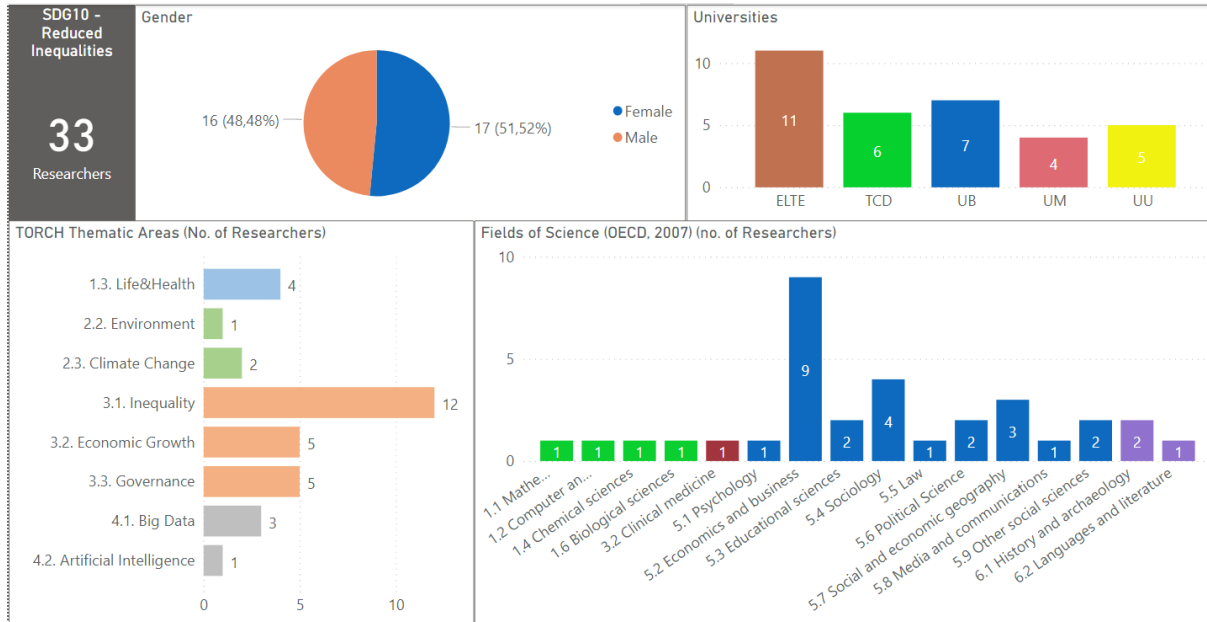
Figure 10. SDG10 focus group preparation. Summary of researchers input via questionnaire.

Table 9. SDG10 Focus Group. Participation and research proposals.

Participants (Researchers)	
33	Responded the form and picked SDG10 (1st or 2nd choice)
33	Invited to the focus group (+ all researchers nominated to participate, up to 131)
28	Attended the session

SDG10 Research Proposals	
26 specific research challenges received, grouped under four broader proposals	
P1. Improving education in order to reduce inequalities	(proposal discarded)
P2. Coping with digitalization and the transformation of the world of work as a new source of inequalities	(proposal selected)
P3. How can policies reduce between and within countries inequalities associated to climate change	(proposal discarded)
P4. Designing better institutions to fight against inequalities	(proposal selected)

Proposals P2 ('Coping with digitalization and the transformation of the world of work as a new source of inequalities') and P4 ('Designing better institutions to fight against inequalities') were agreed to move forward within the focus group. Proposals P1 and P3 were discarded (Table 9).

Focus Group on SDG13 - Climate Action

Figure 11 sums up the participation in the SDG13 focus group, for which 34 specific challenges were provided, grouped into five broader proposals (Table 10).
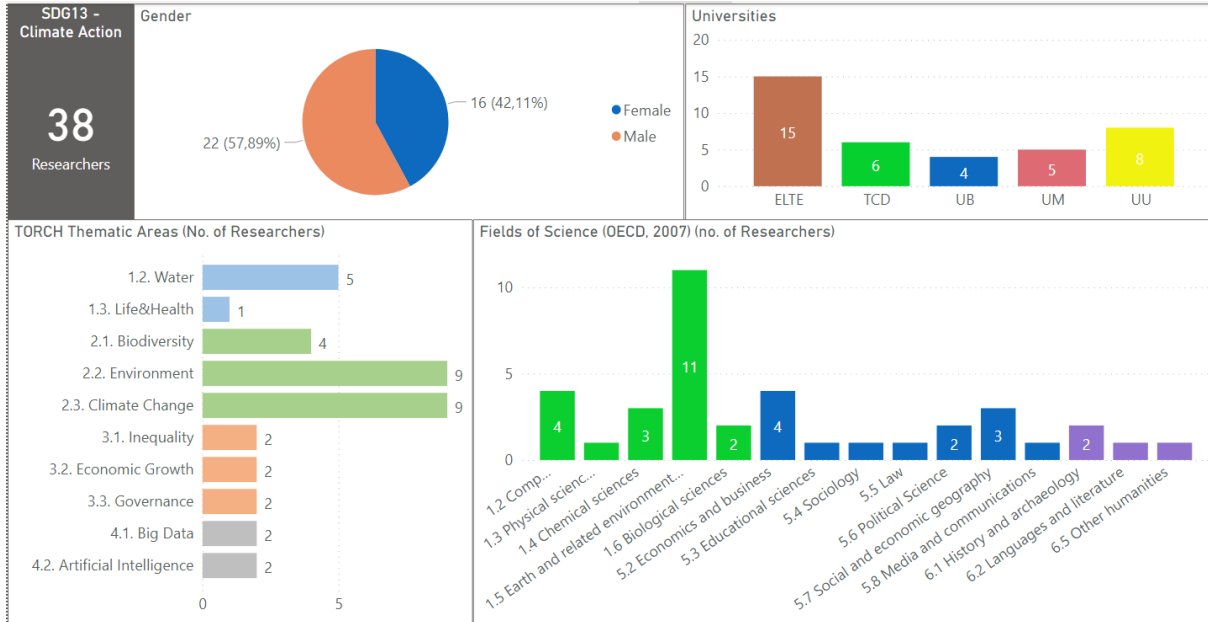

Figure 11. SDG13 focus group preparation. Summary of researchers input via questionnaire.

Table 10. SDG13 Focus Group. Participation and research proposals.

Participants (Researchers)	
38	Responded the form and picked SDG13 (1st or 2nd choice)
38	Invited to the focus group (+ all researchers nominated to participate, up to 131)
25	Attended the session

SDG13 Research Proposals	
34 specific research challenges received, grouped under five broader proposals	
P1. Enhancing Deeper Knowledge of the Climate System Components	(proposal discarded)
P2. Sustainable Management of Freshwater Resources within the Global Change Frameset	(proposal selected)
P3. Strengthening Resilience to Climate-Related Hazards and Fostering Disaster Risk Reduction Policies	(proposal selected)
P4. Integrating Climate Change Measures into European Policies, Strategies and Planning	(proposal discarded)
P5. Improving Education and Awareness-Raising on Climate Change	(proposal discarded)

Proposals P2 ('Sustainable Management of Freshwater Resources within the Global Change Frameset') and P3 ('Strengthening Resilience to Climate-Related Hazards and Fostering Disaster Risk Reduction Policies') were agreed upon to became challenge proposals. Proposals P1, P4, and P5 were abandoned at this point[12] (Table 10).

The interactive bibliographic tool on collaboration networks was put at the focus groups disposal in order to support their task with potentially relevant bibliography on the topics under discussion. In addition, it will also become a useful instrument for the future development of the selected research challenges, both for researchers and university officials.

4.2. Research Challenges List

The outcome of the three focus groups detailed above is shown below in the form of six research challenges CHARM-EU could be developed further as pilots during the second half of the Project:

· SDG3-C1: 'ACTIVE: **A**dult **C**hild and **T**eenage participation **I**n physical acti**V**ity across **E**urope'.

· SDG3-C2: 'Prevention and preparedness of negative effects of climate change on vector-borne infectious diseases'.

· SDG10-C1: 'Coping with digitalization and the transformation of the world of work as a new source of inequalities'.

· SDG10-C2: 'Designing better universities to fight against inequalities'.

· SDG13-C1: 'Preventive Water Sustainable Management of Freshwater resources within a global change frameset (PWSM)'.

· SDG13-C2: 'Mapping Risks, Joining Funds, Taking Actions – Fostering Nature-based Solutions to Mitigate Climate-related Hazards'.

They are reproduced in the following pages as drafted by the different groups of experts, following a fixed structure (the template to formulate the challenges can be found in Annex III).

---

[12] Discarded proposals linked to SDG3, SDG10, and SDG13 were so within the focus groups due to: 1) experts group discussion concluded they did not fit well with this task's purpose; 2) lack of suitable team (multi-disciplinary, multi-university, gender-balanced).

Challenge Proposals: SDG3 - Good Health & Well-Being

SDG3-C1: 'ACTIVE: Adult Child and Teenage participation In physical actiVity across Europe'

1. RESEARCH CHALLENGE

TITLE: ACTIVE: **A**dult **C**hild and **T**eenage participation **I**n physical acti**V**ity across **E**urope.

OBJECTIVES & SOCIETAL IMPACT: Sedentary behaviour is a widespread and growing problem across European countries, with most children, adolescents, adults and aging failing to meet the recommended physical activity (PA) guidelines (WHO, 2018).

Routine physical activity participation has been associated with a marked reduction in the risk of premature mortality and is an effective primary and secondary preventive strategy for at least 25 chronic medical conditions. Most international guidelines recommend a goal of 150 min /week of moderate-to-vigorous intensity physical activity as the minimum required for health benefits. However, this threshold-centered messaging may create an unnecessary barrier to those who might benefit greatly from simply being more active.

Sedentary behaviour is especially serious in children, since sedentary children tend to become sedentary adults and thus increase the risk of development of various diseases in midlife and old age.

In this exploratory study we aim to compile information on existing databases of the volume of physical activity in children, teenagers and adults in the countries involved in the CHARM-EU network, at both national and regional levels, with the purpose of providing a toolkit containing a catalogue of key information to help interested stakeholders, like public health professionals, researchers or professionals of fitness, when assessing the effectiveness of programs and policies.

This resource could be further extended to include relevant information measuring utilization of public transport including the publicly run service of rental bicycles prevalent in many large cities and cycling infrastructures, the availability of public sporting facilities in residential areas etc.

An accompanying empirical analysis will provide a picture of physical activity in populations within and between representative countries across Europe. This will allow us to identify best approaches to promote participation in physical activity.

2. RESEARCH TASKS

Identify colleagues who could join the wider network of expertise relevant to the project.

Identify databases, i.e., cohort studies that "measure" the relevant attributes over time for which access rights have been given or can be acquired easily.

Since these cohort studies will have been designed for different goals, the next step will be to define a common, unified, view on the individual databases such that statistics across these databases become comparable.

Identify a common set of PA measures and programs/policies in each country/region to help comparative analyses.

Formulate a set of "analysis questions" from a medical, sociological, and economical point of view, employing both relevant domain knowledge and exploratory data analysis results.

Develop algorithms to solve these questions on and across the set of studies.

3. CONTRIBUTION BEYOND THE STATE OF THE ART

This research challenge fits into Sustainable Development Goal 3 through ensure healthy lives and promoting well-being for all at all ages, with special focus on reducing mortality from non-communicable diseases. Th is one of the first attempts to collect and compile questionnaire and clinically measured PA data and provide information on programs/interventions implemented to promote PA in the population, mainly when this information is available but dispersed at both national and regional levels across the participating countries. Similar initiatives have been implemented in other countries/regions intended to build a tool available for interested actors, for instance the Catalogue of Surveillance Systems (NCCOR) for the US, can be used to explore potential deficiencies and add extra value to the project.

4. METHODOLOGY

At the project start two systematic reviews will start in parallel. The first -- using a tool like ASReview to ensure comprehensiveness -- for the existing literature in databases such as PubMed and Cochrane to identify the state of

the art. The second for useful datasets, here we again rely on literature databases such as PubMed, but also on registered protocols and, perhaps most of all, on local knowledge, I.e., on experts in the participating universities.

The so discovered databases that are accessible to the project will be integrated -- physically or virtually and in accordance with GDPR regulations -- in a uniform view to allow for reliable cross comparisons.

