



INNOVATIONS IN HOME CARE –
GENERATING NEW SOLUTIONS
THROUGH ADDRESSING UNMET
NEEDS IDENTIFIED BY FORMAL AND
INFORMAL HEALTHCARE PROVIDERS

JOINT THEMATIC STUDY OF THE HOCARE PROJECT



European Union
European Regional
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Aim and target group of this Joint Thematic Study

This Joint Thematic Study – INNOVATIONS IN HOME CARE – GENERATING NEW SOLUTIONS THROUGH ADDRESSING UNMET NEEDS IDENTIFIED BY FORMAL AND INFORMAL HEALTHCARE PROVIDERS - describes, summarises, identifies and analyses transferable knowledge gathered within the HoCare project relevant to one of its sub-objectives. This Study therefore looks at creation and support of new innovations in Home Care specifically from the angle of this Study topic. Other 2 Joint Thematic Studies have been developed and published – with focus on public driven innovation and faster delivery of innovations via quadruple-helix cooperation – and for these please read through the other 2 separate Studies available on the project website.

This Study includes the following key transferable information:

- 1) description of current situations in project partners' countries (Cyprus, Slovenia, Bulgaria, Lithuania, Hungary, Portugal-Madeira, the Czech Republic and Romania) regarding
 - level of cooperation of formal and informal healthcare providers in innovation projects
 - their support from Operational Programmes in terms of participation in research and innovation projects
- 2) summary of common problems and challenges in generating new innovations in home care based on addressing unmet needs of formal and informal healthcare providers
- 3) identification and analysis of selected good practices of financed projects and of Operational programme strategic focus or management practices gathered through the HoCare project's exchange of experience process

This Study is developed primarily for stakeholders outside of the HoCare project partnership - Managing authorities of Operational Programmes supporting Research & Innovations, international, national and regional stakeholders influencing Operational Programmes, or institutions involved or interested in getting finance for their research and innovation projects in home care.

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1. INTRODUCTION TO HOCARE PROJECT

HoCare project (Interreg Europe, PGI01388, <https://www.interregeurope.eu/hocare/>) tackles the challenge of ageing population and the related opportunity for new potential innovations in home care. It's overall objective is to boost generation of innovative Home Care solutions in regional innovation chains by strengthening of cooperation of actors in regional innovation ecosystems using Quadruple-helix approach.

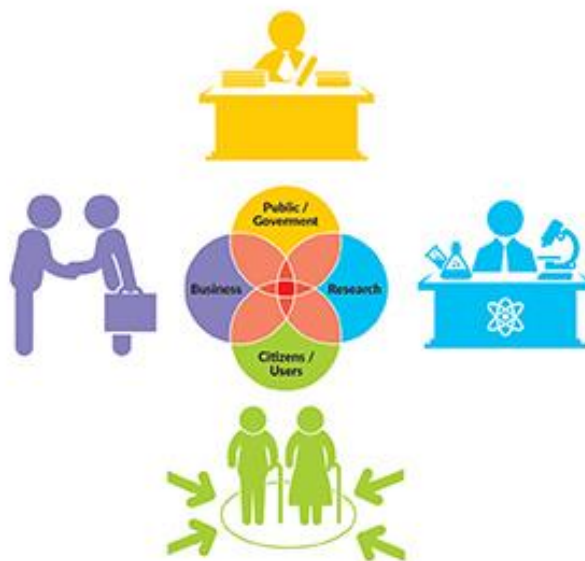


Figure 1 - Quadruple-helix cooperation model involving 4 helixes:
Business, Research, Public/Government, and Citizens/Users

Quadruple-helix is an innovation cooperation model in which “users (citizens), businesses (industry), research actors (academia) and public authorities (government) cooperate in order to produce innovations. They work together to co-create the future and drive structural changes far beyond the scope of what any one organization or person could do alone.” Compared to triple-helix model, this model “encompasses also user-oriented innovation models to take full advantage of ideas' cross-fertilisation leading to experimentation and prototyping in real world setting.”¹

Whereas traditional triple-helix actors – businesses, research and public/government actors - and their mutual cooperation inside of the innovation ecosystem is already built-in and supported in most of the countries and regions, inclusion of Citizen/User helix actors (formal and informal healthcare providers) – as home care solutions up-takers – or more active role of the Public/Government helix bodies during the innovation process is needed.

