CHERRIES
RESPONSIBLE HEALTHCARE ECOSYSTEMS

Adapted territorial methodology for the experimentation per territory. Phase I

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Table of Terms

Table 1: Terminologies and Definitions used in CHERRIES

APPLICATION	Innovation solution proposal answering the call for solutions or all for needs. Consists of the following items: 1/ The Proposal has to follow the templates provided for this purpose; 2/ Declaration of honour duly signed, stating that this very same project proposal does not receive funds elsewhere.
CALL FOR NEEDS	Publication of an announcement inviting either organizations or individuals and generally stakeholders from the 4P model as defined in the project to submit a "need" as also defined in the project. CHERRIES methodology is a demand driven approach on healthcare innovation and the first and most important step is to properly identify and define a solid need. To define the need, the applicant has to complete the application form as designed by the consortium and adjusted accordingly in the territorial conditions. In CHERRIES, the current call is hosted in 3 different regions with different geographical, socioeconomical and healthcare characteristics.
CALL FOR SOLUTIONS	Publication of an announcement inviting innovative Start-ups, SMEs and other organizations to provide a solution addressing the unmet need that has been defined in the call for needs. To provide a solution, the applicant has to complete the application form as designed by the consortium and adjusted accordingly in the territorial conditions.
CHALLENGE PROPOSER (CP)	The organization/entity or group of organizations that propose the unmet need and frame it in the form of a challenge. The CP also works in close collaboration with the solution provider to co-create a solution. The Challenge Proposer is directly in collaboration with the territorial partners of CHERRIES.
EVALUATION SELECTION OF THE NEEDS	Group of stakeholders who are responsible for selecting the need among all proposals submitted. The Evaluation Selection Committee (ESC) is composed by the territorial partners as well as with the experts, professionals, and civil society in the field of the Need and Solution under examination
SELECTION COMMITTEE OF CHALLENGES	Group of stakeholders who are responsible for selecting the challenge among all proposals submitted. The SC (selection committee) is composed by the territorial partners as well as by the experts and committees in the field of the seed and solution under examination
EVALUATION PROCESS	The call for solution evaluation process is structured in three steps: 1- Eligibility Check. A first review performed by the local partners. 2-Proposal evaluation. A SC evaluates all eligible proposals, 3- Solution Provider selection. The selected local beneficiary solution providers and their solutions' proposals are published & notified.
FUNDING/CONTRACTING BODY	Funding/Contracting organization that launches a competitive call to select the best solution provider for each territorial challenge. It also provides the economic support to the Solution Provider to carry out the development of the solution. In CHERRIES project, the funding/contracting body is the regional partner that has received the funding (through the project) and will provide it to the solution provider following the sub-agreement regulation.
SOLUTION PROVIDER	Organization that, once selected, becomes the solution provider and starts co-creation with territorial team, supporter and challenge owner.
SUBGRANT AGREEMENT	Selected Solution Providers are requested to sign a covenant document which main objective is to validate the administrative, financial and technical operational capacity and to establish some minimum ground rules for receiving support from the CHERRIES project.
THEME	A Theme is a large Healthcare area where there are needs that can be addressed by an innovative solution. The Theme is defined by the call for needs and its purpose is to identify unmet need to be solved in relevant healthcare areas.

1 Introduction

CHERRIES engages health ecosystems in South-West Europe (**Murcia ES**), Northern Europe (**Örebro SE**) and South-East Europe (**Republic of Cyprus CY**), in which the territorial preconditions and development paths are varying. CHERRIES project is developing an adapted territorial methodology for the experimentation pilots in each territory. The demand driven innovation processes for co-creation and reflection to mirror territories implemented throughout the project are elaborated in the current document presenting the unique CHERRIES approach. By applying Responsible Research and Innovation tools and principles and adapting them to territorial preconditions in order to collect and identify the needs; the CHERRIES methodology is designed to adopt to regional challenges and to support co-creation solutions in the healthcare ecosystem whilst engaging all relevant stakeholders of the 4P model which are Patients, Professionals, Policymakers and Payors

CHERRIES Methodology has been designed to reflected the live progress and activities of the territorial experimentation process in the three different regions and as a result, it is able to provide any user and reader that potentially would apply the CHERRIES methodology in a mirror territory with all the necessary step-by-step guidance as well as the documentation to be used during its adoption. The unique value of CHERRIES methodology is that it provides the potential adopter with flexibility and agility to adjust and apply the core methodology based on its unique territorial preconditions.

2 Setting up the experimentation in the territories: The CHERRIES experimentation: a 5-step approach

The CHERRIES project set up its territorial experimentiatons following a carefully designed methodology (see chapter 3) that was set up in co-creative process with the key stakeholders in the terrirtories. It gives coherence to the experimentation process and facilitates its design based on territorial preconditions and the stakeholder landscape, allowing for regional adaptations where needed. In general, the CHERRIES approach to RRI-based policy and innovation experimentation in the healthcare sector can be broken down into five steps.

Step 1: Analysis of the regional context and potential for innovation

In order to properly set up the framework for the tailored experimentation processes in the three territories, a comprehensive analysis of the specific regional backgounds was implemented at the beginning of the project. The methodlogy developed for this “mapping exercise”[1] was based on the theoretical interface of innovation policy, RIS3, RRI, and the healthcare sector. The framework consists of mapping exercises within the territories. It covers the identification and classification of stakeholder involvement, the policy ecosystem, provids insights into the current policy mix in the context of RRI, and the innovation support ecosystem and was mapped according to the RIS3 principles.

The territorial mapping exercise encloses - as one of the main steps, the definition of the territorial priorities of the regions. In order to achieve this goal, the methodological approach follows the Research and Innovation Strategies for Smart Specialisation method (RIS3 Guide) from the European Commission (2012). The process entailed the adaptation of the steps and actions considered to provide a more specific input required in the context of the CHERRIES project. This version of the strategy established a special focus on Healthcare and

[1] REFERENCE TO DELIVERABLE FROM WP2

Innovation sector. Additionally, the methodology considers using more recent data and information available, if compared with the previous Regional Smart Specialization Strategies.