The resulting data set is then analyzed for significant differences in physical activity across groups both within countries and between countries by both well-understood risk factors as well as by machine learning approaches. Examples of known factors are Sex/Gender differences, Age groups, Socio-economic class, Rural vs Urban, and School curricula (e.g., how many hours of physical education per week).

Next to the observed differences the project aims to identify interventions taken in the different countries, such as direct or indirect economic interventions, where erecting publicly available playgrounds such as Johan Cruijff courts are an example of the latter. Subsequently the project aims to quantify the effects of these interventions using the aforementioned differences. The so discovered successful interventions will be offered as suggestions for replications in other countries both as a way to validate the results of the project and as a translation of the research to practice. We will confine our analysis to the participating countries of the CHARM-EU network (France, Hungary, Ireland, Netherlands, Spain), although future analysis could be extended to encompass all European countries

5. GENDERED INNOVATION

Data (eg WHO reports 2018) indicate that females are overall less active than males and this is especially the case in female children and adolescents.

The reasons for this include societal factors due to traditional gender roles and stereotypes, the reluctance of adolescent girls to use public play and exercise spaces when compared with boys, the disproportionately lower funding allocated to female sports compared with male counterparts and the lower amount of leisure time generally available to women due to hours spent in unpaid work in the home.

This is especially concerning given the link between sedentary behaviour and female-specific or predominantly female cancers eg breast and ovarian cancer.

6. TRANSDISCIPLINARITY

TRANS-DISCIPLINARY APPROACH: The factors that influence participation in physical activity throughout life are manifold, as described above (eg age, socio-economic status, sex/gender, type and location of residence). In order to consider the influences of each of these and to access the relevant methodological expertise, we require expertise from the following disciplines: computer science/AI, statistics, epidemiology, biomedical science, exercise science, social science, geography, economics and other cognate disciplines.

SCIENTIFIC DISCIPLINES TO BE INVOLVED (OTHER THAN THOSE ALREADY PRESENT IN THIS GROUP): The expertise necessary to complete this project extends beyond the researchers named in this document. As articulated in the methodology, task 1 will be to identify additional participants who can contribute to our network of researchers -they will be drawn from the disciplines mentioned in the previous section.

7. NON-ACADEMIC ACTORS INVOLVEMENT

We will seek input from public and private non-academic bodies involved in the following areas: public health, public transport, town planning, education, sports councils/governing bodies etc.

8. LIST OF REFERENCES

· Catalogue of Surveillance Systems. National Collaborative on Childhood Obesity Research. https://www.nccor.org/nccor-tools/catalogue/ [Accessed on: Month Day, Year]

· de Boer MC, Wörner EA, Verlaan D, van Leeuwen PAM. The Mechanisms and Effects of Physical Activity on Breast Cancer. Clin Breast Cancer. 2017 Jul;17(4):272-278. doi: 10.1016/j.clbc.2017.01.006. Epub 2017 Jan 24. PMID: 28233686.

· https://www.euro.who.int/en/health-topics/disease-prevention/physical-activity/data-and-statistics/physical-activity-fact-sheets/physical-activity-factsheets-2018/physical-activity-country-factsheets

· Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. Lancet Glob Health. 2018;6(10):e1077-e86.

· Laddu D, Paluch AE, LaMonte MJ. The role of the built environment in promoting movement and physical activity across the lifespan: Implications for public health. Prog Cardiovasc Dis. 2021 Jan-Feb;64:33-40. doi: 10.1016/j.pcad.2020.12.009. Epub 2021 Jan 9. PMID: 33428966.
· McKinnon, RA, Reedy, J, Berrigan, D, et al. The National Collaborative on Childhood Obesity Research Catalogue of Surveillance Systems and Measures Registry: New tools to spur innovation and increase productivity in childhood obesity research. Am J Prev Med. 2012 Apr;42(4):433-5. Available at https://10.1016/j.amepre.2012.01.004
· Spiteri K, Broom D, Bekhet AH, de Caro JX, Laventure B, Grafton K. Barriers and Motivators of Physical Activity Participation in Middle-aged and Older-adults - A Systematic Review. J Aging Phys Act. 2019 Sep 1;27(4):929-944. doi: 10.1123/japa.2018-0343. PMID: 31141447.
· https://www.euro.who.int/en/health-topics/disease-prevention/physical-activity/data-and-statistics/physical-activity-fact-sheets/physical-activity-factsheets-2018/physical-activity-country-factsheets

9. TEAM OF RESEARCHERS

Name	University	Scientific Discipline	Gender
Gil Trasfi, Joan	UB	Economics	M
Kelly, Áine	TCD	Physiology & Neuroscience	F
Siebes, Arno	UU	Computer Science	M
Tortosa, Avelina	UB	Medicine, Neurology	F

10. ADDITIONAL COMMENTS

N/A

The full team of researchers that participated in the focus group leading to the SDG3 proposals can be found in Annex IV.

SDG3-C2: Prevention and preparedness of negative effects of climate change on vector-borne infectious diseases

1. RESEARCH CHALLENGE

TITLE: Prevention and preparedness of negative effects of climate change on vector-borne infectious diseases.

OBJECTIVES & SOCIETAL IMPACT: Climate change is altering the biology of invertebrates transmitting pathogens (insects, mites, nematodes, mollusks, etc.) by allowing certain species to colonize new territories, thus increasing the prevalence or risk of emergence of diseases affecting human populations. These new risks must be anticipated to mitigate their effects, and this can be done by the following actions:

1. Identification of emerging vector-borne diseases.
2. Controlling vector populations.
3. Methodological improvement for pathogen detection and diagnostic tests.
4. Environmental and ecological studies, conservation, and restauration of ecosystems.
5. Modeling the relation of climate change with the increase of vector-borne diseases.
6. Development of open access data bases and analytical tools for prevention and surveillance, common methods, and indicators of the effectiveness for the implemented measures.
7. Public health recommendations and guidelines.
8. Dissemination, educational programs for prevention and awareness that are culturally sensitive, accessible and inclusive for maximum reach.

Societal impact:

Prevention and quicker detection and control of vector-borne diseases with an important impact on the incidence of very dangerous diseases and a cost-effective impact in global health and the economy of the countries.

2. RESEARCH TASKS

Analysis of available data on vector-borne disease, identification of the most prevalent diseases, such as viruses (dengue, West Nile, zika, chikungunya, yellow fever, Crimean-Congo haemorrhagic fever, etc.), parasites (plasmodium, schistosomes, fasciola, etc.) or bacteria (Borrelia, etc.).

Optimization of detection and diagnostic tests.

Characterization of the pathogenic strains, evolution, and virulence factors.

Characterization of human host response to infection.

Design and development of accessible and inclusive communication activities and educational programs.

Analysis of the ecosystems of the vectors, identification of reservoirs.

Design and implementation of pilot studies of environmental restauration measures.

Design of prevention and prophylaxis measures and regulations.

Optimization of the control of vector populations, and implementation in specific areas.

Building a network of publicly available data bases on geographical areas where the pathogens are present and incidence of the diseases.

Early alerts for emerging strains and infected vectors.

3. CONTRIBUTION BEYOND THE STATE OF THE ART

This research challenge fits into the Green missions of EU Horizon Europe "Adaptation to climate change and societal transformation" that support the European Green Deal. The mechanisms and dynamics of host interactions (humans, animals) - vectors/intermediate hosts - pathogens will be studied in the context of global changes. Adaptation and evolution capacities will be assessed and modeled. Alternative strategies to insecticides will be developed, in accordance with the Green Deal. This transdisciplinary research will thus cover fundamental and finalized aspects which allow the development of concrete applications for the surveillance, diagnosis and control of diseases and their vectors, and ensure effective and accessible communication of public health messaging.

4. METHODOLOGY

The methodology includes promotion of synergies and combination of expertise, in order to carry out innovative and ambitious interdisciplinary research projects on an international scale. Particular attention will be paid to multi-site

5. GENDERED INNOVATION

Epidemiological and clinical data will be segregated by gender. Any influence of biological sex on host response will also be noted.

6. TRANSDISCIPLINARITY

TRANS-DISCIPLINARY APPROACH: The transdisciplinary project requires a wide range of contributions and expertise from clinical, ecological, microbiology, immunology, molecular biology, zoological, bioinformatics and epidemiology, mathematical modelling, education and communication skills, public health managers and regulatory experts.

SCIENTIFIC DISCIPLINES TO BE INVOLVED (OTHER THAN THOSE ALREADY PRESENT IN THIS GROUP): Many disciplines will be mobilized to achieve these objectives: human infectiology, ecology, pharmacology, chemistry, epidemiology, mathematics/physics, informatics, human and social sciences and modeling.

7. NON-ACADEMIC ACTORS INVOLVEMENT

Communication media, educational organizations, regional and local governments and communities, NGOs, managers of natural parks and ecosystems.

8. LIST OF REFERENCES

· Achee, N. L., J. P. Grieco, H. Vatandoost, G. Seixas, J. Pinto, L. Ching-Ng, A. J. Martins, W. Juntarajumnong, V. Corbel, C. Gouagna, J. P. David, J. G. Logan, J. Orsborne, E. Marois, G. J. Devine, and J. Vontas. 2019. Alternative strategies for mosquito-borne arbovirus control. PLoS Negl. Trop. Dis. 13: e0006822.

· Caminade C, McIntyre KM, Jones AE. Impact of recent and future climate change on vector-borne diseases. Ann N Y Acad Sci. 2019 Jan;1436(1):157-173. doi: 10.1111/nyas.13950. Epub 2018 Aug 18.

· Booth M. Climate Change and the Neglected Tropical Diseases. Adv Parasitol. 2018;100:39-126. doi: 10.1016/bs.apar.2018.02.001. Epub 2018 Mar 28.

· Semenza JC, Suk JE. Vector-borne diseases and climate change: a European perspective. FEMS Microbiol Lett. 2018 Feb 1;365(2):fnx244. doi: 10.1093/femsle/fnx244.

· Ogden NH. Climate change and vector-borne diseases of public health significance. FEMS Microbiol Lett. 2017 Oct 16;364(19). doi: 10.1093/femsle/fnx186.

· Bouyer J, Chandre F, Gilles J, Baldet T. Alternative vector control methods to manage the Zika virus outbreak: more haste, less speed. Lancet Glob Health. 2016 Jun;4(6):e364. doi: 10.1016/S2214-109X(16)00082-6

· Ogden NH, Lindsay LR. Effects of Climate and Climate Change on Vectors and Vector-BorneDiseases: Ticks Are Different. Trends Parasitol. 2016 Aug;32(8):646-656. doi: 10.1016/j.pt.2016.04.015.

· Levy BS, Patz JA. Climate Change, Human Rights, and Social Justice. Ann Glob Health. 2015 May-Jun;81(3):310-22. doi: 10.1016/j.aogh.2015.08.008.

· Berry A., Fillaux J., Martin-Blondel G., Boissier J., Iriart X., Marchou B., Magnaval F., Delobel P. (2016). Evidence for a permanent presence of schistosomiasis in Corsica, France, 2015 (rapid communication). Eurosurveillance, 21 : pii=30100.

· Boissier J., Mone H., Mitta G., Bargues D.M., Molyneux D., Mas-Coma S. (2015). Schistosomiasis reaches Europe. Lancet Infectious Diseases, 15: 757-758.

· Roche, B., L. Leger, G. L'Ambert, G. Lacour, R. Foussadier, G. Besnard, H. Barre-Cardi, F. Simard and D. Fontenille, 2015. The Spread of Aedes albopictus in Metropolitan France: Contribution of Environmental Drivers and Human Activities and Predictions for a Near Future. PLoS One 10(5): e0125600.

· Malekshahi Z, Schiela B, Bernklau S, Banki Z, Würzner R, Stoiber H. 2020. Interference of the Zika Virus E-Protein With the Membrane Attack Complex of the Complement System. Front Immunol. 11:569549.

· Reiss T, Rosa TFA, Blaesius K, Bobbert RP, Zipfel PF, Skerka C, Pradel G. 2018. Cutting Edge: FHR-1 Binding Impairs Factor H-Mediated Complement Evasion by the Malaria Parasite Plasmodium falciparum. J Immunol. 201(12):3497-3502.

· Hart TM, Dupuis AP 2nd, Tufts DM, Blom AM, Starkey SR, Rego ROM, Ram S, Kraiczy P, Kramer LD, Diuk-Wasser MA, Kolokotronis SO, Lin YP. 2021. Host tropism determination by convergent evolution of immunological evasion in the Lyme disease system. PLoS Pathog. 17(7):e1009801.