HoCare project has run extensive international exchange of experience process to reach various levels of improvements - both strategical level improvements (by governance improvement of

¹ European Commission, Digital Single Market, Open Innovation 2.0, <https://ec.europa.eu/digital-single-market/en/policies/open-innovation>

relevant Operational Programmes supporting R&I – their strategic focus and management practices) as well as practical level improvements (by support of transfer of high quality projects financed through these Operational Programmes) supporting high quality projects, instruments' efficiency and partially also wider usage of available instruments in partner countries.

HoCare had three thematic sub-objectives related to the natural generation of innovation for Home Care in regional innovation chains.

1. The first sub-objective focused on generation of innovation through addressing unmet needs identified by formal carers (i.e. hospitals, social houses, elderly houses) and informal carers (i.e. family members) – the topic of this Study
2. The second sub-objective focused on generation of innovation through public driven innovation processes – the topic of another separate Study
3. The third sub-objective focused on bringing innovative Home Care solutions quicker to the market by using quadruple-helix approach – the topic of another separate Study

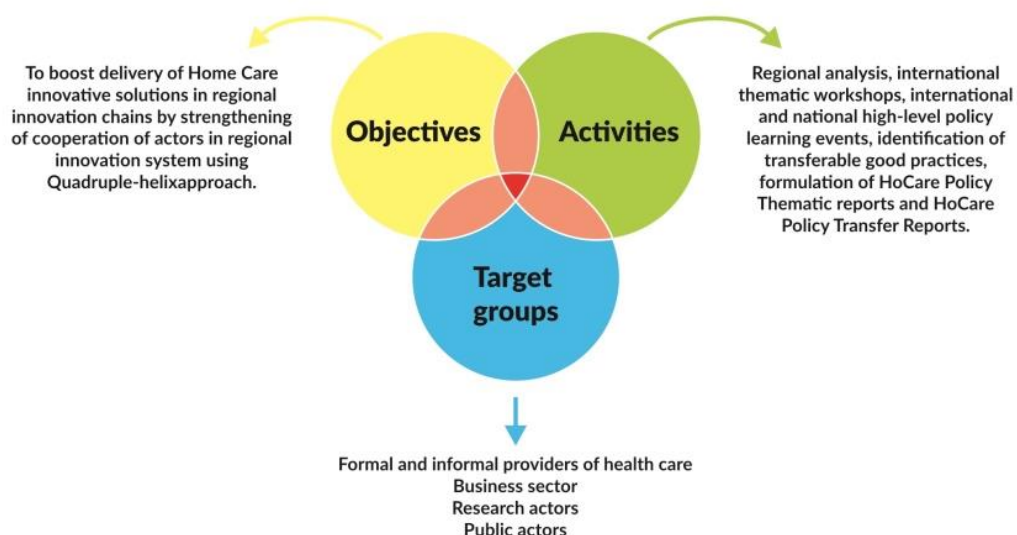


Figure 2 - Objectives, target groups and activities of HoCare project

Transferable knowledge cited in this Study was created by sequence of multiple activities: (1) detailed mapping of regional situations in Research & Innovations in Home Care and Quadruple-helix cooperation in R&I carried out in all project partners' countries, (2) three International Thematic workshops held in Madeira, Budapest and Ljubljana/Litja (each for one sub-objective of the project), (3) numerous national/regional meetings with Managing Authorities of territorial Operational Programme supporting R&I and regional Stakeholders, and (4) numerous physical and virtual meetings among project partners.

2. INTRODUCTION TO THE TOPIC OF THIS JOINT THEMATIC STUDY – INNOVATIONS IN HOME CARE – GENERATION OF NEW SOLUTIONS THROUGH ADDRESSING UNMET NEEDS IDENTIFIED BY FORMAL AND INFORMAL HEALTHCARE PROVIDERS

This Study focuses on transferable knowledge gathered for the 1st sub-objective of the HoCare project. In the following pages, creation of innovations in Home Care will be therefore assessed specifically only in terms of new innovations coming from addressing unmet needs identified by formal and informal healthcare providers.