The steps to describe the territorial context of the regions are as follows:

a. Analysis of regional economic specialisation: We assessed this task using sources such as; EUROSTATS at regional level and R&I Observatory, which contains the country reports from 2017, providing a brief analysis of the R&I system covering the economic context, main actors, funding trends & human resources, policies to address R&I challenges.
b. Analysis of innovative behaviour: An examination of the regional innovative behaviour, capabilities, priorities, needs, and observable trends from the country and regional perspective. The sources used for this activity included the Smart specialisation platform – EU, European Observatory for Clusters and Industrial Change Mapping Tool, European innovation scoreboard, and the regional innovation scoreboard (RIS).
c. Defining type of health care system: The health care system was assessed on its public or private nature and the level of health care provided. We took as a source the Country Health profiles developed by the European Observatory on Health Systems and Policies and the Organisation for Economic Co-operation and Development (OECD).[2]

Analysis of Scientific and Technological specialisation

Analysis of the regional knowledge production data based on publications and patent applications. In this section, we communicate the main strengths and capabilities already present in the region from the scientific perspective. Leiden University measured scientometric indicators based on CWTS internal database (Web of Science's (WoS) produced by Clarivate Analytics.

The type of analyses performed considered the following characteristics and sources of data, to build a profile of the current knowledge production in the regions:

- **Societal Grand Challenges:** Knowledge production associated with the SGC. We assessed the average number of publications (normalized by population) of each SGCs category associated with "Health" for the period 2012- 2016. This, characterizing the relationship between Health categories from SGC and the World Health Organization (WHO) priorities (Data source: Knowmak project).
- **Complexity and diversity indicators:** It refer to the variety of knowledge and is measured by the number of scientific subfields with revealed comparative advantage (RCA). Diversity matters because regions are more likely to expand and diversify into new topics and fields that are closely related to their existing activities. The complexity measure looks to explain the knowledge produced in a region combining metrics of the diversity of regions and the ubiquity of the fields to create measures of the relative complexity of a region's scientific portfolio. Hausmann and Hidalgo (2009)[3]. For further details of the methodology applied, please refer to Heimeriks *et al.* (2019)[4].
- **Relatedness:** The relatedness indicator measures the Revealed comparative advantage (RCA) by analysing the fields in which the region has an above-average concentration of publications. Likewise identify which scientific subfields are often found together in the same region, as a representation of

[2] https://www.euro.who.int/en/about-us/partners/observatory/publications/country-health-profiles
[3] Hausmann, R., & Hidalgo, C. A. (2009). The building blocks of economic complexity. Proceedings of the National Academy of Sciences of the United States of America, 106(26), 10570–10575. doi:10. 1073/pnas.0900943106
[4] Heimeriks, G., Deyu, Li, Wout, L., Meijer, I. & Yegros, A. (2019) Scientific knowledge production in European regions: patterns of growth, diversity and complexity. European Planning Studies 27(11):1-21.

the ability of the territory to diversify into related subfields. This analysis was performed for publications in the year 2018.

- **Analysis and characterization of priorities at micro-fields level**: The outcomes from this analysis provide a more detailed characterization of the fields already prioritized in the Relatedness analysis. It provides complementary information in respect to the level of specialization and knowledge production in the territory. We considered the absolute number of publication output and the Relative number of publications to specify the level of specialization in each field. For further details please refer to Waltman & Van Eck (2012)[5]. The sample for each region considers not only scientific articles but also reviews and conference proceedings published from 2014-2018
- **Characterization of the most relevant fields from Biomedical and Health Science:** Using the same methodology as for the micro-level fields. This analysis involves only the key subjects developed in the Biomedical and Health Science field.

Step 2: Governance - Ensuring participation and ownership

After setting up the regional frame through step 1, the next step focused on getting governance strucutures in place that allowed creating an inclusive and participative environment for the key stakeholder, ensuring ownership of the process beyond the project consortium. In terms of process, this meant aiming for a wide participation of actors and experts from within region. The most important types of organizations that have been involved are public authorities, universities, and other knowledge-based institutions, investors and enterprises, civil society actors, and Healthcare organizations.

This step has been conducted in accordance with the territorial mapping of the Stakeholders. The process consisted of the following 4 steps: 1) identification of stakeholders from current regional network 2) addition of potential new partners from datasets 3) selection criteria for stakeholders 4) categorize stakeholders regarding their degree of involvement in the project.

Step 3: Elaboration of an overall vision for the future of the region

This is a highly political step. Its value mainly rests on getting the political endorsement for the subsequent steps, particularly for the implementation of the prioritized areas. The vision should also include justifications for its relevance in terms of meeting societal challenges, such as providing more healthy living conditions for its citizens, providing new employment opportunities for specific categories of the population, combating social divide, environmentally responsible, etc.

Step 4: Identification of territorial priorities

This step addresses the results of the analysis performed in Step 1, 2 and 3 and likewise the territorial priorities raised by the regions, as a result of the engagement process with the groups of local actors and stakeholders. It comes up with clearly defined regional needs (through a call for needs as described above) and launches a call for solutions addressing this regional priority per territory.

Ideally, both priorities should be aligned. If the assessment of the regional capabilities and skills present in the region (Step 1) are connected to the priorities defined by each territory as part of the “entrepreneurial discovery” process, the region has a better chance to succeed in that area.

[5] Waltman, L., & Van Eck, N.J. (2012). A new methodology for constructing a publication-level classification system of science. Journal of the American Society for Information Science and Technology, 63(12), 2378–2392. (paper, preprint)

Some of the requisites filled by the current priorities defined in each territory are:

a. Priority level should be smaller than whole sectors, but bigger than single activities for maximal effectiveness.
b. Priorities do not have to fit in one particular sector and can be connected to multiple sectors. This is important because often innovative concepts are formed from a diverse set of capabilities.
c. Concerning the importance of RRI and SDGs in today's society these priorities do not have to carry an economic value only.
d. Stakeholders can formulate their societal visions for the future and collectively integrate these into their smart specialization priorities.