9. TEAM OF RESEARCHERS

Name	University	Scientific Discipline	Gender
Casaroli, Ricardo	UB	Medicine	M
De Vos, John	UM	Medicine	M
Gironès, Rosina	UB	Virology	F
Jagoe, Caroline	TCD	Social sciences	F
Józsi, Mihály	ELTE	Immunology	M
Kelly, Áine	TCD	Physiology & Neuroscience	F
Siebes, Arno	UU	Computer Science	M

10. ADDITIONAL COMMENTS

N/A

The full team of researchers that participated in the focus group leading to the SDG3 proposals can be found in Annex IV.

Challenge Proposals: SDG10 - Reduced Inequalities

SDG10-C1: Coping with digitalization and the transformation of the world of work as a new source of inequalities

1. RESEARCH CHALLENGE

TITLE: Coping with digitalization and the transformation of the world of work as a new source of inequalities.

OBJECTIVES & SOCIETAL IMPACT: The new digital transformation, accelerated by the response to the COVID-19 pandemics, is severely affecting the ways in which we live and work. New ways of organizing work, i.e., where, when and how we work, are being explored and non-standard forms of work are gaining relevance worldwide. In fact, not all workers will benefit from the new digital transformation to the same extent. While new occupations have already emerged, many jobs have already disappeared, and more are likely to go in the future. Some groups of workers will be displaced due to the high risk of automation of some productive tasks, but also due to their significant shortcomings in technological competences and skills. These effects might vary by age and gender and sectorial specialization. A substantial proportion of today's students would be employed in jobs that don't exist yet. The ability to anticipate and prepare for future skills requirements is critical in order to mitigate the increasing risk of employment polarization.

However, the rise of new ways of organizing production, such as digital labor platforms, pose serious threats to decent work (not only in terms of wages, but also on working conditions) and fair competition among firms. The growing datafication and the use of algorithms allows offshoring worldwide some of the existing services activities while creating new business opportunities. But, these new characteristics of organization of work also affects access to employment, working conditions of individuals, and assessment of work quality that could generate new sources of inequalities. Last, the COVID-19 pandemic has led to a step change in the prevalence of teleworking that has benefited many businesses and employers, but hybrid models of remote work are only likely to persist after the pandemics for a highly-educated well paid minority of the workforce, accentuating inequalities. However, these new models will also open new challenges of conciliating work and family life.

In sum, this proposal aims to fully investigate the risks of job losses, diagnose the employment related problems face by employees, employers and trade unions, and identify potential solutions to reduce the inequality derived from digital transformation of working, especially in the post-Covid era

2. RESEARCH TASKS

1. State-of-the-art and future challenges: What do we know?
- Literature review.
- Identification of potential winners and losers: revision of earlier studies and update of job-occupation-tasks analysis after the pandemics.
- Future trends in digitalization (internet of things, 5G, cloud computing, big data, AI, blockchain, computing power, etc.) and datafication as a catalyst of transformations in the labour market.
- New trends in employment: gig economy, equality in flexible working, etc.
- Current and future trends in work organization and impacts on work-family reconciliation.
- Existing databases and identification of data gaps to analyze future trends.

2. Impacts on firms/workplace: What are the main channels through which digitalization affects the world of work?
- What are the drivers of digital transformation in the world of work (i.e. disruptive innovations, business model innovation?
- How does digitalization affect HRM practices and work-organization, in particular tele-working and platformization and how, in turn, does HRM and work-organization affect the use of digital technologies and digital innovation? Human aspects of digital transformation such as senior manager support, implementation or realization (used by employees), and employee experience are important factors under this perspective.
- What are the effects of digitalization & business model innovation on market outcomes, in particular, the surplus created and the division of surplus among workers, shareholders and consumers?
- How does digitalization affect global value chain worldwide? Identifying key sectors and countries.

3. Impacts on people: Who would be excluded?
What are the economic outcomes of digitalization and the changing organization of work on:

- Job polarization, wage inequality, gender inequality, and regional disparities (taking into account that the effects could be different depending on the type of digital technologies considered).
- Quality of life & job satisfaction (working conditions, health outcomes, difficulties to reconcile work and family life)
- How do workers adjust their behavior to cope with the negative effects of the digital labor platforms?
4. Policies: how can we reverse inequalities?
- Technology regulation, review of emerging regulatory innovations (such as required algorithmic transparency of digital platforms in Spain)
- Labor market regulation.
- Education policies tackling digital inequalities (including long-life learning).
- Work and family reconcile measures.

3. CONTRIBUTION BEYOND THE STATE OF THE ART

The proposal is innovative in the sense that it adopts an integrative perspective trying to understand the drivers of inequality linked to technological change in the world of work, and its impacts from a wide perspective focusing on the role of firms, the effects on people (from both the economics and social terms), and the policies that would help to reverse new sources of inequalities caused by the digitalization of work. The multi-country perspective under comparative case-studies will also represent a clear contribution towards the state-of-the-art.

4. METHODOLOGY

A mixed method approach would be adopted. The research would combine different qualitative and quantitative techniques. Field work would be required in order to carry out surveys and focus groups with relevant agents and non-academic stakeholders. The quantitative analysis could rely on pre-existent datasets with individual/longitudinal information at the firm and household level, complementing this analysis with socio-economic worldwide sectoral databases. The research might also detect information and data gaps needed to analyze future trends.
The geographical scope of the analysis must be decided (level: national, regional, etc. and countries to be considered). This will clearly have an impact on the person-months needed to carry out the analysis, and on the budget required for the field work.

5. GENDERED INNOVATION

Gender dimension is very relevant in the context of this research due to the existence of gender-based occupational segregation of tasks (vertical segregation), gender-based sectorial segregation (horizontal segregation), and gender wage gap and discrimination. Besides, digitalization and datafication will create new forms of work that will have important impact to reconcile work and family life, which has had a clear gender component up to now.

6. TRANSDISCIPLINARITY

TRANS-DISCIPLINARY APPROACH: New digital technology cause changes in production process that directly affect organization of work, affecting not only labor market but also organization of family life. These effects will have different impacts for different workers groups (by age, gender, occupation, etc.) and different regions and countries. Understanding the dynamics, future trends, and potential solutions of such complex changes requires the interaction of different academic disciplines with agents of social life (stakeholders, policy makers, social organizations, etc.). The proposal would involve experts from Economics, Management, Sociology, Geography, and Information Systems (Digitalization).
SCIENTIFIC DISCIPLINES TO BE INVOLVED (OTHER THAN THOSE ALREADY PRESENT IN THIS GROUP): Human Resources Management; Economics; Adult Education; Geography; Sociology of Work; Law; Public Administration; Gender studies; Business analytics; Technology and Information Systems (digitalization, big data management).

7. NON-ACADEMIC ACTORS INVOLVEMENT

International Labor Organization (ILO); UNESCO; Employers' Federations; Trade Unions; NGOs; Public bodies (education, work and regulation).

8. LIST OF REFERENCES

· Baldwin, R. (2019). The Globotics Upheaval. Globalization, Robotics, and the Future of Work. New York: Oxford University Press.

· Bucher, E. L., Schou, P. K., & Waldkirch, M. (2021). Pacifying the algorithm–Anticipatory compliance in the face of algorithmic management in the gig economy. Organization, 28(1), 44-67

· Bührer C., & Hagist C. (2017) The Effect of Digitalization on the Labor Market. In: Ellermann H., Kreutter P., Messner W. (eds) The Palgrave Handbook of Managing Continuous Business Transformation. Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-60228-2_5

· Daugherty, P. R., & Wilson, H. J. (2018). Human + Machine. Reimagining Work in the Age of AI. Harvard Business Review Press: Boston.

· Deloitte (2019). The future of work in technology. https://www2.deloitte.com/content/dam/insights/us/articles/4972_The-future-of-work-in-technology/DI_The-future-of-work-in-technology.pdf

· Frenken, K., & Fuenfschilling, L. (2020). The rise of online platforms and the triumph of the corporation. Sociologica, 14(3), 101-113. https://doi.org/10.6092/issn.1971-8853/11715

· Frenken, K., van Waes, A., Pelzer, P., Smink, M., & van Est, R. (2020). Safeguarding Public Interests in the Platform Economy. Policy & Internet, 12(3), 400-425. https://doi.org/10.1002/poi3.217

· Frenken, K., & Schor, J. (2017). Putting the sharing economy into perspective. Environmental Innovation and Societal Transitions, 23, 3-10. https://doi.org/10.1016/j.eist.2017.01.003

· Harteis C. (2018). Machines, Change and Work: An Educational View on the Digitalization of Work. In: · Harteis C. (eds) The Impact of Digitalization in the Workplace. Professional and Practice-based Learning, vol 21. Springer, Cham. https://doi-org.sire.ub.edu/10.1007/978-3-319-63257-5_1

ILO (2021). The role of digital labour platforms in transforming the world of work, World Employment and Social Outlook 2021, https://www.ilo.org/global/research/global-reports/weso/2021/WCMS_771749/lang--en/index.htm

· Matthess, M., & Kunkel, S. (2020). Structural change and digitalization in developing countries: Conceptually linking the two transformations, Technology in Society, 63, 101428. https://doi.org/10.1016/j.techsoc.2020.101428

· OECD (2019). Skills Outlook 2019: Thriving in a Digital World. OECD: Paris. https://doi.org/10.1787/df80bc12-en

· Warmuth A.D., Glockentöger I. (2018) Effects of Digitalized and Flexible Workplaces on Parenthood: New Concepts in Gender Relations or a Return to Traditional Gender Roles? In: Harteis C. (eds) The Impact of Digitalization in the Workplace. Professional and Practice-based Learning, vol 21. Springer, Cham. https://doi-org.sire.ub.edu/10.1007/978-3-319-63257-5_6

· WEF (2016). Digital Transformation of Industries. https://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/digital-enterprise-narrative-final-january-2016.pdf

· Zhang, X., Fu., N., & Brennan, L. PSFs. (2020). Internationalisation in a Digital World: Shared Platform as an Enabler, the 80th Annual Meeting of the Academy of Management, Vancouver, British Columbia, Canada, August 7-11, 2020.

9. TEAM OF RESEARCHERS

Name	University	Scientific Discipline	Gender
Frenken, Koen	UU	Geography	M
Fu, Na	TCD	Human Resources Management	F
Hollaender, Kirsten	UU	Sociology	F
Horváth, László	ELTE	Education	M
Ramos, Raul	UB	Labour Economics	M
Serrano, Mònica	UB	Economics	F
Susha, Iryna	UU	Data governance	F

10. ADDITIONAL COMMENTS

The research proposal is also related to SDG 8: Decent Work and Economic Growth; SDG 10: Reduce Inequalities; SDG 5: Gender Equality; and SDG 4: Quality Education.

The full team of researchers that participated in the focus group leading to the SDG10 proposals can be found in Annex IV.

SDG10-C2: Designing better universities to fight against inequalities

1. RESEARCH CHALLENGE

TITLE: Designing better universities to fight against inequalities.

OBJECTIVES & SOCIETAL IMPACT: Universities are central institutions in social and economic reproduction. Often their focus is on studying "the outside world". However, universities also shape and are shaped by wider societal forces and trends and reflect and refract them. What is the role of universities in promoting or decreasing inequalities across different dimensions such as class, gender, race, geography, disability or sexual orientation for example? What are the causes that promote or decrease such inequalities within and by universities? We are especially interested in these questions with an eye to exploring ways in which universities can increase equality within and beyond their own institutions. We thus propose to study what existing university institutions do to this effect, how we can measure this, and what the possibilities are for developing or (re)designing institutions that facilitate and support equality.

Historically, universities have rarely focused on reducing or eliminating social inequalities. Instead, often they are highly unequal hierarchical structures that have resulted in embedded inequalities within institutions, as well as influencing the nature of the research and engagement beyond the institutions – risking a perpetuation of inequalities within the broader society. While there is a global trend towards increasing inclusive and diverse participation in higher education (Marginson, 2016), unequal access to universities (e.g. Duru-Bellat et al., 2008) and unequal graduate outcomes (OECD, 2014) continue to be documented. Between universities and across countries, factors such as the economic and social background aof academics, as well as their gender and country of origin, influence if they do not determine their access to research resources and thus their likelihood of participating as full contributors in scientific communities (publishing in highly-ranked journals or attending prestigious conferences). In parallel, also within and across countries, female students coming from poorer family backgrounds are less likely to access higher education in the first place, and if they do, they have less job opportunities than students coming from richer family backgrounds (OECD, 2014). These imbalances extend beyond higher education and up to the global production of knowledge on a variety of issues. For instance, scholars in international relations and science and technology studies have widely documented the underrepresentation of female and Global South scholars in global change science, including in politically-relevant scientific assessments, academic networks, conferences, and publications (e.g., Biermann, 2006; Corbera et al., 2016; van der Hel, 2016; Yamineva, 2017; Díaz-Reviriego et al., 2019).