When looking at the quadruple-helix cooperation model, the topic of this Study therefore focuses primarily on innovations initiated by the 4th helix (Citizen/User helix) of quadruple-helix cooperation model. This typically includes mainly users – home care recipients themselves (elderly people, chronic ill people, disabled people, people on rehabilitation or monitoring) and their carers. However organizations working directly with home care recipients/carers knowing their needs – i.e.

- (1) formal healthcare providers (e.g. hospitals, social houses, elderly houses) and
- (2) informal healthcare providers (e.g. family members) care organizations, associations and networks engaged in home care,

do also represent the 4th helix of the Quadruple-helix cooperation model and will be specifically included in the following descriptions and discussions.

Formal and informal healthcare providers are often those who are the closest to the real needs of home care recipients – whether these are elderly, chronic ill patients, patients on distant care / monitoring services or informal carers themselves. When connected, engaged, supported and motivated well into the research & innovation cooperation process, projects and networks, these organizations and associations can transfer important information on unmet needs of home care recipients and carers to other members of the Quadruple-helix cooperation – businesses, research and public actors – providing specific additional value for the other actors of the innovation ecosystem.

The boost of transfer of knowledge on unmet needs from the closest target group with best knowledge of the needs – formal and informal healthcare providers - could lead into development of new products and services for home care. Inclusion of these types of institutions or individuals into the research & innovation process highly increases the chance for the business success of the developed solutions. Typically, most prominent stages for their inclusion include:

- A) detailed description of the real unmet need through idea generation transfer to others
- B) product/service development - user-centred design (UCD)
- C) product/service testing - user acceptance testing (UAT).

In these roles, they can provide maximum value for other members of the quadruple-helix cooperation system helping to create new innovation and achieve maximum business success.

As home care recipients are often elderly people or people with lower enthusiasm about innovative solutions, UCD is a crucial method during the new product/service design phase as it helps to design a product/service, which will be more likely accepted by target groups on the market. UAT, on the other hand is a tool to be applied in the pre-commercial phase, to get feedback about the usability of

developed product/service, especially recommended in case the product/service was designed towards a lower engagement level end users – again the case for home care recipients.

Cooperating with formal and informal healthcare providers also helps to implement new solutions by them at later stage, closing the research and innovation process with easier start of the implementation and usage of the developed product/service on the market.

3. DESCRIPTION OF CURRENT SITUATIONS IN PARTICIPATING COUNTRIES

Level of participation and support of formal and informal healthcare providers (Citizen/User helix) in the research and innovation activities and the transfer of their knowledge of unmet needs in home care to other actors of the innovation ecosystems is varied across different countries. The following pages describe situation in each of the countries in regards to the following 2 key issues:

1) INNOVATION ECOSYSTEM

- What is formal and informal healthcare providers' position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

2) SUPPORT FROM OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

3.1 Cyprus

In Cyprus, there is a small network of actors that have not been able to network properly and have limited participation in the home care solutions development process. Public health sector supports home care with nurse and community care, yet these services are understaffed and carers spend only limited effort in networking and/or in research and development processes. Recently, private sector companies have developed home care programs, but since they are still in their infancy, they place important effort in gaining market share rather than investing in innovation. The vast population of informal carers in Cyprus are economic migrants with limited, if not at all, access to networking.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF KNOWLEDGE OF UNMET NEEDS

- What is formal and informal healthcare providers' position in the innovation ecosystem of home

care research and innovation?

- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In Cyprus, formal healthcare providers count to a big number relatively to other counties both in public and private sector. In recent years several private sector initiatives have been offering home care services. However, only few of the regional hospitals, which are especially active (Nicosia's General Hospital) also in homecare research and innovation activities, are part of the core innovation ecosystem. Many national level organizations - mainly associations of social or home care providers and regional/local level organizations (NGOs) are also active in both formal and informal healthcare, but again only few of them are active and part of research and innovation activities. Research Funding in Cyprus is limited, approximately to 2% of GDP, and funding from European Union is narrowed to EEA Grants and Cross Border cooperation programmes as Horizon 2020 proposal projects require advanced expertise and skills. Only a few of these projects, such as ARIADNE and Tele-Rehabilitation, were creating innovative and sustainable solutions. Most of them deliver only informative and educational services or services that end with project closure.

Informal healthcare providers, especially carers, in Cyprus count to a significant number. These informal carers not only aid patients at home but also people above 70s with no significant illness or dysfunction. Their nationality origins mostly from Philippines, Indonesia, Pakistan, India, etc. Only a small portion of carers origin from Europe. Their verbal communication with local population is limited and their access to further education, networking and projects is almost impossible. Their everyday activities are focused mainly (but are not limited to) on care giving (e.g. housekeeping) and the time for labour license is limited (2-5 years), being the most important restricting factors for motivation for any further activities.

When formal and informal healthcare providers know the unmet needs in the home care very well (from elderly, chronic ill patients, patients on distant monitoring and care, informal carers), having no experience of setting up research and innovation projects and having almost no possibility to be direct partner in any financed project in Operational Programme is another restrictive factor in participation in the user needs definition and innovation process.

The transfer of knowledge on unmet needs in the home care ecosystem in Cyprus from the side of formal and informal healthcare providers is small. Furthermore Cyprus lacks strategically designed initiatives. Most long-term networking teams exist mainly between private or public hospitals and university research teams therefore the transfer of needs for innovations is rather isolated in small closed research groups.

Actors from the citizens' / users' helix are not clearly aware of advanced methods of innovation cooperation. When dealing or discussing matters in regards to research and innovation production or cooperation, they seek cooperation with actors from all other helixes for different reasons. One of the reasons is the need for funding; therefore they mostly contact the public or the business sector. Another reason is the need for using specialized know-how or knowledge for a specific matter; in that case they mostly seek cooperation with academia or research actors. There are almost no cases

in which they put forward a plan or cooperation with all helixes at the same time or for the same objective.

Private businesses and business supporting organizations are mostly focused on activities that have the potential to produce profit in short time, therefore they operate mostly based on their own resources. Business people tend to avoid cooperation with the public sector, except from cases where it is required (for issuing a permit or applying for funding) due to the long lasting bureaucratic procedures that may delay any of the efforts for creation of innovation.

Latest initiatives in Cyprus such as the procedure to establish the legal framework of operation of the National Committee for eHealth and the recently approved legal framework for the National Health System can address coordination and networking challenges amongst the actors.

KEY CHALLENGES:

1. LACK OF AWARENESS FOR ADVANCED COOPERATION MODELS
2. NEED FOR FUNDING AND SPECIALIZED KNOWHOW TO START INNOVATION PROJECTS
3. LOW INTEREST AMONG BUSINESSES TO BE PART OF PUBLICLY SUPPORTED INNOVATION PROJECTS

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

Currently there is no support of formal and informal healthcare providers inside the research and innovation projects in the Operational Program "Competitiveness and Sustainable Development" 2014-2020. The operational programme Managing authority mainly focuses on managing projects, creating a national strategy and coordinating implementation for other thematic areas and axes that do not include homecare. The main obstacles for formal and informal healthcare providers participating in research and innovation projects are lack of vision, long term strategy and coordination on national Level.

Other limiting factors are:

- a. the lack of a legal framework in regards to private (and especially health) data protection and formal guidelines and recommendations for IT solutions
- b. the fact that the Ministry of Health mainly manages the public hospital facilities and their everyday activities rather than being the center of excellence to coordinate the research and innovation activities and educate formal and informal carers.
- c. lack of motivation amongst informal carers due to limited time working visa and low education levels.
- d. lack of well defined business model that both public and private sector can communicate to citizens.