Step 5: Definition of coherent policy mix, roadmaps, and action plan

This step is being addressed through the Policy mapping activity. The mapping exercise follows the methodological approach developed within the consortium and aims in the design of territorial RRI-compliant innovation policy mix and the evidence based RRI -compliant development strategies

As already considered under the CHERRIES project framework, it is advised by the EU guidelines to test the new concepts in practice by setting up pilot projects in which can experiment with policy mixes before applying policies on the larger scale. For effective use of these pilot projects, a well-constructed evaluation mechanism should be in place to effectively assess which policy mixes are favourable.

The following chapters present the nature of the CHERRIES experimentation cases in the three pilot territories, describing their key characteristics, set up and implementation status (as of May 2021) according to the outlined 5 step approach.

3 The CHERRIES methodology

The engagement of societal actors, with central roles or knowledge about the healthcare and innovation ecosystem in the territories as well as citizens, all kind of citizens, irrespective of their age, gender, ethnicity and socio-economic background, is a central aim and methodological cornerstone of CHERRIES. The need articulation processes as well as the co-creation phase of the experiments guarantee that developed solutions are aligned with the values, needs and expectations of society[6].

The CHERRIES methodology presents a clear pathway towards RRI in the healthcare sector and offers innovation actors the tools and processes aimed at facilitating multi-stakeholders approaches to innovate in healthcare. It does so in order to address societal challenges in an adequate way through various aspects of a multi-stakeholder's dialogue:

- Broader vision/Long term vision.
- Increased and improved relationship between customers and users.
- New resources of creativity and innovation.
- Increased awareness about upcoming regulatory regimes.
- Reconsideration of business processes focusing on customers rather than competitors.
- Obtain competitive advantages and benefits by including RRI in their processes and products (cost reduction, risk reduction, better supply chain engagement, reputation, innovation capabilities, increased attractiveness of the employer, new opportunities).

[6] CHERRIES (G.A no.872873) Annex I to the Grant Agreement

- Increase the capacity of health entities to systematically identify and solve their needs while creating opportunities for private companies.
- Digital solutions with a high success rate -in terms of their application in practice/market uptake- because they have been developed side by side with the client.

RRI can help healthcare actors in their decision making taking into account a long-term vision, an inclusive attitude and a societally oriented approach.

CHERRIES experimentation process is therefore permeated by a RRI approach, from needs' identification to solutions' definition and co-creation. Through the proposed methodology and throughout the different pilot phases, CHERRIES will help healthcare innovation players act according to RRI process dimensions such as diversity and inclusion, openness and transparency, anticipation and reflection, responsiveness, and adaptability.

Moreover, wherever relevant, the 2 regional calls (call for needs and call for solutions) will refer to some specific RRI-driven criteria (such as open access, gender equality, public engagement, governance, ethics and science education) forcing healthcare innovation players working together towards ethically acceptable, socially desirable and environmentally sustainable products and services.

In the following paragraphs, where each phase of the experimentation is described in more detail, CHERRIES will suggest practices and tools that will help regional actors shaping responsible healthcare ecosystems.

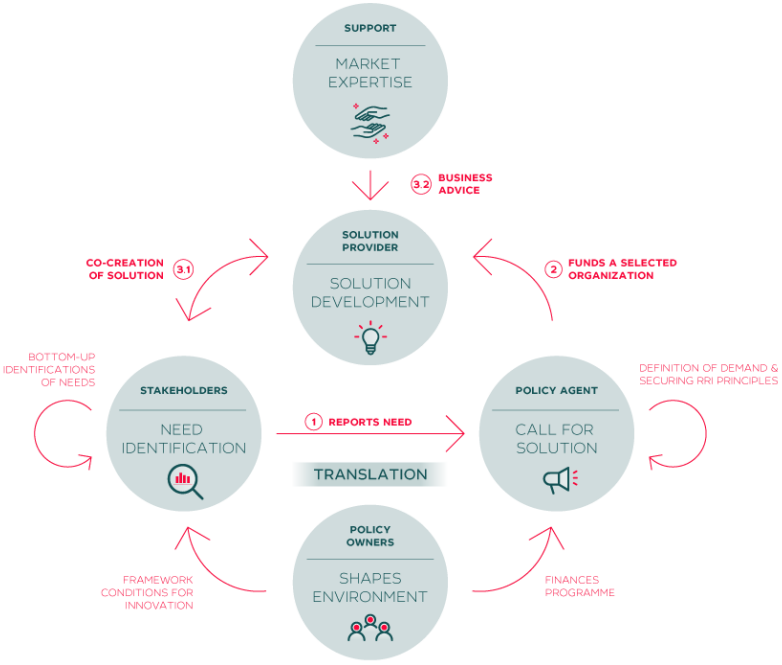

Figure 1: Schematic representation of the CHERRIES experimentation approach.

Introduction to the Phases of the Methodology

As mentioned above the CHERRIES methodology suggests a standard process that enables each region to tailor and adjust to its specific territorial context. Flexibility and adaptability are two key assets of CHERRIES approach.

The representation of the four phases in Figure 2, reflects the process and presents the method to be used by the partners responsible for the implementation of the CHERRIES pilots per territory. To propose a very practical and operational framework, the document is structured along these four phases which each region needs to implement on the regional level.

Phase 1 focuses on the need identification. In order to achieve this objective, stakeholders launch a call for needs to identify the unmet need in the social healthcare arena and, through a process of evaluation and selection, a regional need will be selected in each region.
Phase 2 aims to the translation of the selected need to be shaped into a call for solutions. The call for solutions is also divided into five micro-processes that are presented in Figure 3.
Phase 3 refers to the Co-Creation of Pilots in the territories within a duration of 9 months as well as to the contractual and managerial aspects of the activity.
Phase 4 aims to present the lessons learned during the adoption of the Methodology in the mirror territories as well as the adoption of RRI principles and tools in the healthcare ecosystem.