Moreover, although student unions could be efficient in the identification of the negative consequences raised by inequality among students and participate in monitoring or mentoring programs aimed at this, they are usually more focussed on academic problems that affect them. Visibility is a key factor in this: being represented at universities, both as students and staff members is crucial. While currently there are initiatives to break some glass ceilings in student communities, most of the universities involved in the project have a composition of university staff that is far from representing these diversities that exist in society. At the same time, teacher training programmes have a central role in setting an example for how to handle inequality and create an inclusive environment. A lot of awareness-raising is needed in this domain, inclusiveness should be an organic part of teacher training.

Despite increased awareness and critique of the sharp imbalances that pervade higher education and research, this critical reflection has hardly upset existing hierarchies in this area. Such imbalances, in turn, jeopardize both the democratizing potential of higher education for society as a whole and the legitimacy of science. This project is thus relevant from a societal standpoint, as it strives to enhance inclusion and fairness in higher education by identifying hidden structures of exclusion and by searching for novel ways to transform universities and academic practices towards more participation of and engagement by traditionally excluded groups. Therefore, it is important to compare the practices of universities located in different countries in order to identify evidence-based strategies of coping with and reducing inequalities at a European level, because such a comparative perspective will allow us to tackle various types of inequalities and strive for best practices that can be implemented in varying contexts, thus also connecting the "East", the "West", the "North" and the "South".

2. RESEARCH TASKS

The research will focus on identifying the causes of inequalities, as well as ways to address these, that are inherent to the five CHARM-EU partner universities. The units of analysis are existing diversity/inclusion policies, staff assessment/evaluation systems, staff selection procedures, public engagement strategies, and overall practices and belief systems that affect inequality and diversity within and across universities. In addition, it will study the diversity

of student populations and professionals that are (and are not) targeted by universities, considering not just representation but markers of equality and inclusion.

While the research itself will focus on inequality and diversity policies and practices within the universities and in universities' direct engagement with and effects on society, we will also reflect on the wider implications of this on society at large, by considering the roles that universities have (or should have) in promoting equality in societies that they are part of.

In order to promote inclusiveness within universities, they may/should include various inclusive practices in their programmes, partly generalizable, partly contingent on the discipline. Identifying these practices is an important research task in this context.

3. CONTRIBUTION BEYOND THE STATE OF THE ART

While there is increasing scholarly and public attention to how universities (can) generate societal impact through transdisciplinary research, public engagement and open science, issues of inequality and the democratization of science within such impact remain underexplored. It is often assumed that universities do 'good' by producing (scientific) knowledge for society, and increasingly with other social actors. However, not all production or even co-production of knowledge enhances equality; it may in fact also maintain, produce or reinforce (existing) inequalities, even if this is unintended or unconscious. Studying the effects that universities have on inequality is therefore both crucial and timely. While research has been conducted on inequality, diversity and inclusion within universities in Europe that has generated useful recommendations (see e. g. the LERU report Buitendijk et al. 2019), the competitive advantage of TORCH is its ability to conduct comparative analyses on this issue across universities and EU member states. This will result in in-depth understandings of how and under what conditions inequalities arise or are perpetuated, and what institutions might (or might not) help in reducing inequalities.

The CHARM-EU partner universities represent a wide diversity of countries with different educational traditions, heritage, institutions and beliefs. One aspect of the proposed research is the cross-cutting comparison of different practices, existing institutions and value systems, which can promote finding "best" practices. The implementation of inclusive practices to increase the diversity, fairness, and legitimacy of existing institutions should also take account of different national contexts and educational traditions. One strength of the proposed research is then the use of the comparative method in order to find solutions which fit in a wider European context, and facilitate truly transnational European cooperation to promote more equality within universities, and also tackle the wider issue of how universities can be used as tools and institutions that can work towards decreasing inequalities in different societies. The East-West comparison adds a further novel dimension to our research proposal, which is based on the interdisciplinary and transnational approach to the study of existing educational inequalities across Europe, which can only by addressed adequately through a common European strategy.

The proposed research will draw on the insights generated through the different Work Packages within TORCH. These include the cross-cutting principles, which includes analyses of gender (in)equality within the universities; the common science agenda, which sheds light on the universities' (inter)disciplinary strengths and complementarities; open science practices and policies; and finally public engagement, which explores the institutional structures, best practices and (dis)incentives for transdisciplinary research and education in the universities.

Besides a focus on in-depth comparative analyses of equality, diversity and inclusion across universities in Europe, the unique selling point of this research is its focus on the wide variety of dimensions of inequality (see also section 5 on gender). This also comes with a study of not only the impacts of universities on societies that directly surround them, but also a focus on their global impacts. Important to consider here are the geographic focus (especially Global North vs. Global South) of research, education and public engagement activities, as well as the diversity (or lack thereof) of scientific knowledge that is drawn upon and being generated by universities, which often have a bias toward the Global North.

Though in a sense it is uncontested that universities should be inclusive spaces, it is rarely examined how to achieve this aim, and, as a result (as also stated above), universities often end up cementing existing inequalities due to a lack of methodology to redress this. The aim of creating a more inclusive environment can only be achieved with a much higher level of awareness. For this reason, besides studying the effects that universities have on inequality, an inventory of inclusive methods should also be drawn up. This will be one of the innovative aspects that is expected to make this research an important reference point in the long run as well.

4. METHODOLOGY

The tasks mentioned above pose several methodological challenges that we will address through a mixed toolkit involving four major steps: identifying potential causes of inequality, testing their effects, comparing these effects across universities and countries, and assessing results with affected communities.

The first step will be carried out through a combination of literature review, survey methods, ethnographic observations, semi-structured interviews, and focus group discussions with groups of relevant actors in the academic communities, including student and trade unions' representatives, faculty members at different career stages, administrative staff, and representatives of societal communities outside universities. With this, we will ensure that the identification of potential causes of inequality is based on both accumulated scientific evidence and the result of inclusive deliberation.

The second step must meet several challenges, as does any attempt at causal inference (Pearl & Mackenzie 2019). In order to obtain unbiased estimates of the effects and causes on inequality, we will make use of experimental or quasi-experimental designs that meet the standard assumptions of randomized controlled trials, which ensure that observed effects are unaffected by selection bias, reverse causality or other common problems of causal inference (Angrist & Pischke 2008). Such designs may include original lab and survey experiments, and designs using observational data such as Differences-in-Differences, Instrumental Variables, and Regression Discontinuity.

The third step involves the comparative method. Given the small-N nature of our proposal (our comparative units include five universities across five European countries), causal identification through qualitative comparative case study research has been uncommon. However, counterfactual-based causal inference (Rubin 1974) allows causal inference through case-study comparison even with a small number of cases, through a careful case-selection plan (Plümper et al. 2019). Moreover, this step will ensure that best practices will be comparable across universities and countries that are represented in the project.

Finally, the fourth step intends to bring back the affected communities to discuss the implications of the identified causes of inequality and how best practices can be translated into effective policies. To address this, the project will promote discussion groups and workshops to present and disseminate results, raise awareness, discuss policy, and survey potential areas of cooperation and possibilities of public engagement between universities, policy makers, and societal agents such as NGOs, unions, and civic associations concerned with the causes and consequences of inequality.

5. GENDERED INNOVATION

Along with the other dimensions of diversity and inequality, gender will be one of the key aspects that this research will focus on. Previous research conducted by TORCH showed that most of the member universities have strong gender-related policies in place, with gender often being a priority in the strategic institutional development of universities. However, gender is often considered an issue that largely concerns women, with limited attention to male parenthood, varying levels of support for LGBTQI+, and only a minority of member universities having policies for gender minorities. All this warrants further research into awareness that exists and the approach that universities take with regard to the wide diversity of gender issues that exist, not only within their own institutions, but also in engaging with society in research and education.

6. TRANSDISCIPLINARITY

TRANS-DISCIPLINARY APPROACH: Since inequality itself is a highly complex phenomenon having its roots in a great variety of factors, it cannot be successfully approached from the perspective of a single discipline or by scientists alone. Even in less complex cases a transdisciplinary approach offers several advantages. This is because the problems that emerge from study by different disciplines regarding a certain research area are likely to contain some similar components and be examined from different perspectives. Researchers and professionals with different scientific and professional backgrounds can bring perspectives of their own combined with different methodologies that can be included in working out the details of the proposal. These different areas of expertise can be channeled into one comprehensive project with multiple foci on different aspects of the research question.

In our case a transdisciplinary approach is simply inescapable. Inequality is present in almost every walk of life: access to services, education, work, entertainment. It also determines our attitudes to large-scale problem solving: how important might I find environmental issues if I struggle to survive on a daily basis? When different disciplines cooperate there will certainly be inclusive practices that can be used only within certain domains, but several

TORCH

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017229.

methods will have a wider coverage (or can easily be transformed into ones with a wider coverage), or even be applicable across the board. These different areas are all linked to universities more or less directly. Working out inclusive methodologies starting from this position can have a massively far-reaching impact.

SCIENTIFIC DISCIPLINES TO BE INVOLVED (OTHER THAN THOSE ALREADY PRESENT IN THIS GROUP): Sociology; Political Science; Development Studies; Human Geography; Ethics; Law. In addition to these, data will be gathered from across the wide variety of disciplines and faculties of the universities so as to make the research representative for the entire university.

7. NON-ACADEMIC ACTORS INVOLVEMENT

Trade unions, social workers, the media, community organizations representing local groups (e. g. organizations of persons with disabilities; community development organizations); secondary schools in communities under-represented in higher education, local governments; civil society, NGOs; international organizations; research funding agencies.

8. LIST OF REFERENCES

· Angrist, J. D., & Pischke, J.-S. (2008). Mostly harmless econometrics. Princeton University Press.

· Biermann, F. (2006). 'Whose experts? The role of geographic representation in global environmental assessments', in Global Environmental Assessments. Information and Influence, eds. Ronald B. Mitchell, William C. Clark, David W. Cash and Nancy M. Dickson (Cambridge, Mass.: MIT Press): 87–112

· Buitendijk, S., Curry, S., & Maes, K. (2019). Equality, diversity and inclusion at universities: The power of a systemic approach. LERU position paper. September 2019. https://www.leru.org/files/LERU-EDI-paper_final.pdf

· Corbera, E., Calvet-Mir, L., Hughes H., and Paterson, M. (2016) 'Patterns of authorship in the Intergovernmental Panel on Climate Change Working Group III report', Nature Climate Change 6, no. 1: 94–99.

· Díaz-Reviriego, I., Turnhout E., and Beck, S. (2019). 'Participation and inclusiveness in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services', Nature Sustainability 2: 457—464.

· Duru-Bellat, M., Kieffer, A., & Reimer, D. (2008). Patterns of social inequalities in access to higher education in France and Germany. International journal of comparative sociology, 49(4-5), 347-368.

· Imbens, G. W., Angrist, J. D. (1994) "Identification and Estimation of Local Average Treatment Effects." Econometrica, vol. 62, no. 2, [Wiley, Econometric Society], 1994, pp. 467–75.

· Marginson, S. (2016). The worldwide trend to high participation higher education: Dynamics of social stratification in inclusive systems. Higher education, 72(4), 413-434.

· Nalani, A; Yoshikawa, H.; and Carter, P.L. (2021). Social Science–Based Pathways to Reduce Social Inequality in Youth Outcomes and Opportunities. Socius: Sociological Research for a Dynamic World. Volume 7 (2021): 1–17.

· O'Byrne, C., Jagoe, C., & Lawler, M. (2019). Experiences of dyslexia and the transition to university: a case study of five students at different stages of study. Higher Education Research & Development, 38(5), 1031-1045.

· OECD (2014), Education at a Glance 2014: OECD Indicators, OECD Publishing. http://dx.doi.org/10.1787/eag-2014-en.

· Pearl, J., & Mackenzie, D. (2019). The book of why. Penguin Books.

· Plümper T, Troeger VE, Neumayer E. Case selection and causal inferences in qualitative comparative research. PLoS One. 2019, 14(7).