The OP owner, the Directorate General for European Programs, Coordination and Development, always applies the quadruple helix approach as a principle for the design or development of any of its

policies. The DG EPCD applied this method for identifying the needs on national level for every sector for development, including the sector of home care. Though this process the OPs are formed including specific priorities and targeted measures on national level. The field that would need improvement is the part of the defined eligible organizations for projects' implementation through the OPs, since the vast majority of the funding schemes targets just one or two helixes' organizations.

KEY CHALLENGES:

1. NO SPECIFIC MEASURES FOR HOME CARE RESEARCH AND INNOVATION SUPPORT
2. PRIMARY FOCUS ON MANAGEMENT OF PUBLIC HOSPITAL FACILITIES
3. NARROW LIST FOR ELIGIBLE ORGANIZATIONS FOR RESEARCH AND INNOVATION PROJECTS' IMPLEMENTATION TARGETING NOW MOSTLY 1 OR TWO SPECIFIC HELIXES ONLY

3.2 Slovenia

In Slovenia, the potential users of home care products/services (civil society – as informal care providers - and formal healthcare providers) seem to be increasingly aware of the possibilities and benefits of the implementation of innovative home care services. Their role is crucial since they are in direct contact with the necessary users of such innovations (older people in need of care and their family members) who are crucial various phases of the innovation development process - from needs assessment to validation and implementation of such new services.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF KNOWLEDGE OF UNMET NEEDS

- What is formal and informal healthcare providers' position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In Slovenia, formal and informal healthcare providers are now the essential part of the home care innovation ecosystem. However it was not always like today. Around decade ago Academia and the Business sector took the main role in the research and development projects in the field of Home Care applying to dedicated EU based funds. Since there was a huge gap in the funds available and commercially successful products, it became stronger demand in the project requirements to cooperate with end-users (User-centred design). The most proactive organizations (academia and business) approached end-users and invited them to cooperate.

Through the years end-user sector gained much credibility. Business sector realized that without strong involvement of end users in all phases of product development the chances to develop a commercially successful product decreases dramatically. There are now approximately 10 Slovenian organizations formally offering home care services (formal healthcare providers) that are very interested in being involved in pilot projects and are proactively contributing to the discussions (via

national and regional conferences and workshops) on the topics of introducing assistive technologies in home care. These can be considered as experienced partners, based on their abilities and competence, knowing how to contribute in the phase of project preparation and project implementation. They know how to plan and allocate enough resources to project and motivate internal and external stakeholders for participation.

The end-user organizations (civil society and formal health care providers) seem to be increasingly aware of the possibilities and benefits of the implementation of ICT-supported home care services. Usually they get methodological support on how to assess needs from academia or in some case also from the business sector. They do a fieldwork on needs assessment of real home care users and provide data back to other stakeholders, who transform the formulated needs to the features and design of the product. However, this is repeated in many cycles and their involvement in the project is constant.

Despite the facts stated above, in general, the whole innovation ecosystem in home care is still relatively weak, as it mainly depends on the international research programmes' calls and there is not a systematic governmental strategy in place for development of home care solutions. Therefore, the projects are more or less sporadic and are not leading to systematic product/solution development and end-users benefiting from the development yet.

KEY CHALLENGES:

1. LACK OF COOPERATION AMONG STAKEHOLDERS
2. LACK OF STAFF AT END-USER ORGANIZATIONS WEAKING CAPACITY TO INVEST TO INNOVATION
3. LACK OF SUSTAINABLE BUSINESS MODELS FOR ALL
4. POOR UNDERSTANDING OF USERS' NEEDS
5. LACK OF AGE-FRIENDLY DESIGN FOR PRODUCTS/SERVICES

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

While among the key planned activities within the Operational Programme the "Development of ICT support for implementing the services, development and upgrading of community-based services and support for informal types of services" as one of the objective is mentioned, the action plan for achieving this should be developed. One of the starting points of the action plan should focus on building strong national multi-stakeholder ecosystem for the implementation and scaling of smart solutions for home care.