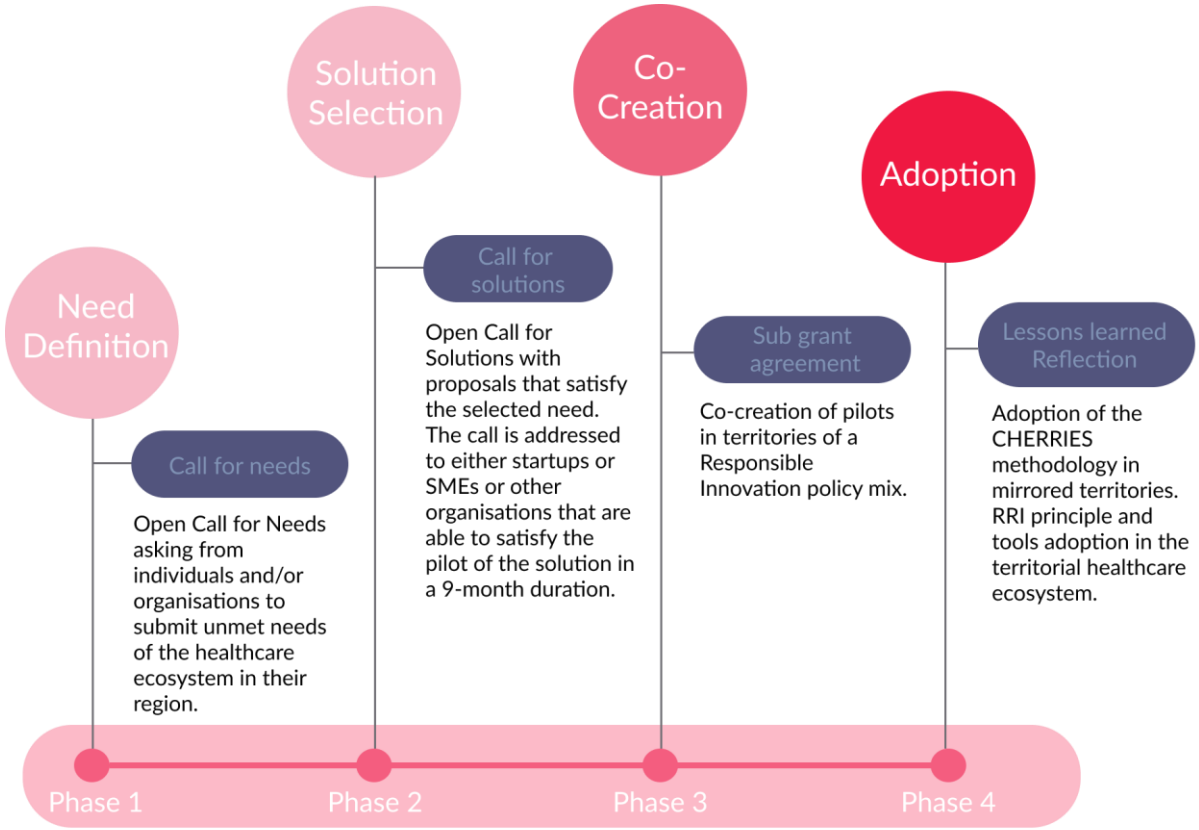

Figure 2: Cherries Methodology divided in phases

4 PHASE 1: The need identification

4.1 Introduction to the CHERRIES need identification process

The needs should arise from the healthcare system and go beyond the level of an individual patient, be concrete without being overly specific, fit the scope defined by the project framework, and be solvable through an innovative solution.

What is a need?

needs in the CHERRIES project can be defined as singular requirements that are identified and reported by healthcare professionals or patients, they are associated with everything human beings require to function well. In the context of CHERRIES, a need is an issue within or connected to the healthcare system that is either affecting the healthcare service delivery quality, creating avoidable costs within the healthcare system or both things at once.

The reported needs are aggregated (if appropriate) into sectoral demands of the healthcare professionals or patients. Thereby, CHERRIES is taking a clear user- or citizen-led approach to innovation processes.

How do the needs connect to the innovations in CHERRIES?

We are aiming to identify needs in an open and participatory manner and subsequently we will fund projects meeting these needs with innovative solutions. These solutions could be new services, products, processes, inter- or intra-organisational routines or social practices that are considered as innovative and responsible.

An innovation in the context of healthcare generally refers to new medicines, diagnostics, health technologies, practices, objects, social or institutional arrangements perceived as novel by an individual or a unit of adoption. The OECD defines health innovations as: "*Health innovation identifies new or improved health policies, systems, products and technologies, and services and delivery methods that improve people's health and wellbeing. Health innovation responds to unmet public health needs by creating new ways of thinking and working with a focus on the needs of vulnerable populations. It aims to add value in the form of improved efficiency, effectiveness, quality, sustainability, safety and/or affordability. Health innovation can be preventive, promotive, curative and rehabilitative and/or assistive care*."[7] Following this broad definition of innovations, we seek to identify underlaying needs as a mean of improving the healthcare system with a demand-oriented and user-centred perspective.

What is the scope of the needs?

The scope arising from the project framework conditions. The CHERRIES project can fund one innovation pilot per region. The maximum amount for the successful solution provider can get is €50.000. Further, the solution provider and the "Regional team" agree that they co-create the solution in the course of 10 months. This limited resources in terms of money and time, limit the scope of potential solutions and subsequently the need will be selected keeping these specifications in mind.

[7] WHO, n.d., https://www.who.int/topics/innovation/en/ retrieved 24.06.2020.

Establish the process for needs definition

The identification of the needs followed several steps presented in the following scheme.