· Rubin DB, 1974. Estimating causal effects of treatments in randomized and nonrandomized studies. Journal of Educational Psychology, 66(5): 688–701.

· van der Hel, S. (2016). 'New science for global sustainability? The institutionalisation of knowledge co-production in Future Earth', Environmental Science & Policy 61: 165-175,

· Velich, A. (2021). Ken Loach's Fair Share of Home and Family Issues from Cathy Come Home and The Angels' Share to Sorry we missed you. British and American Studies; Timisoara, vol 27, (2021): 125-134.

· Yamineva, Y. (2017). 'Lessons from the Intergovernmental Panel on Climate Change on inclusiveness across geographies and stakeholders', Environmental Science and Policy 77: 244—251.

9. TEAM OF RESEARCHERS

Name	University	Scientific Discipline	Gender
Bartha, Eszter	ELTE	Sociology	F
Carmody, Pádraig	TCD	Geography	M
Hoffman, István	ELTE	Law	M
Jagoe, Caroline	TCD	Social sciences	F
Sénit, Carole-Anne	UU	Political Science	F
Solymosi, Katalin	ELTE	Biological sciences	F
Szécsényi, Krisztina	ELTE	Languages and literature	F
Vallbé, Joan-Josep	UB	Political Science	M
Velich, Andrea	ELTE	Social History, Film Studies	F
Vijge, Marjanneke	UU	Political Science & Development studies	F

10. ADDITIONAL COMMENTS

N/A

The full team of researchers that participated in the focus group leading to the SDG10 proposals can be found in Annex IV.

Challenge Proposals: SDG13 - Climate Action

SDG13-C1: Preventive Water Sustainable Management of Freshwater resources within a global change frameset (PWSM)

1. RESEARCH CHALLENGE

TITLE: Preventive and Sustainable Management of Freshwater resources within a global change frameset (PSMFw).

OBJECTIVES & SOCIETAL IMPACT: OECD (2008) identified five key areas of environmental policy: waste generation and recycling, personal transport choices, residential energy use, food consumption and domestic water use.

A summary of 55 research papers devoted to sustainable consumption studies reveals that scholars mainly analyse household energy consumption, food, housing and transportation (Caeiro, Ramos and Huisingh, 2012), but there is less attention paid to water consumption and sustainable management and to the importance of information dissemination and raising awareness of social responsibilities and to promote more sustainable management and consumption of freshwater resources (EEA, 2021).

The main objective of this research proposal is to ensure the sustainable use of water, taking into account the needs of both people and natural ecosystems.

The specific objective of this proposal is to increase the knowledge, awareness and rationalization of society regarding the demand and uses of water. Education and awareness-raising are the key elements in reducing the environmental impact of an ever-increasing population. (Students, being future entrepreneurs and managers as well as purchase decision-makers in their families, maybe an appropriate target group for such awareness-raising.) This Bottom-Up approach will also be followed with policymakers by directing the proposals to local administrations that will act as hot spots for the dissemination of the sustainable water management procedure.

Optimizing the efficiency of water consumption in processes related to agriculture, industrial activities, energy production, tourism, as well as the treatment and reuse of water, are areas in which numerous research projects are focused. However, a step prior to all of them is the awareness of citizens regarding the impact of water-related activities in which we usually participate. Increased awareness and a corresponding change in habits could significantly impact the sustainable use of this resource. People in economies in transition have economic limitations and may have less awareness around issues of sustainability and in future may increase their water consumption as their economic situation improves.

This proposal is particularly relevant in the context of climate change that will increase the incidence of dry periods and droughts, especially in the Mediterranean region (MedECC, 2020). A decrease in water resources, together with increased demand and competition between agricultural, energy, industrial and drinking water uses, will inevitably lead to an increase in conflicts (Tramblay et al., 2020). The challenge is further complicated if the increase in floods and the development of measures that negatively affect the ability to cope with droughts are taken into account (Ward et al, 2020). Its resolution will require a greater awareness of citizens and the development of participatory methodologies in decision-making based on knowledge.

2. RESEARCH TASKS

The development of this proposal has three main tasks:

- Establishment of dynamic maps that show the uses of water for each type of activity including information on the process as well as the demand for water and the wastewater produced (water account).
- Establishment of a communication plan aimed at citizens that facilitates knowledge of the uses of water and the development of new consumption habits.
- Establishment of a communication plan aimed at policymakers that facilitates the establishment of guidelines aimed at sustainability in the use of water.

3. CONTRIBUTION BEYOND THE STATE OF THE ART

Recent articles have shown the complexity associated with actions to adapt to climate change and its impact on water resources (Ward et al., 2020). Having tools for better discernment in decision-making, taking into account the different uses of water and its availability, is a priority challenge.

This proposal is aimed at the main actor responsible for the sustainable use of water, which is the citizenry and the individuals that constitute it. In many cases, non-responsible use is caused by the lack of accessible information and the reference elements from which to decide what is the reasonable and sustainable use of water.

This proposal tries to focus on the generation of rigorous and accessible information to citizens and, based on it, generate changes in collective attitudes accompanied by changes in political guidelines. To consolidate these changes in the future society, this proposal focuses on a bottom-up strategy, taking as a starting point the students and local administrations.

4. METHODOLOGY

When focusing on the societal awareness of water scarcity, quantity and quality of availability of water have been a topic in numerous media reports worldwide. The spatial distribution has also been considered (e.g., WSA, 2021); however, public awareness is less concentrated on this aspect. From a scientific and technological point of view important spatial data have been generated from various sources (e.g., from remotely sensed data; Pekel et al. 2016) even the temporal dynamics have also been considered (Degefu et al. 2018), but the existing, widely used visualization techniques (e.g. Google Earth) were not used to present the spatial inequalities for the interested general audience.

The methodology for the establishment of the use of dynamic digital maps will start from the compilation of the information available for the different uses and territories. In this context, the bottom-up principle will also be applied: the sources of information and the involved communities will cover various spatial scales from the local towards the regional scope and beyond. From a professional point of view, spatial and textual data integration remains in the background, but for the sake of convenience, this information will be converted to known formats and will be organized by layers in maps that can be associated with applications such as the aforementioned Google Earth - tools that can be used by any users with various levels of education as the present low hurdles to access. It is important that accessibility is easy, clear and dynamic so that its use is friendly and can be attractive to citizens; especially sustainability communication research emphasizes low (access) convenience as a major issue of sustainable citizen/consumer behaviour. The application will also include some reference data that allow to objectively anchor the evaluation of the consulted data. The possibility that citizens can provide information by always establishing a validation system will be investigated.

The format and content as well as the way of accessing the maps will be part of the communication plan, initially defining the target of citizens to whom it is addressed. Different segmentation approaches for sustainability (marketing) communication (e.g., socio-demographic, behavioural) will be considered. Accompanying the presentation of the maps, a strategy for changing habits linked to the awareness acquired from the data consulted and the reference values will be designed.

During the data integration, we want to build structures, which may be used both for research and the public.

Among the raising awareness targets education (esp. higher education) should be addressed as part of the wider public information dissemination campaign, as they will make future scholars, policymakers, media and social media experts, would-be parents etc. and the influencers of their generation. Such key opinion leaders have proven to be essential in sustainability marketing contexts. University teaching assignments can also help students to realise the actual amounts and significance of water consumption.

The communication plan with policymakers will also start from data and references, from here, models will be generated in which the impact on sustainability that the different measures would generate can be evidenced.

We also try to use a bottom-up approach in raising awareness to get the future generation of university students more actively involved in disseminating information on water and by giving them special tasks not only to learn but also to educate the market, with higher motivation for the public we also intend to influence local implementation. Communication barriers should be overcome by giving the public and students data in a well-structured and clear manner. Giving special assignments and taking the significance of non-verbal communication levels into consideration may help to increase the motivation level, too and support higher levels of involvement, raising awareness. To support the communication strategy fair-mindedness and empathy should be promoted, which might be supported by team-building along with the topic of water usage and consumption, or by serious games.

5. GENDERED INNOVATION

The map related to the uses of water for the different processes will make it possible to show the motivations behind these uses and in the case of domestic uses, the gender roles associated with each of the uses. Evidence on the role of women in domestic processes will be the starting point for the modification of values and the change of habits and progress towards gender equality. When educating the market, using better communication strategies and supporting fair-mindedness and teamwork, it can also have a positive outcome towards reducing gender inequalities, too.

6. TRANSDISCIPLINARITY

TRANS-DISCIPLINARY APPROACH: Water is a transversal vector that participates in practically all the processes that occur on earth. Establishing the map of water uses, making it accessible to citizens and introducing motivations for changing attitudes in the population and politicians that allow sustainable use of water necessarily requires a transdisciplinary treatment.

This transdisciplinary treatment requires the contribution of historians, hydrologists, geologists, meteorologists, chemists, computer scientists, economists, lawyers, as well as psychologists and educators.

SCIENTIFIC DISCIPLINES TO BE INVOLVED (OTHER THAN THOSE ALREADY PRESENT IN THIS GROUP): Sustainable agriculture, Data mining, Network analysis, Database management system science, Edutainment, Communication science.

7. NON-ACADEMIC ACTORS INVOLVEMENT

Public utility companies (network operators, service providers), municipal wastewater treatment facilities, water resources management and irrigation organizers, media, marketing institutions (e.g., social media, societal marketing), policymakers.

8. LIST OF REFERENCES

· Brundiers, K., Wiek, A. and Redman, C.L. 'Real-world learning opportunities in sustainability: from classroom into the real world' in International Journal of Sustainability in Higher Education, 2010. Vol. 11, No. 4, pp.308–324.

· Degefu, D.M., Weijun, H., Zaiyi, L. et al. Mapping Monthly Water Scarcity in Global Transboundary Basins at Country-Basin Mesh Based Spatial Resolution. Sci Rep 8, 2144 (2018). DOI:10.1038/s41598-018-20032-w

· Dimante, D., Tambovceva, T., Atstāja, D. 'Raising Environmental awareness through education' in International Journal of Continuing Engineering Education and Life-Long Learning. 2016. Vol.26. No.3. 259-272.

· EEA (2021) https://www.eea.europa.eu/themes/water/european-waters/water-use-and-environmental-pressures/water-use-and-environmental-pressures#toc-2, accessed on 03/12/2021.

· Fortuin, I., Karen, P.J. and Bush, S.R. 'Educating students to cross boundaries between disciplines and cultures and between theory and practice', in International Journal of Sustainability in Higher Education, Vol. 11, No. 1, pp.19–35.

· Gonzalez-Arcos, C., Joubert, A. M., Scaraboto, D., Guesalaga, R., & Sandberg, J. (2021). "How Do I Carry All This Now?" Understanding Consumer Resistance to Sustainability Interventions. Journal of Marketing, 85(3), 44–61. https://doi.org/10.1177/0022242921992052

· MedECC, 2020 Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report [Cramer, W., Guiot, J., Marini, K. (eds.)] Union for the Mediterranean, Plan Bleu, UNEP/MAP, Marseille, France, 632pp. ISBN: 978-2-9577416-0-1. DOI: 10.5281/zenodo.4768833

· Pekel, JF., Cottam, A., Gorelick, N. et al.: High-resolution mapping of global surface water and its long-term changes. Nature 540, 418–422 (2016).

· Phipps, Marcus, Ozanne, Julie L. (2017), "Routines Disrupted: Reestablishing Security Through Practice Alignment," Journal of Consumer Research, 44 (2), 361–80.

· Tramblay, Y. et al, 2020. Challenges for drought assessment in the Mediterranean region under future climate scenarios. Earth-Science Reviews 210, 103348. https://doi.org/10.1016/j.earscirev.2020.103348

· Ward, Ph., et al., 2020. The need to integrate flood and drought disaster risk reduction strategies. Water Security. 11, 100070, ISSN 2468-3124, https://doi.org/10.1016/j.wasec.2020.100070.10.1016/j.earscirev.2020.103348

· WSA (2021) Water Scarcity Atlas. https://waterscarcityatlas.org/, accessed on 03/12/2021.

· Wood, J. T. (2015). Interpersonal communication: Everyday encounters. Nelson Education.