It seems that authorities are currently searching for effective measures for upscaling innovative solutions for active and healthy ageing and formal and informal healthcare providers are essential stakeholders. Managing Authority is preparing a call for couple of national pilots to test new national system of Long term care which includes Home care as well. Other dedicated calls are not expected, but home care projects can apply within research and development product development general calls. Their chances in these calls are however weak since the emphasis is on the biggest market

success, which is easier to achieve in others industries.

KEY CHALLENGES:

1. NO SUPPORT PROGRAMME RELEVANT FOR HOME CARE SEGMENT HAS NOT BEEN APPROVED YET

3.3 Bulgaria

In Bulgaria, the main drawback regarding the cooperation of formal and informal healthcare providers in innovation projects is the rigid regulation of social services in Bulgaria that squeezes introduction of innovation.

The formal home care in Bulgaria is strictly regulated as “social services in the home environment” and encompasses providing support for the social inclusion of disabled persons, children, elderly people and other vulnerable groups. The home care is subject to licensing processes and specific ongoing control by a specific governmental structure – the Agency for social support. Social services in home environment are structured and regulated as “Personal assistant; “Social assistant; “Home assistant”; “Home social patronage”. There are very sporadic and limited attempts for innovations and they are more like exclusions than like a positive trend. Innovations are only initiated at the level of single organisations or some networks created by few suppliers of social services for home care. The strict regulations of the home care services do not restrict the introduction of innovations but on the other side they do not stimulate or urge the care providers to deploy them. The fees for social services have not been updated since 2003. The mechanism of financing of home care also is not sustaining the introduction of any kind of innovations. It is mostly through donors’ funded programs that innovations in home care services are introduced and this is done on a very limited scale and usually in large cities in Bulgaria.

The informal care that is provided by informal caregivers is in Bulgaria typically unpaid and there are very limited trials to implement innovations in this field. In nearly all cases, similar initiatives are started in relation to a project funded by a donor, or by the family.

Despite this, framework innovations in home care sector are still actively sought even on a smaller scale by many innovative NGOs, innovative ICT and research companies, few national networks and some universities.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF KNOWLEDGE OF UNMET NEEDS

- What is formal and informal healthcare providers’ position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?

- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In Bulgaria, the largest formal healthcare providers are not very active in suggesting innovations or in triggering the innovation processes in home care. They are mainly focusing on facilitating and deepening the integration between the different services offered in the field of home care rather than on innovations in the sector. As a whole they are mostly distrustful towards innovative solutions, mainly in the less developed areas, where the needs for innovations are stronger as they lack qualified workforce.

On the other hand, all the country benefits a very good, fast and good quality internet penetration (even in the most distanced areas) which represents an underdeveloped and underused opportunity for innovations. The country also has a growing potential for ICT based innovations deployment thanks to the fact that Bulgaria is amongst the leading outsourcing providers in ICT sector in Europe.

Despite most of the formal healthcare providers are not pro-innovation oriented, they are ready to take part in implementing innovative solutions in integrated care. Many of the formal home care healthcare providers are interested in participating in innovative initiatives and projects in home care sector, but not many of them are prone to test ideas and innovative solutions because there is a doubt if unprepared users will accept and use innovations.

Many organizations in informal healthcare are operating at national level, they are active and initiate and develop many projects, however not for innovative solutions though, as these are mostly related to the delivery of integrated care, specific education and further support. The informal carers largely neglect the opportunities for improvement of their operations that innovations could provide, while the government and the municipalities as contractors of social services to the formal/informal carers do not stimulate the introduction of innovations in home care.

Regarding the access to the funds and programs, carers are focused on their operations, they are not eligible as main beneficiaries, they do not participate in long-term networks with other organizations, and they are sceptical on implementation of innovations if not based on user needs and piloted before massive implementation.

On regional basis there is a different level of innovative activity related to the user's helix – innovations are initiated mainly in the large cities and the regions that are lagging behind and need the most innovations are not interested in innovations.

Only a few amongst the formal healthcare providers could afford to devote any kind of resources and capacities and motivation in the ecosystem to cooperate in research and innovations. Their participation is often linked with specific open and available funding opportunities, not on a regular and self-sustainable basis.