Table 2: Establishment of process of needs definition

PREPARATION	The objective is to define and prepare the documentation, process and tools that is followed and used by the consortium in order to select the needs in each region. It is composed of: • General planning • Appointment of the Executive team coordinating the process on the stakeholders' side. They should define the calendar, responsibilities, and dissemination strategy. They also create the template for submission of unmet need proposals, set up the tools to collect them and develop the content for dissemination. • In prevision of the call for needs a questionnaire will be created. The objective of this questionnaire is to collect the most important information necessary to assess and select the proposal. • Setting up the tools to collect needs. • Define the evaluation criteria
RECRUITMENT	This phase is focused on the dissemination of the initiative amongst the society. The objective is to ensure that the identified main stakeholders fully understand the project, the process, the objectives and especially their key role in the project. It includes the organisation of a workshop to present the initiative, the objectives, the selected Topics, the defined process and more especially the coming call for needs
CALL FOR NEEDS	The objective of the call for needs is to collect via an online tool (platform or Google doc for example) the most relevant needs the society may have today, and which could be solved with an innovative Health solution. The citizens are invited to fill in a specific online questionnaire to submit the most critical need they have at the moment.
EVALUATION	The objective is to evaluate the needs submitted during the call for needs according to the selection criteria previously defined.

4.2 Define the selection process of the most important need(s)

Table 3: Selection Process for the needs

APPOINTMENT OF THE EVALUATION COMMITTEE	Each CHERRIES region has to create its regional Evaluation Committee (EC) by identifying the most relevant experts to assess the needs submitted on the platform according to the defined Selection Criteria and their knowledge of the healthcare sector. The Evaluation Committee is composed by experts and stakeholders depending on the regional scope. Indicatively:

	• Healthcare stakeholder organisation (4 members): • Top management • Clinical stakeholders, • Information Technology experts, • Innovation management experts, • Representatives from the other involved stakeholders to assess per challenge the feasibility of potential solutions within the expected time and budget constraints.
ASSESMENT AND SELECTION	The **Evaluation Committee (EC)** selects 1 need based on the Selection Criteria defined. The Evaluation is done in two steps: ▪ **Step 1: Evaluation of the Eligibility Criteria**. The first step of the evaluation process will be the evaluation of the Eligibility Criteria. The Eligibility Criteria was not assessed by the whole Evaluation Committee but only by one expert from the regional healthcare stakeholder. ▪ **Step 2 – Evaluation of the Selection Criteria.** The second step of the evaluation process will be the evaluation of the Selection Criteria.

4.3 Define the selection criteria

Table 4: Selection Criteria for the needs

EXPECTED IMPACT	Expected impact for the stakeholder's organization, the healthcare professionals and the patients. Based on his/her expertise and knowledge, the expert should estimate the potential level of improvement of the actual situation if the defined Need is solved by a new solution. This measurement has to be assessed following (at least) the three main criteria: • Outcomes for the health situation • Cost savings compared to the current situation. • Satisfaction of end users (they could be citizens, patients and/or healthcare professionals)
FEASIBILITY	Feasibility of the project. The expert should ask himself/herself: is it realistic to solve this Challenge today? Or are there too many barriers for the moment? To assess these criteria, the expert should take into consideration the actual situation in the hospital, the features of the potential solutions to be implemented and their future degree of adoption (e.g., expected interoperability efforts, feasibility of the pilot, adherence of the patient/healthcare professional...)

PRIORITY	Priority: these criteria measure the alignment with the healthcare policies & strategies of the hospital but also with the regional, national or European healthcare policies. The expert should evaluate the level of alignment of the Challenge regarding the different healthcare and innovation policies and so assess the potential contribution to these different policies.
SCALABILITY	Scalability of the Challenge. The expert should evaluate the scalability potentiality of the Challenge. The scalability will be evaluated regarding its level of duplicability: are there lot of other healthcare actors who might have the same Challenge/need? (The more hospitals that face the same Challenge, the higher the score. These criteria must also measure the feasibility of the later scaling up of the solution if the pilot finalizes successfully. The key aspect here is the replicability. Finally, these criteria also integrate the potential market and Business attractiveness towards future commercialization potential.

5 Experimentation cases

5.1 The CHERRIES experiment in Murcia

Methodological considerations for the call

Following the best practices of inDemand, we used the same submission template to collect the needs, adjusted to CHERRIES requirements.

The template was uploaded on the SMS intranet using the web tool developed in inDemand. This tool is based on a web shared rewriting tool called "*Orbeon*" which permits to confidentially write, delete and add information both, to the responsible of the proposal and the advisor.

This tool was only accessible for the SMS professional as it was located in the SMS intranet to facilitate the control to the access with the safest conditions. The tool was opened a few days before the second webinar, that took place on November 3rd, 2020, focused on the process of submission of the need proposals. The platform remained opened **for three weeks, improving** the quality of each of the needs' proposals thanks to the frequent interactions of the proposers with the advisor.

Regional dissemination of the call

For the dissemination it was used the date base of the proposers created during the inDemand project as well as the mails of Associations of patients and universities extracted from the EIP on AHA of Region of Murcia and identified for the CHERRIES toolkit and partners disseminated the call in their social networks. Due to the COVID-19 situation instead physical meetings, we organised three webinars.

1. The first webinar had a conceptual scope, introducing CHERRIES project, RRI approach and inDemand as a good practice on healthcare.[October 28th, 2020]
2. The second webinar was focused on the process to write and send a proposal of need, explaining rules, templates and useful tools. [November 4th, 2020]

3. Finally, a specific webinar devoted to RRI was given by an RRI expert. [December 1st, 2020]

76 participants were registered from all different profiles and each webinar was attended by **20-25 people**. A recording of each session was sent to those that had registered to the sessions, but couldn´t attend.

Figure 3: Murcia call for needs CHERRIES banner

needs reported.