9. TEAM OF RESEARCHERS

Name	University	Scientific Discipline	Gender
Borrell, Valérie	UM	Hydrology	F
Garcia, Jose F.	UB	Chemistry	M
Llasat, María Carmen	UB	Meteorology and climatology	F
Lundin, Brigitte	UM	Education and games	F
Merfeld, Katrin	UU	Economics/Marketing/NBS	F
O'Hagan Luff, Martha	TCD	Sustainable finance	F
Székely, Balázs	ELTE	Interdisciplinary earth sciences	M
Tóth, Ádám	ELTE	Earth sciences/hydrogeology	M
Velich, Andrea	ELTE	Social and urban history, pedagogy, media studies	F

10. ADDITIONAL COMMENTS

N/A

The full team of researchers that participated in the focus group leading to the SDG13 proposals can be found in Annex IV.

SDG13-C2: Mapping Risks, Joining Funds, Taking Actions – Fostering Nature-based Solutions to Mitigate Climate-related Hazards

1. RESEARCH CHALLENGE

TITLE: Mapping Risks, Joining Funds, Taking Actions – Fostering Nature-based Solutions to Mitigate Climate-related Hazards

OBJECTIVES & SOCIETAL IMPACT: This research aims to first map climate-related hazards and identify the potential of nature-based solutions (NBS) to overcome these hazards in the context of climate change and to strengthen the co-benefit of nature-based solutions to increase the well-being of the community. Limited knowledge exists on the scope of nature-based solutions to address climate change issues and the relevant mechanisms/structures supporting the implementation of NBS. However, transdisciplinary and collaborative implementation of NBS is likely to lead to greater success. We will explore financial barriers such as high upfront costs, financial incentives such as preferential borrowing costs or reductions in insurance premia and social barriers such as lack of awareness of solutions or access to solutions, and find mechanisms to overcome these barriers to make NBS feasible. Particularly, we also aim to assess the effectiveness of social interventions aiming at increasing awareness of NBS to foster their implementation. The improvement of climate-risk awareness by the population is a need already recognized by the United Nations since the Hyogo Framework for Action, and continue to be advocated in the global agenda such as Sendai Framework for Disaster Risk Reduction and recent COP 26 in Glasgow to achieve Sustainable Development Goals and will be developed in this project through citizen science tools and co-creative processes oriented to change management.

2. RESEARCH TASKS

- Mapping the likelihood of occurrence of climate-related hazards (flooding, erosion, heat-waves etc.) and ecological and societal consequences of those risks (crop failure, ecosystem degradation, climate migration etc.).
- Estimate present and future trends of climate-related hazards in the countries involved in the project as well as trends in vulnerability and exposure.
- Build a global numerical model focusing on the extreme asymmetric behaviour in the climate change.
- A systematic procedure to search for data corresponding to different disasters related to extreme climate episodes and their consequences.
- Knowing where risks (likelihood & consequence) enable mitigation measures to be put in place, increasing resistance to those risks and adaptation measures to increase recovery from those risks (both components of resilience).
- Aggregating and downscaling climate-related data to high-risk areas.
- Identifying NBS case studies across the risk gradients to assess their potential effectiveness.
- Identify relevant cases/regions that have the potential of benefitting from these NBS.
- Explore relevant cases of existing NBS collaborations to learn mechanisms for adoption and distribution of benefits.
- Explore different stakeholders' perceptions, attitudes, and values associated with relevant NBS (cost, benefits, overarching motives/goals, obstacles, prejudices…).
- Explore existing financial barriers and private sector and public sector incentives for the use of NBS and the impact of changes in these financial elements.
- Identify appropriate social intervention to increase awareness of NBS.
- Develop communication campaigns/measures to raise awareness/educate potential stakeholders and institutions to strengthen NBS governance.
- Develop citizen science campaigns using common tools and methodologies.

3. CONTRIBUTION BEYOND THE STATE OF THE ART

- Inform regions about the risk of climate-related natural hazards and opportunities to mitigate that risk using NBS.
- Identification of how NBS can contribute to the mitigation of the two dimensions of climate-related natural hazard risk (likelihood and consequences).
- Identify and bring stakeholders together to understand the drivers of implementation of NBS and support the process of implementation with social science expertise.
- Financial barriers: Design effective private sector and public sector financial incentives for multiple stakeholders; design effective mechanisms to reduce upfront cost hurdles and foster collaborative processes during realization.

- Behavioural barriers: Identify economic and social benefits and according to communication techniques for stakeholders to invest resources (time, money…).
- Identify cognitive and affective barriers to (special) NBS among different stakeholders.
- Identify complementary measures to NBS, preferably non-structural measures (i.e. early warning systems).
- All lead to support evidence-based policymaking and awareness-raising.

4. METHODOLOGY

Use large-scale climate projection models to highlight areas of increased risk of climate-related natural hazards. Use down-scaled climate projection models in areas of high risk at a finer resolution to develop natural hazard risk projections (likelihood and consequences).

Production of a climate risk atlas to aggregate knowledge to translate and transfer scientific information and facilitate engagement with stakeholders in the development of effective nature-based solutions.

Identify places/systems where nature-based solutions can effectively contribute to mitigating climate-related natural hazards.

Multi case study approach exploring relevant cases of existing nature-based solutions to identify relevant stakeholders, their perception of the impact of the adoption of NBS on climate-related hazards and themselves, their motivations and the financial and social mechanisms that were found to be effective. These identifications will be based on participatory mechanisms.

Design Financial Models/Communication Frameworks to bring NBS stakeholders together and enable joint financing by qualitative and quantitative mapping of stakeholders attitudes and awareness of different NBSs in different regions and cities, applying developmental evaluation and action research methods during the implementation of NBSs. Conducting in-depth case studies of (selected) NBS to explore stakeholder associations/motivations/barriers.

5. GENDERED INNOVATION

Research papers found a gender difference in environmental concern and therefore differentiated social innovations needed to effectively increase awareness of NBS in all stakeholder groups.
- Contemplate the gender issue in the TORCH teams composition.
- Some studies have shown that women are more willing to do everything possible to mitigate climate change and develop mitigation strategies. This differentiation will be taken into account in awareness campaigns and actions.
- Women are more vulnerable to hydro-meteorological risks in which force intervenes in the chances of survival (eg: holding on to a tree in a flood), while men have more reckless actions in the face of risks that they consider minor (e.g.: crossing a stream when there is a flash-flood). These differences will be taken into account in awareness campaigns.

6. TRANSDISCIPLINARITY

TRANS-DISCIPLINARY APPROACH: This approach requires skills in natural sciences to identify relevant climate-hazard related data and computer science to aggregate the relevant data for the atlas. Next, it requires expertise from the NBS field to find and explore relevant cases of urban and rural NBS. In parallel, it requires knowledge in management and governance, finance, and marketing, psychology and education to identify relevant barriers and incentives and propose feasible solutions and educative materials. Sociologists should be also included to analyse social and individual behaviours and feelings in facing to climate-hazards and searching for potential changes that increase social resilience. Besides this, social sciences are fully involved in the evaluation of exposure and vulnerability and their evolution.

SCIENTIFIC DISCIPLINES TO BE INVOLVED (OTHER THAN THOSE ALREADY PRESENT IN THIS GROUP): GIS (geographic information system) experts, social scientists.

7. NON-ACADEMIC ACTORS INVOLVEMENT

NGOs fighting climate change and supporting NBS; local municipalities suffering from climate impacts and engaging in NBS; private companies that (potentially) engage in NBS realization (insurance companies, sustainable banks); funding agencies; UN agencies; knowledge institutions/partnerships working on NBS; citizens.

8. LIST OF REFERENCES

· Blöschl, G. et al. (2020). Current flood-rich period is exceptional compared to the past 500 years in Europe. Nature, 583, 560–566. https://doi.org/10.1038/s41586-020-2478-3

· Davies, C., & Lafortezza, R. (2019). Transitional path to the adoption of nature-based solutions. Land Use Policy, 80, 406–409. https://doi.org/10.1016/j.landusepol.2018.09.020

· Dorst, H., van der Jagt, A., Raven, R., & Runhaar, H. (2019). Urban greening through nature-based solutions – Key characteristics of an emerging concept. Sustainable Cities and Society, 49, 101620. https://doi.org/10.1016/j.scs.2019.101620

· Frantzeskaki, N. (2019). Seven lessons for planning nature-based solutions in cities. Environmental Science & Policy, 93, 101–111. https://doi.org/10.1016/j.envsci.2018.12.033

· Gilabert, J., Ventura, S., Segura, R., Martilli, A., Badia, A., Llasat, M. C., Corbera, K., Villalba, G. (2021). Abating heat waves in a coastal Mediterranean city: What can cool roofs and vegetation contribute? Urban Climate, 37, 100863. https://doi.org/10.1016/j.uclim.2021.100863

· Kampelmann, S., Van Hollebeke, S., & Vandergert, P. (2016). Stuck in the middle with you: The role of bridging organisations in urban regeneration. Ecological Economics, 129, 82–93. https://doi.org/10.1016/j.ecolecon.2016.06.005

· Maes, J., & Jacobs, S. (2017). Nature-Based Solutions for Europe's Sustainable Development. Conservation Letters, 10(1), 121–124. https://doi.org/10.1111/conl.12216

· NATURE editorial. (2017). 'Nature-based solutions' is the latest green jargon that means more than you might think. Nature News, 541(7636), 133. https://doi.org/10.1038/541133b

· Petrucci, O. et al. (2019). Flood Fatalities in Europe, 1980–2018: Variability, Features, and Lessons to Learn. Water, 11, 1682. https://doi.org/10.3390/w11081682

· Raymond, C. M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Nita, M. R., Geneletti, D., & Calfapietra, C. (2017). A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. Environmental Science & Policy, 77, 15–24. https://doi.org/10.1016/j.envsci.2017.07.008

· Seddon, N., Chausson, A., Berry, P., Girardin, C. A. J., Smith, A., & Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. Philosophical Transactions of the Royal Society B: Biological Sciences, 375(1794), 20190120. https://doi.org/10.1098/rstb.2019.0120

· Toxopeus, H., Achterberg, E., & Polzin, F. (2021). How can firms access bank finance for circular business model innovation? Business Strategy and the Environment, 30(6), 2773–2795. https://doi.org/10.1002/bse.2893

· Toxopeus, H., & Polzin, F. (2021). Reviewing financing barriers and strategies for urban nature-based solutions. Journal of Environmental Management, 289, 112371. https://doi.org/10.1016/j.jenvman.2021.112371

· Ward, Ph. et al. (2020). The need to integrate flood and drought disaster risk reduction strategies. Water Security, 11, 100070. https://doi.org/10.1016/j.wasec.2020.100070

· Sudmeier-Rieux, K., Arce-Mojica, T., Boehmer, H. J., Doswald, N., Emerton, L., Friess, D. A., ... & Walz, Y. (2021). Scientific evidence for ecosystem-based disaster risk reduction. Nature Sustainability, 4(9), 803-810. https://doi.org/10.1038/s41893-021-00732-4

9. TEAM OF RESEARCHERS

Name	University	Scientific Discipline	Gender
Borrell, Valérie	UM	Hydrology	F
Buckley, Yvonne	TCD	Ecology and nature-based solutions	F
Fülöp, Ágnes	ELTE	Computer science/statistical physics	F
García, Jose F.	UB	Chemistry	M
Llasat, María Carmen	UB	Climatology and meteorology	F
Lundin, Brigitte	UM	Education and games	F
Merfeld, Katrin	UU	Economics/Marketing/NBS	F
O'Hagan Luff, Martha	TCD	Sustainable finance	F
Tóth, Ádám	ELTE	Earth sciences/hydrogeology	M
Toxopeus, Helen	UU	Economics/Sustainable Finance/NBS	F

Triyanti, Annisa	UU	Environmental governance/Ecosystem-based adaptation and disaster risk reduction governance	F
Varga, Attila	ELTE	Psychology, education	M

10. ADDITIONAL COMMENTS
N/A

The full team of researchers that participated in the focus group leading to the SDG13 proposals can be found in Annex IV.

5. CONCLUSIONS & NEXT STEPS

This report constitutes the second step towards achieving TORCH's WP4 main objective; namely, to develop a series of challenges CHARM-EU would develop in each Thematic Area, from among institutional strengths and complementarities, while considering the state of the art and the financing mechanisms and potential barriers. As such, this document lists the research challenges and describes the process employed to achieve their formulation, with a SDG-driven approach, from a multi-disciplinary, multi-university and gender-balanced perspective.

The procedure to develop the challenges combined a three-step participatory process that involved researchers from the five universities with a prioritization exercise from an institutional perspective. This allowed define the target research areas and the teams of researchers to be involved in the task. From a methodological point of view:

· 389 researchers participated in the first phase (Research Areas Questionnaire), that helped identify common research interests with a bottom-up approach.