Although the above described situation is not favourable or opportune for innovations in home care, as the innovation ecosystem of home care research and innovation is growing mainly on behalf of the private hospitals and innovative companies, part of the formal and informal healthcare providers

are more and more deeply involved in the deployment of innovations. Cooperation, research networks, links and partnerships are constantly being built up, mainly initiated by universities or led by NGOs. This process is favoured by the opportunities created by transnational cooperation projects and transfer of innovation projects. There is however no intensive transfer of knowledge on needs from the formal and informal healthcare providers of home care to other actors in the innovation ecosystem. This process needs further intensification and fertilization.

KEY CHALLENGES:

- 1) LACK OF STRUCTURED COOPERATION FORMS BETWEEN DIFFERENT ACTORS IN HOME CARE
- 2) WEAK COMMUNICATION BETWEEN DIFFERENT LEVELS OF FORMAL HOME CARE HEALTHCARE PROVIDERS
- 3) RESEARCH AND INNOVATION AGENTS DO NOT COMMUNICATE WITH END USERS AND INFORMAL HEALTHCARE PROVIDERS

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

Most activities oriented towards the field of possible innovations in home care by the different ministries that deal with home care – Ministry of Labour and Social policy, Ministry of Health, Ministry of Economy (only as MA of OPIC) are not synchronized and linked and innovation in home care is not a priority for none of them, and also is not a priority for the municipalities (as the intermediary between the state and the end users in terms of spending the funds for social services).

The majority of intervention programmes in OP Innovation and Competitiveness do not base on any kind of triple or quadruple-helix models – there are only 2 programmes oriented towards the clusters that require cooperation and 2 programmes supporting/requiring partnership between business and academia.

The formal healthcare providers are rarely eligible as beneficiaries within the Operational programmes. At this programming period there is very limited access to funding for deploying innovations in home care. The quadruple-helix approach is currently involved in OPIC mainly in the form of specific clusters – only clusters that are into the scope of the priority directions of the RIS3 thematic areas are eligible for financing under Specific Objective 1. Under Specific Objective 2, other might be supported, but no specific support is envisaged for home care sector. Only the public actors (municipalities, universities) are owners and operators of Innovation Infrastructure programme (science-technological parks, tech-parks and business incubators) and the access to this programme is closed for formal care providers.

Only few associations of formal and informal home care service providers are involved in projects of collective research and partly in infrastructure services too only as members of the clusters. The private hospitals – being amongst the most active in innovations in health care and thus being important players in home care (e.g. for telemedicine services) are not eligible under any kind of Operational funds' programmes.

KEY CHALLENGES:

1. OPERATIONAL PROGRAMME DOES NOT SUPPORT AS ELIGIBLE BENEFICIARIES THE GROUPS BEING MAIN PROVIDERS OF HOME CARE – NGOs, HOSPITALS, PRIVATE HOSPITALS
2. OPERATIONAL PROGRAMME DOES NOT PROGRAM SCHEMES SPECIFICALLY ENVISAGING ACTIVITIES IN THE FIELD OF INNOVATION IN HOME CARE SECTOR
3. OPERATIONAL PROGRAMME COMPLIES WITH STRATEGIC DOCUMENTS NONE OF WHICH SPECIFIES HOME CARE SECTOR AS A PRIORITY ONE

3.4 Lithuania

In Lithuania, number of associations and university researchers are constantly talking about problems in care sector: policy making (especially problems in establishing priorities and implementing the approved strategies), lack of clear funding and adequate funding schemes, lack of research based practices, big workload of care workers and not adequate qualifications in some cases. Most of the problems have not been solved for ages because of lack of cooperation between different actors of the ecosystem. Only recently some improvement can be seen.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF KNOWLEDGE OF UNMET NEEDS

- What is formal and informal healthcare providers' position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In Lithuania, till 2014 the links in the ecosystem were very weak and the voice of end users was completely neglected. Situation improved a bit in 2014-2016 when working groups were established on the provision of nursing care at home and outpatient health care facilities, on the workload and qualification of care providers. Some healthcare providers started pilot projects of providing home care services. Number of private initiatives also increased, but is not scaling up.