Eight proposals were received during the three weeks the tool was opened, and the advisor helped the proposers to improve their applications. The number of applications was lower than expected in comparison with the previous processes of inDemand, when 68 and 32 proposals were received. The reason was probably due to these two factors:

- The worrying situation of covid outbreak with worst rates and trends of infections each week, to which healthcare professionals were completely devoted to.
- And the added difficulty of building a consortium between healthcare professionals, associations of patients and research groups of universities.

Regarding the **sectors** where needs were received, we could provide the below breakdown.

- The 8 proposals counted with the participation of SMS healthcare professionals, since their attendance was mandatory.
- 3 needs mentioned alliances with Associations of patients but only one was written with an association as member of the regional team.
- 3 needs counted with researchers from universities. In one case, as double role as some SMS professionals are also involved in the University, in another case as a consultant and in only one case, as a co-writer of the proposal.

Regarding to **4P group** where needs were received from:

- The 8 proposals were submitted by the main payor (SMS healthcare professionals), as a mandatory requirement.
- The patients were represented in 3 proposals but submitted directly by only one of them.
- Policy makers were not invited as they were not players of the needs. Their involvement was considered more important during the next phase of the co-creation.
- Providers were no invited to the call for needs, reserving them for the following step, the call for solutions.
- The 3 needs that involved university researchers required further comment because they could be double role, payors and providers. There was a specific discussion during the Evaluation Committee meeting on whether the participation of the universities in the call for proposals for challenges conflicted with the companies as well as on the rights of public entities in the intellectual property of the subsequent results of the co-creation.

Topics and cluster of needs reported.

The topics and areas related with the proposals received were:

- Application of voice interface in the health record.
- Emergency IT connection of the triangle (ambulance, coordination center & hospital).
- Last desire ambulance promotion.
- Early detection of progression in Multiple Sclerosis.
- Monitoring of pelvic floor dysfunction.
- Optimization of the nursing rotating team.
- Virtual physiotherapy at home.

Occupational therapy at Primary Care about post-COVID-19.

Chosen need and cluster of needs reported

Finally, after the meeting of the Evaluation Committee, the proposal called Early detection of progression in **Multiple Sclerosis**, with the acronym **CADEM,** was selected as winner. Although the Need was submitted under the acronym of CADEM, during the translation of the need into a challenge, the acronym of the challenge was named **Progress**.

It is focused on **early detection of the progression in Multiple Sclerosis** applying sensors to patients by internet of things (**IoT**) further than current test face to face every 6 or 12 months. The approach is to carry out a **controlled clinical trial** with at least 30 patients for 5 months.

Despite of the challenge of starting from a low level of maturity, the **complementarity** of skills, experience, and commitment of the team involved is a guarantee of success possibilities.

This need was the only one submitted by an association of patients (*EMACC, Esclerosis Múltiple Asociación de Cartagena y Comarca*) in addition with a researcher group of Biomedical Engineering from the Polytechnic University of Cartagena (UPCT) and the Neurology Service of Cartagena Hospital. This was **the most complete RRI approach** among all proposals of needs received.

5.2 The CHERRIES experiment in Örebro

One of the bearing principles in RRI – and in CHERRIES – is public engagement. This has been an important issue in Örebro. In the need identification process, an important standpoint has been that the Open call should not limit people from reporting needs because they are not established in a specific organisation – everybody is welcome to contribute. This also opens up for incoming needs with very different level of abstraction – one might be extremely narrow and specific while another might be very broad and general.

Methodological considerations of the call for needs

The Örebro team has used the call for needs template developed in CHERRIES. However, some adjustments have been made. The adjustments have primarily been based on the fact that the stakeholders, the Örebro team aimed to reach, are not always used to writing this type of material, and thus in order to be open and inclusive towards these stakeholders the form has been adjusted accordingly. The questions regarding scalability (as the call was not limited to one hospital or institution), description of objectives and indicators of the solution, and the commitment (as the call was open for private citizens, who cannot be expected to make that commitment) have been removed from the template.

The Örebro team aimed for simplicity and thus chose to provide the submission form as an editable PDF. Submission have been accepted in digital and handwritten form. The template has been published together with information on call for needs on Region Örebro county's website. The website was open for 3,5 weeks.

Regional dissemination of the call for needs

The target groups for the call for needs where broad; civil society organisations, public institutions including healthcare, and general public/private citizens. To reach civil society, the main dissemination channel was the civil society umbrella organisation Möckelnföreningarna. To reach public officials and health care professionals we mainly used our ordinary channels in the region and the municipalities. To reaching private citizens, dissemination was made through information in local radio and through Möckelnföreningarna's communication channels.

Three participatory workshops have been organised to promote the call for needs. The first one primarily targeted civil society organisations and private citizens, the second one has primarily been aimed at professionals, and the third one has had mixed participants. The first of the three has been carried out physically, while the other two events had to be organised online. The workshops provided information about CHERRIES and about call for needs. As experience shows, people tend to go directly to possible solutions without sufficiently reflecting the needs, the focus has also been also on identifying and analysing needs.

Additionally, a webinar introducing RRI approaches has also been carried out during the time the call was open. Although this webinar was not focusing on the call for needs, the call was promoted during the webinar. The submission form was published together with information on call for needs on Region Örebro county's website. Information was also disseminated on Activa's website and in the Region's social media channels, in newsletters and in meetings with stakeholders.

In summary, a number of dissemination actions were made to reach the target groups. Although, there were some difficulties to reach and engage especially healthcare sector and private citizens, which most likely had effect on the reported needs.

Reported needs

During the call for needs, six proposals were received. This is a lower number than expected. The assumption is, that stakeholders as professionals and associations were occupied with the ongoing pandemic. On the other hand, elderly people as the main target group, have been hard to reach during the pandemic both physically and digitally.

Further, during the workshops a great deal of commitment could be observed, but the step of filling in a form and submit the need seemed to pose an additional barrier that was not present in sharing during a workshop. In the workshops, the Örebro team has been able to collect many good proposals that were later not submitted in written form. The Örebro team thus chose to take the workshop results into consideration during the assessment of the submitted needs. The workshops have contributed to the understanding of the issue and therefore made it easier to assess the submitted needs. When reporting the number of needs received below, however, only those that have been received via the form are reported.