· Based on researchers input and the five universities priorities, three UN SDGs were established as the target scientific areas the challenges would be linked to: SDG3 (Good Health & Well-Being), SDG10 (Reduced Inequalities), and SDG13 (Climate Action).

· Around 100 researchers participated in three SDG-driven focus groups, in order to determine the research challenges specific topics and assemble small teams to formulate them.

This pathway represented a useful exercise to learn about CHARM-EU research strengths and to bring researchers with diverse backgrounds together around some shared scientific and societal challenges the Alliance would tackle in the future. Six proposals were developed:

· 'ACTIVE: **A**dult **C**hild and **T**eenage participation **I**n physical acti**V**ity across **E**urope' (SDG3-C1).

· 'Prevention and preparedness of negative effects of climate change on vector-borne infectious diseases' (SDG3-C2).

· 'Coping with digitalization and the transformation of the world of work as a new source of inequalities' (SDG10-C1).

· 'Designing better universities to fight against inequalities' (SDG10-C2).

· 'Preventive Water Sustainable Management of Freshwater resources within a global change frameset (PWSM)' (SDG13-C1).

· 'Mapping Risks, Joining Funds, Taking Actions – Fostering Nature-based Solutions to Mitigate Climate-related Hazards' (SDG13-C2).

These will be shared with the Alliance's academic community (and general public), and discussed during the first TORCH Annual Forum (Budapest, March 2022), to incorporate the non-academic

actors' insight. Subsequently, they will be submitted for the consideration of the CHARM-EU Vice-Rectors Committee and Rectors Assembly, in order to establish which of them will be developed further during 2022 as pilots, as described in TORCH WP9 (Action Plans and Pilots). The teams of researchers responsible for their formulation will be encouraged to apply for international and national funding opportunities that will allow implementing them as research projects from 2023 onwards. All selected challenge proposals will undergo ethical review by the partners' Ethics Committees in due course to ensure any potential ethical aspects are considered.

As an added value of the tasks carried out within this process, an interactive tool based on bibliographic analysis of current authorship networks was developed. This instrument will be available for the academic community of the CHARM-EU universities, and would help uncover researchers with common interests based on their scientific production.

ANNEX I: RESEARCH AREAS QUESTIONNAIRE

SECTION 1 - DATA PROTECTION

1 Data joint controllers

•University of Barcelona: General Secretary. Gran Via de les Corts Catalanes, 585, 08007 Barcelona,

•Trinity College Dublin: Secretary's Office, West Chapel/House 10, Trinity College, Dublin 2, Ireland,

•Utrecht University: UU-Joint Virtual Administration Officer,

•Eötvös Loránd University: Rector's Cabinet International Strategy Office. 21–23 Szerb utca, Budapest, H-1056, Hungary.

•University of Montpellier: Université de Montpellier – 163 rue Auguste Broussonnet – 34090 Montpellier

Purpose: Gather information on scientific expertise, which would lastly allow the project to develop the list of challenges the CHARM-EU alliance will face in each thematic area, based on institutions strengths and complementarity.

Rights: Right of access, right to rectification, right to erasure your data, right to object, right to request data portability and restriction of processing.

Additional information: For further information you can read the following privacy statement: XXXX

I declare that I have read the "Privacy Statement: Collection of personal data on TORCH WP4 - Research Thematic Areas".

Yes; No

SECTION 2 - PROFESSIONAL DETAILS

2 First name

3 Last name

4 Gender

Female; Male; Non-Binary; Prefer not to say; Prefer to self-describe

5 Prefer to self-describe

6 Email Address

7 University

University of Barcelona; Trinity College Dublin; Utrecht University; Eötvös Loránd University; University of Montpellier

8 Faculty/Institute

9 Department/Unit

10 Job Role/Position

11 ORCID

SECTION 3 - RESEARCH EXPERTISE: FIELDS OF SCIENCE

This section refers to the Fields of Science Classification (OECD, 2007).

12 According to the Fields of Science Classification (OECD, 2007), what is your main field of expertise?

1. Natural Sciences; 2. Engineering and Technology; 3. Medical and Health Sciences; 4. Agricultural Sciences; 5. Social Sciences; 6. Humanities

13 According to the Fields of Science Classification (OECD, 2007), what is your specific field of expertise?

1.1 Mathematics; 1.2 Computer and information sciences; 1.3 Physical sciences; 1.4 Chemical sciences; 1.5 Earth and related environmental sciences; 1.6 Biological sciences; 1.7 Other natural sciences; 2.1 Civil engineering; 2.2 Electrical engineering, electronic engineering, information engineering; 2.3 Mechanical engineering; 2.4 Chemical engineering; 2.5 Materials engineering; 2.6 Medical engineering; 2.7 Environmental engineering; 2.8 Environmental biotechnology; 2.9 Industrial Biotechnology; 2.10 Nano-technology; 2.11 Other engineering and technologies; 3.1 Basic medicine; 3.2 Clinical medicine; 3.3 Health sciences; 3.4 Health biotechnology; 3.5 Other medical sciences; 4.1 Agriculture, forestry, and fisheries; 4.2 Animal and dairy science; 4.3 Veterinary science; 4.4 Agricultural biotechnology; 4.5 Other agricultural sciences; 5.1 Psychology; 5.2 Economics and business; 5.3 Educational sciences; 5.4 Sociology; 5.5 Law; 5.6 Political Science; 5.7 Social and economic geography; 5.8 Media and communications; 5.9 Other social sciences; 6.1 History and archaeology; 6.2 Languages and literature; 6.3 Philosophy, ethics and religion; 6.4 Art (arts, history of arts, performing arts, music) ; 6.5 Other humanities

SECTION 4 - RESEARCH EXPERTISE: TORCH THEMATIC AREAS AND SDGS

This section refers to the TORCH Thematic Areas and their correspondence to the UN SDGs

14 Which of the TORCH Main Thematic Lines fits your research interests best?

1. Food, Water, Life&Health; 2. Biodiversity, Environment, Climate Change; 3. Inequality, Economic Growth, Governance, Migration; 4. Big Data, Artificial Intelligence

15 Which of the TORCH Thematic Areas fits your research interests best?

1.1. Food; 1.2. Water; 1.3. Life&Health

16 Which of the TORCH Thematic Areas fits your research interests best?

2.1. Biodiversity; 2.2. Environment; 2.3. Climate Change

17 Which of the TORCH Thematic Areas fits your research interests best?

3.1. Inequality; 3.2. Economic Growth; 3.3. Governance; 3.4. Migration

18 Which of the TORCH Thematic Areas fits your research interests best?

4.1. Big Data; 4.2. Artificial Intelligence

19, 20, 21 Is there any other Thematic Area that may also fit your research interests?

not applicable; 1.1. Food; 1.2. Water; 1.3. Life&Health; 2.1. Biodiversity; 2.2. Environment; 2.3. Climate Change; 3.1. Inequality; 3.2. Economic Growth; 3.3. Governance; 3.4. Migration; 4.1. Big Data; 4.2. Artificial Intelligence

22 Which of the TORCH Thematic Lines (and their related SDGs) would you be interested in contributing to?

1. Food, Water, Life&Health; 2. Biodiversity, Environment, Climate Change; 3. Inequality, Economic Growth, Governance, Migration

23 Which of the following SDGs fits your expertise/research interests best (considering the tentative topics/keywords they are related to)

2. Zero Hunger; 3. Good Health and Well-Being; 6. Clean Water and Sanitation

24 Which of the following SDGs fits your expertise/research interests best (considering the tentative topics/keywords they are related to)

13. Climate Action; 14. Life Below Water; 15. Life on Land

25 Which of the following SDGs fits your expertise/research interests best (considering the tentative topics/keywords they are related to)

1. No Poverty; 5. Gender Equality; 8. Decent Work and Economic Growth; 10. Reduced Inequalities; 16. Peace, Justice and Strong Institutions

26 According to the SGD you picked, which of the following topics fits your expertise best. 2. Zero Hunger

land rights; food producer; undernutrition; agricultural management; hidden hunger; genetically modified food; fertilizers; food security; food governance; food value chain; OTHER

27 According to the SGD you picked, which of the following topics fits your expertise best. 3. Good Health and Well-Being

public health; child well-being; youth well-being; water-borne diseases; infectious diseases; sexually transmitted diseases; child mortality; childbirth complications; infant mortality; substance abuse; healthy lifestyle; inclusive health; OTHER

28 According to the SGD you picked, which of the following topics fits your expertise best. 6. Clean Water and Sanitation

water management; water sources; water scarcity; water security and/or shortage; water use and conservation; water supply; water infrastructure; water quality; clean and drinking water; water toxicology; water pollution; waste water; water footprint; blue water; green water; grey water; black water; water ecosystems; groundwater; OTHER

29 According to the SGD you picked, which of the following topics fits your expertise best. 13. Climate Action

climate change; climate change adaptation; climate change mitigation; climate policies; climate justice; climate change financing; climate services; climate modelling; climate prediction; climate variations; climate extremes; climate forcing; climate risks; natural hazards; regional climates; urban climates; land use; greenhouse emissions; radiative forcing; global warming; thermal expansion; atmosphere; glacier retreat; ice-ocean interactions; ocean acidification; sea level; nitrogen cycle; unfccc; ozone; anthropocene; ecoclimatology; Green Climate Fund; bioeconomy; disaster risk reduction; environmental education; energy conservation; food chain; OTHER

30 According to the SGD you picked, which of the following topics fits your expertise best. 14. Life Below Water

marine ecosystems; marine conservation; community-based conservation; marine pollution; water cycle; biogeochemical cycle; oceanic circulation modelling; ice-ocean; ocean acidification   eutrophication; coral bleaching; marine economy; coastal management; coastal habitats; fishery; traditional ecological knowledge; marine protected areas; coastal ecotourism

marine quota; species richness; nutrient runoff; small island development states; OTHER

31 According to the SGD you picked, which of the following topics fits your expertise best. 15. Life on Land

terrestrial ecosystems; terrestrial freshwater; biodiversity; human-wildlife conflict; bioeconomy; wildlife products and market; biological production; ecological resilience; habitat loss and fragmentation; habitat restoration; trophic webs; endangered species; invasive species; land use; sustainable land management; land and soil degradation; land conservation; soil restoration; forestry; forest management; wetlands; mountain environments; drylands; drought; deforestation; desertification; protected areas; ecotourism; OTHER

32 According to the SGD you picked, which of the following topics fits your expertise best. 1. No Poverty

poverty reduction; financial development; financial empowerment; distributional effects; child labour; food bank; development aid; social protection; microfinance; access to economic resources; OTHER

33 According to the SGD you picked, which of the following topics fits your expertise best. 5. Gender Equality

feminism; women's rights and empowerment; women's political participation; women in leadership; women's economic development; female entrepreneurship; women's ownership; gender discrimination; gender (in)equality; gender segregation; employment equity; womens' (un)employment; occupational segregation; female exploitation; gender-based violence; forced marriage; female infanticide; female genital mutilation; domestic violence; sexual violence; human trafficking; forced prostitution; sexual rights; reproductive rights; divorce rights; contraceptive behaviour; reproductive healthcare; OTHER

34 According to the SGD you picked, which of the following topics fits your expertise best. 8. Decent Work and Economic Growth

economic development; sustainable growth; economic globalization; inclusive economy; circular economy; low-carbon economy; carbon offsetting; economic diversification; resource efficiency; economic decoupling; income inequality; (un)employment; employment policy; labour market disparities; labour rights; labour market institutions; child labour; forced labour; living wage; financial access and inclusion; microfinancing; microentreprises; medium entreprises; social entrepreneurship; rural economy; foreign development investment; sustainable tourism; OTHER

35 According to the SGD you picked, which of the following topics fits your expertise best. 10. Reduced Inequalities

socio-economic (in)equality; financial (in)equality; economic reform policies; political inclusion; social protection policies; immigration/emigration; migration policies; foreign direct investment; development gap; north-south divide; social exclusion; economic marginalization; income inequality; discriminatory policies; economic empowerment; OTHER

36 According to the SGD you picked, which of the following topics fits your expertise best. 16. Peace, Justice and Strong Institutions

actual innocence; false confession; armed conflicts; civil conflicts; Geneva Convention; warfare; peacekeeping; corruption; bribery; democratic deficit; democratization; politics; ethnic conflict; genocide; human trafficking; justice system; refugees; terrorism; torture; effective rule of law; arms flow; good governance; freedom of information; human rights; inclusive institutions; arbitrary detentions; inclusive societies; fair societies; independent judiciary; separation of powers; extremisms; organized crime; arms trafficking; cybercrime; insurgence; illicit money; freedom of speech; press freedom; OTHER

37 If Other, please specify:

38 Is there any other comment or relevant information you would like to share?

ANNEX II: RESEARCH CHALLENGES FOCUS GROUPS QUESTIONNAIRE

SECTION 0 - DATA PROTECTION

1 Data joint controllers

• University of Barcelona: General Secretary. Gran Via de les Corts Catalanes, 585, 08007 Barcelona,

• Trinity College Dublin: Secretary's Office, West Chapel/House 10, Trinity College, Dublin 2, Ireland,

• Utrecht University: UU-Joint Virtual Administration Officer,

• Eötvös Loránd University: Rector's Cabinet International Strategy Office. 21–23 Szerb utca, Budapest, H-1056, Hungary.