Collected needs – clusters and themes
Analysing the collected needs, a few clusters are shown:

- The need for social contacts among elderly overall
- The need for social contacts among the elderly that are loneliest today
- Technical skills and the possibility to use digital tools among elderly (to counteract loneliness)
- The potential in civil society when it comes to meet the needs – regardless of the need

These themes were also well represented in the discussions during the three workshops. Thereby the workshops can be seen as validation of the collected needs, as the number of collected needs was quite low.

Selected need

The evaluation committee consisted of representatives from the local healthcare, Region Örebro län and Activa. There was also an assessment group on standby, in case more extensive analysis was needed, but that never had to be activated.

To support an objective assessment, the committee used an evaluation template with criteria to help assess the collected needs. But since several of the collected needs concerned the same needs and at the same time, several of the collected needs was poorly described, the committee landed in a mutual assessment of the collected needs and, rather than selecting one of the collected needs – one submitter – selected a need that had more than one submitter. The need selection was also supported by the results of the workshops conducted earlier in the call for needs process.

The collected needs concerned involuntary loneliness and the need for social contacts in various ways as well as the challenge of reaching those most in need. Involuntary loneliness is a concern especially for elderly people that significantly impacts the mental health of some patients. Long-term loneliness could result in self-

isolation from social contacts and society in general. Expectations that others will make contact, is rooted in a perception that elderly do not want to be a burden to family and society Therefore, people with the greatest need for social contacts can be difficult to reach with various efforts that aim to break the loneliness and offer a social context. The selected need concerns the need to find new ways to reach these groups.

5.3 The CHERRIES experiment in the Republic of Cyprus

Regional scope

The call for needs in the region of Cyprus was focused on three target groups:

- **Healthcare** professionals of both private and public sector.
- Associations of **patients.**
- Other public stakeholders (municipalities, organized groups) and citizen representatives.

Eligible consortiums could consist of one, two or three representatives of the target groups. However, it was compulsory for each consortium to have at least one healthcare professional from the AIK as it is essential to take them into account to run the pilot if the need is selected.

We followed our previous **experience with Social Challenges Innovation Platform as well as our experience from running local challenges through our activities over the years** and followed the best practices for generating a momentum and awareness around the scope of CHERRIES and the future potential benefits that will bring to the local ecosystem.

The number of proposals received, 8 proposals, was more or less what was expected based on the wide spectrum that the description of the need was covering as well as the COVID-19 situation and the engagement of individuals to go through the application form.

Special attention has been given in properly explaining the importance of the Need definition and input, with back-and-forth interaction with potential applicants. It can be said that it was more time consuming as expected because applicants needed to provide a detailed description of the need as well as to understand the structure and the methodology that had to be followed.

Overall, it is important to mention that we are satisfied that at the level of the Need application, the majority of the needs reported would cover multiple RRI aspects as well as more than 2 out of the 4 groups of the 4P model.

Methodological considerations for the call

The submission template of the call for needs was designed in Microsoft Forms. The submission template followed the generic version of the application form that was initially proposed through the consortium and adjusted to the local requirements of the call. The form was written in English as it is the third official language of the country and is widely spoken in Cyprus.

The form was uploaded on CyRIC Microsoft server and Cyprus created a dedicated section with all the details and description of the call along with a direct link that connected the user to the form (See Appendix 1) .Also, AIK uploaded the relevant communication material for the call for needs in their online media and social

network accounts and the ‘’call to action’’ for the application form was diverted through the same link to our cloud based application form.

The data inserted into the application form were only accessible through the CyRIC server infrastructure, hence only authorised people had access to all the relevant material for GDPR purposes. By the completion of the call for needs, all material was extracted in printed form and shared only between the evaluation committee members which are listed below in this report. Initially the call was open for three weeks but over further engagement with stakeholders and the metrics of the participation, they extended the call for another two weeks. During these two weeks the applicants had the ability to enhance their already submitted inputs as well as receive two more applications

Regional dissemination of the call

For the **dissemination** of the call, we decided to use multiple channels through our social media as well as bilateral communication with individual potential applicants that we considered important to acknowledge the project and the upcoming call for solutions in the future as well as inform them about the Need collection process and their involvement.

Due to the COVID-19 situation instead physical meetings, we organised.

1. Bilateral calls with stakeholders to inform them about Cherries, the call for needs as well as their potential and future involvement (always following up with emails and attachments of relevant material)
2. Bilateral teleconferences with stakeholders and potential applicants to follow up conversations on current and future implications of their involvement.
3. Social Media campaigns though Facebook and LinkedIn that are mainly active and broadly used in Cyprus with follow up private messages to potential applicants and general awareness of the project itself.

Overall, it is estimated that we hosted 26 bilateral teleconferences and several phone calls with organizations/ individuals/professional and associations.

needs reported

Eight proposals were received through the duration of the Open call for needs. During this time, CyRIC and AIK personnel were able to interact and guide the applicants through their applications with elaborations, enhancement of the input and generally answering questions related to the subject and the project.
It is worth mentioning that during the interaction with stakeholders, potential applicants, professionals and individuals, more interest was given on the upcoming call for solutions rather than the call for needs, and it was important to clarify the necessity of the demand driven process of the project. Additionally, given the definition of the challenge, it was designed in such a way that it would provide reflection and replicability of the Need and the upcoming solution in mirror territories. For example, a Need that frames a specific potential solution could either be the basis for solving more than one issues.

Regarding the **sectors** where needs were received, we could provide the below breakdown.

- 1 need was submitted by a patient association. The same need was submitted by an individual and a professional
- 1 need was submitted by a professional that also represents a group of the citizens of the Republic.

- 1 need was submitted by the same professional that represents all the citizens but also this specific portion of the citizens with their need.
- 1 need was submitted by an ex-professional that currently is out of the field.
- 1 need was submitted through a provider (through an individual representing the provider and a population group)
- All 8 needs have described common issues that mostly refer on describing provision of medical services and prescribed medicines to specific patient groups.

Notes

Policy makers are already informed on the process and their efforts and interest are expected to be through the co-creation and further sustainability of the project rather than submitting a need.

Special Interest has been given in identifying potential parties for the co-creation process that also represent an association/organization because they might express potential interest to adopt and/or sustain the solution.

Themes and cluster of needs reported

The titles of the proposals received are the following:

- “Electronic request of repetitive prescriptions, examinations and other tests needed by patients on a regular basis.”
- “Day Care services for autism patients”
- “Professional and effective SEN and psychiatric support services”
- “Prescribing (Electronic)”
- “A need to develop awareness, communication and distribution of flu and other vaccines via public messaging, private/individual messaging and scheduling”.
- "The need for staff that can understand and handle autistic persons. Give them priority as they are disabled. Disability is not just the wheelchair. At least one trained person on every shift on every hospital or clinic that can be reached on demand. "
- “Telemedicine-Need for remote health care services”
- “Provision of medical services to the Cypriot citizens that live in Northern Cyprus as well as Cypriot citizens that live in rural and remote areas who do not have easy access to healthcare services and prescribed medicines”.

Figure 4: Cyprus call for needs CHERRIES banner

Selected Need

Provision of medical services to the Cypriot citizens that live in rural and remote areas and do not have easy access to healthcare services and prescribed medicines.

The aim is to provide as many medical services as possible to the population of our villages (or anybody else with no easy access to medical centres and health professionals) without them having to cross the checkpoint borders to visit a health professional.

Ideas and potential challenges to be solved.

1. Remote visits to the doctor - where the doctor will speak with the patient via VIDEO conference and with the assistance of the local nurse will get the information and data needed for a diagnosis to be made. He will then give (written) instructions to the nurse and patient about the next actions to be made. He will prescribe any necessary medication. The prescription will be forwarded to the Government Office responsible to provide the medication to the village patients.
2. Chronic patients such as diabetics who need monitoring based on daily measurements can, provide, with the assistance of the local nurse, the measurements that will allow the doctor to monitor.
3. Physiotherapy - patients who need to exercise for a specific problem can attend sessions with a physio via Videocalls.
4. Guidelines on how to approach crises such as the one of Coronavirus that we are facing currently.
5. Guidance to the professional care stuff on how to deal with emergencies and accidents until further support arrives.
6. Collecting the needs such as flu vaccine for the vulnerable.

6 Appendices

** Note that the attached appendices were adjusted and adapted per region accordingly. **

Appendix 1 - call for needs template form that used by partners.

CHERRIES : Responsible Healthcare Ecosystems Cyprus Call for Needs

Discover CHERRIES call for needs, the first step of our RRI and demand- oriented approach to inform and shape regional innovation policies and strategies (eg. smart specialization) to better meet the current challenges healthcare innovation ecosystems are facing in Europe.

We call patients and citizens, medical professionals, healthcare institutions and other relevant territorial and societal actors to express their needs in eHealth and its applications in providing high quality medical and healthcare services especially in rural and remote locations of the island.

We are looking for specific eHealth needs that clearly define the problems and hurdles that individuals or organizations are currently facing in providing high quality medical and health care services. Transforming systems in a way that would give patients and health professionals more of an active role, as users of new technology in the care continuum, is a priority.

The territorial support actors of the project in Cyprus are CyRIC-the certified EU|BIC of Cyprus and Aretaeion Private Hospital (AIK).

* Required

Submitter Information

Personal Information of person submitting the form.

1. Submitter's Name *

2. Submitter's Surname *

4/23/2021

3. Email address *

4. Telephone Number

5. I am submitting this need as an: *

- ○ Individual/Professional
- ○ Institution

6. Name of Institution *

7. Title/role/position in institution *

8. Unit/Department *

4/23/2021

9. Type of institution *

- ○ Public Authority
- ○ Private Company
- ○ Third Sector organisation
- ○ Other

10. Role of Institution *

- ○ Patient Organisation
- ○ Healthcare Provider
- ○ Healthcare Policy
- ○ Healthcare Financing
- ○ Other

The Need

11. Title and Acronym [Max 200 characters] *

12. Description of the need: [Max 4000 characters]
Overview of the actual situation: description in detail of the need and current situation.
- Describe the need
- Describe its causes
- Describe its implications if nothing is done *

13. Describe how the need affects you in your daily work/life [Max 2000 characters] *

14. Describe which community/group/individuals would benefit if you overcome the identified need [Max 2000 characters] *

Scalability

15. Is the defined Challenge only for your organization? *

- ○ Yes
- ○ No

Functionality

16. Describe in what way you could address the need, especially any main potential features/functionalities, which could help addressing the need. [Max 3000 characters] *

Expected Impact

17. Describe the expected situation if a new solution addressing the need is implemented
    - In what way would the solution affect your organization/life
    - In what way would the solution affect the target group
    [Max 4000 characters] *

Feasibility

18. Describe possible barriers to implement innovative solutions to address the need [Max 3000 characters] *

19. Describe how you could overcome these barriers [Max 3000 characters] *

Additional supporting material

20. Please attach a link (Dropbox, Google Drive, One Drive etc) with any additional/supporting material you might have related to the need and its description.

Commitment

Confirmation of your involvement in the CHERRIES co-creation model and your active participation if your need is selected by the Evaluation Committee

21. I confirm my involvement in the CHERRIES co-creation model and my active participation if my need is selected by the evaluation committee. *

○ I confirm

4/23/2021

Legal Disclaimer

This is to comply with the European GDPR Regulation

22. I hereby consent to have my personal data processed in accordance to GDPR Regulation *

○ I consent

4/23/2021

CHERRIES Partners

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement nº 872873. This document reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.