• University of Montpellier: Université de Montpellier – 163 rue Auguste Broussonnet – 34090 Montpellier

Purpose: Gather information on scientific expertise, which would lastly allow the project to develop the list of challenges the CHARM-EU alliance will face in each thematic area, based on institutions strengths and complementarity.

Rights: Right of access, right to rectification, right to erasure your data, right to object, right to request data portability and restriction of processing.

Additional information: For further information you can read the following privacy statement: XXXX

I declare that I have read the "Privacy Statement: Collection of personal data on TORCH WP4 - Research Thematic Areas".

Yes; No

SECTION 1 - PERSONAL DETAILS

2 First name

3 Last name

4 Email Address

5 University

University of Barcelona; Trinity College Dublin; Utrecht University; Eötvös Loránd University; University of Montpellier

SECTION 2 - TORCH SUSTAINABLE DEVELOPMENT GOALS

6 Which of the following SDGs fits best with your research expertise/interests?

SDG3 – Good Health & Well-Being; SDG10 – Reduced Inequalities; SDG13 – Climate Action; None of them fits my research interests (so I am not interested in joining any subsequent focus group)

7 Is there any other of the above SDGs (and focus groups) you might be interested in?

SDG3 – Good Health & Well-Being; SDG10 – Reduced Inequalities; SDG13 – Climate Action

SECTION 3 - RESEARCH QUESTIONS

8 The following questions request you to propose a research challenge linked to the SDG of your choice. If you prefer not to propose any challenge, but would be interested in participating in the focus groups, please let us know.

I am proposing a research challenge; I am not proposing any research challenge, but I would like to participate in the focus group.

9 Based on your research expertise, please describe what is the key scientific challenge/topic to be tackled in relation to the SDG you picked in the previous section (feel free to include any information about methods, data, infrastructures, resources, etc. that would be needed to achieve this goal).

10 Please let us know three of your most recent publications on this subject.

11 Please let us know three recent publications on this subject (on which you were not involved as an author)

12 TRANSDISCIPLINARITY. Apart from your research discipline, which other scientific fields could contribute to tackle the SDG you picked and the challenge you proposed.

13 GENDERED INNOVATION. Please describe how gender perspective is relevant to the SDG/challenge you proposed.

14 GENDERED INNOVATION. How gendered innovation could be implemented in this research line?

15 INVOLVING NON-ACADEMIC ACTORS. Please state what non-academic actors and stakeholders could be relevant to the SDG/challenge you proposed.

16 INVOLVING NON-ACADEMIC ACTORS. Is there any particular method you would like to propose to involve non-academic actors in this research line?

17 Is there any other comment or information you would like to share?

ANNEX III: RESEARCH CHALLENGE PROPOSAL TEMPLATE

SDGX – XXXX: Research Challenge Proposal

1. RESEARCH CHALLENGE

Please state the title for the proposed research challenge (not necessarily the same title used during the focus group session).

(max 30 words)

Please describe the research objectives and expected societal impact (why do we need to address it?).

(max 200 words)

2. RESEARCH TASKS

Please list and briefly describe the research tasks to be taken in order to develop the proposed research challenge.

(max 200 words)

3. CONTRIBUTION BEYOND THE STATE OF THE ART

Please describe the innovative dimension of the proposed research challenge with regards to the current state of the art.

(max 400 words)

4. METHODOLOGY

Please briefly describe the methodology to be applied in developing the proposed research challenge.

(max 400 words)

5. GENDERED INNOVATION

Please describe how gender perspective is relevant to the proposed research challenge and how it would be incorporated.

(max 200 words)

6. TRANSDISCIPLINARITY

Please describe why a transdisciplinary approach would be required to develop the proposed research challenge.

(max 200 words)

Please list what disciplines (other than those already present in this group) could contribute to develop the proposed research challenge, if any.

(max 30 words)

7. NON-ACADEMIC ACTORS INVOLVEMENT

Please list what non-academic actors might be involved in developing the proposed research challenge.

(max 200 words)

8. LIST OF REFERENCES

Please list some papers relevant to the proposed research challenge (if possible, published from 2010 onwards). Please highlight those papers authored by participants in this group.

(max 15 references)

9. TEAM OF RESEARCHERS

Please list the researchers who elaborated this research challenge proposal.

Name	University	Scientific Discipline	Gender

10. ADDITIONAL COMMENTS

Please add any additional comments if desired.

(max 200 words)

ANNEX IV: RESEARCH CHALLENGES FOCUS GROUPS - TEAMS OF RESEARCHERS

SDG3 - Good Health & Well-Being. Focus Group Form and Session: List of participants.

Name	Uni	Field of Science (OECD, 2007)	Name	Uni	Field of Science (OECD, 2007)
Barthélémy, Daniel	UM	1.6 Biological sciences	Laurent, Anne	UM	1.2 Computer and inf. sciences
Caron, Patrick	UM	1.6 Biological sciences	Lavelle, Ed	TCD	1.6 Biological sciences
Casaroli, Ricardo	UB	3.2 Clinical medicine	Magdalou, Brice	UM	5.2 Economics and business
Comiskey, Catherine	TCD	1.1 Mathematics	Matay, Monika	ELTE	6.1 History and archaeology
Elek, Zoltan	ELTE	1.5 Earth and env. sciences	Maussang, Kenneth	UM	1.3 Physical sciences
Fu, Na	TCD	5.2 Economics and business	Mihucz, Victor G.	ELTE	1.4 Chemical sciences
Garcia, Jose F	UB	1.4 Chemical sciences	Newman, Carol	TCD	5.2 Economics and business
Girones, Rosina	UB	1.6 Biological sciences	Poncelet, Pascal	UM	1.2 Computer and inf. sciences
Guillen, Montserrat	UB	5.2 Economics and business	Siebes, Arno	UU	1.2 Computer and inf. sciences
Guillon, Marlène	UM	5.2 Economics and business	Sik, Domonkos	ELTE	5.4 Sociology
Gyori, Miklos	ELTE	5.1 Psychology	Smit, Lidwien A.M.	UU	3.3 Health sciences
Hoffman, István	ELTE	5.5 Law	Soós, Gabriella	ELTE	5.2 Economics and business
Jagoe, Caroline	TCD	5.9 Other social sciences	Tortosa, Avelina	UB	3.1 Basic medicine
Józsi, Mihály	ELTE	1.6 Biological sciences	Van Vuuren, Detlef	UU	1.5 Earth and env. sciences
Káplár-Kodácsy, Kinga	ELTE	5.3 Educational sciences	Varga, Máté	ELTE	1.6 Biological sciences
Kelly, Aine	TCD	1.6 Biological sciences	Villanueva, Sergio	UB	5.8 Media and communications
Kucsera, Csaba	ELTE	5.4 Sociology	Zemplén, Gabor	ELTE	6.5 Other humanities

SDG10 - Reduced Inequalities. Focus Group Form and Session: List of participants.

Name	Uni	Field of Science (OECD, 2007)	Name	Uni	Field of Science (OECD, 2007)
Bartha, Eszter	ELTE	5.4 Sociology	Magdalou, Brice	UM	5.2 Economics and business
Carmody, Pádraig	TCD	5.7 Social and econ. geography	Matay, Monika	ELTE	6.1 History and archaeology
Casaroli, Ricardo	UB	3.2 Clinical medicine	Moriña, David	UB	1.1 Mathematics
Cheikbossian, G.	UM	5.2 Economics and business	Morris, Michael A.	TCD	1.4 Chemical sciences
Cormier-Salem, M.-C.	UM	5.7 Social and econ. geography	Newman, Carol	TCD	5.2 Economics and business
Frenken, Koen	UU	5.2 Economics and business	Ramos, Raul	UB	5.2 Economics and business
Fu, Na	TCD	5.2 Economics and business	Sénit, Carole-Anne	UU	5.6 Political Science
Gyori, Miklos	ELTE	5.1 Psychology	Serrano, Mònica	UB	5.2 Economics and business
Herrmann, Andrea	UU	5.2 Economics and business	Soler-Gallart, Marta	UB	5.4 Sociology
Hoffman, István	ELTE	5.5 Law	Solymosi, Katalin	ELTE	1.6 Biological sciences
Hollaender, Kirsten	UU	5.4 Sociology	Spratt, Trevor	TCD	5.9 Other social sciences
Horváth, László	ELTE	5.3 Educational sciences	Szécsényi, Krisztina	ELTE	6.2 Languages and literature
Jagoe, Caroline	TCD	5.9 Other social sciences	Vallbé, Joan-Josep	UB	5.6 Political Science
Káplár-Kodácsy , Kinga	ELTE	5.3 Educational sciences	Velich, Andrea	ELTE	6.1 History and archaeology
Kucsera, Csaba	ELTE	5.4 Sociology	Vijge, Marjanneke	UU	5.7 Social and econ. geography
Laurent, Anne	UM	1.2 Computer and inf. sciences	Villanueva, Sergio	UB	5.8 Media and communications

SDG13 - Climate Action. Focus Group Form and Session: List of participants.

Name	Uni	Field of Science (OECD, 2007)	Name	Uni	Field of Science (OECD, 2007)
Antal, Attila	ELTE	5.6 Political Science	Newman, Carol	TCD	5.2 Economics and business
Báldi, Katalin	ELTE	1.5 Earth and env. sciences	O'Hagan-Luff, Martha	TCD	5.2 Economics and business
Barthélémy, Daniel	UM	1.6 Biological sciences	Poncelet, Pascal	UM	1.2 Computer and inf. sciences
Buckley, Yvonne	TCD	1.5 Earth and env. sciences	Raessens, Joost	UU	5.8 Media and communications
Carmody, Pádraig	TCD	5.7 Social and econ. geography	Sénit , Carole-Anne	UU	5.6 Political Science
Cormier-Salem, M.-C.	UM	5.7 Social and econ. geography	Solymosi, Katalin	ELTE	1.6 Biological sciences
Cronin, Michael	TCD	6.2 Languages and literature	Szalai, Zoltán	ELTE	1.5 Earth and env. sciences
Elek, Zoltan	ELTE	1.5 Earth and env. sciences	Székely, Balázs	ELTE	1.5 Earth and env. sciences
Fulop, Agnes	ELTE	1.2 Computer and inf. sciences	Tello, Enric	UB	5.2 Economics and business
Garcia, Jose F	UB	1.4 Chemical sciences	Tóth, Ádám	ELTE	1.5 Earth and env. sciences
Hollaender, Kirsten	UU	5.4 Sociology	Vadas, András	ELTE	6.1 History and archaeology
Judit, Bartholy	ELTE	1.5 Earth and env. sciences	van Rijswick, Helena	UU	5.5 Law
Laurent, Anne	UM	1.2 Computer and inf. sciences	Van Vuuren, Detlef	UU	1.5 Earth and env. sciences
Llasat, Maria Carmen	UB	1.5 Earth and env. sciences	Varga, Attila	ELTE	5.3 Educational sciences
Maussang, Kenneth	UM	1.3 Physical sciences	Velich, Andrea	ELTE	6.1 History and archaeology
Merfeld, Katrin	UU	5.2 Economics and business	Vijge, Marjanneke	UU	5.7 Social and econ. geography
Middelburg, Jack	UU	1.5 Earth and env. sciences	Vitrià, Jordi	UB	1.2 Computer and inf. sciences
Mihucz, Victor G.	ELTE	1.4 Chemical sciences	Weidinger, Tamás	ELTE	1.5 Earth and env. sciences
Morris, Michael A.	TCD	1.4 Chemical sciences	Zemplén, Gabor	ELTE	6.5 Other humanities