In general, the ecosystem stays very weak, highly influenced by the top-down approach, with government policy focused on improvement of formal care, preparation of care specialists, review of their funding systems, but with little focus on home care. Newly approved Government action plan foresees measures for bigger decentralization of social services (including home care) what can open a new window of the opportunity for NGOs and social enterprises, but the debate involving all stakeholders is not developing yet.

For strongest and most visible actors who represent ageing society and people in need for care services (i.e. associations of elderly people, associations of disabled people) home care is also not on the list of priorities. Their focus is on education, working environment, equal rights, and

deinstitutionalization. Focus of association of care specialists is on improvement of general funding and increasing of wages of care specialists. Other actors who are closer to home care services are disorganized, lack capacity and resources to initiate R&I projects, especially that there is no separate schemes for them and they will need to compete with much stronger players and the prognosis for success is very low.

Understanding that technology and innovation can help to reduce costs and increase efficiency of services is also very low. HoCare project and dissemination of good practices already facilitated further debate in the ecosystem and some of the stakeholders are thinking about further actions outside of the project.

KEY CHALLENGES:

1. THE MOTIVATION OF ECOSYSTEM ACTORS IS WEAK - home care is not on the list of priorities as there are more important issues to solve in the short term connected with care system in general
2. THE COOPERATION BETWEEN THE MAIN RESPONSIBLE MINISTRIES AND STAKEHOLDERS IS FRAGMENTED AND LOOSE - The cooperation between Ministry of the Economy, the Ministry of Education and Science, the Ministry of Social Affairs and Labor and Ministry of Health is very fragmented. Cooperation between other stakeholders is also very loose. Actors who try to initiate home care related projects lack capacity and resources to scale up their services.
3. CURRENT LEGAL ENVIRONMENT DOES NOT SUPPORT DEVELOPMENT OF INNOVATIVE SOLUTIONS IN THE FIELD OF HOME CARE SEGMENT - System is full of formal bureaucratic requirements which act as an obstacle to start new innovative initiatives, but remains unsolved because lack of motivation and cooperation

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

Current system of funding in Lithuania only theoretically supports quadruple-helix cooperation cooperation. According to evaluations performed by Ministry of Finance of Lithuania, the biggest cooperation is seen at the programming level and the smallest at project level. At the same time, formal and informal care providers, end users and even NGOs are more interested in particular projects than in general strategic aims.

Home care is not supported directly in Lithuanian Operational Programme. Lithuania has horizontal priority “health for all” which gives homecare projects also small competitive advantage, but in general it does not have big impact at project selection level.

Current management and structure of structural funds makes it very difficult to initiate real collaborative projects, especially those which aim to solve societal needs, so most funding goes through “verticals” (i.e. funding for formal care providers, funding for NGOs, funding for researchers, funding for business).

As institutions can initiate and win limited number of projects, they are concentrating their efforts on

meeting the crucial necessities and needs (public sector) or on projects with biggest return on investment (private sector). Home care area is still considered as “nice to have”, but not crucial: unclear market for business, difficult to implement projects with lots of unclear regulations and potential risks.

KEY CHALLENGES:

1. THE CURRENT FINANCING INSTRUMENTS ORIENTED TO HOME CARE SEGMENTS IS SPLIT BETWEEN 2 MINISTRIES - the Ministry of Social Affairs and Labor and the Ministry of Health Care. Innovation and support to business companies willing to create home care solutions are under the Ministry of Economy. This automatically enhances the risk of conflict between institutions while sharing specific responsibilities and financing contributions.
2. THE HOME CARE AREA IN LITHUANIA IS NOT A PRIORITY - state intervention in this area usually limited to social support. At the same time Government wants to decentralize the social service system and transfer provision of some services to NGOs and social enterprises. That opens a new window of opportunity.
3. LITTLE INFLUENCE ON DESIGN OF OPERATIONAL PROGRAMMES AND LITTLE RESOURCES TO INITIATE OWN REGIONAL PROGRAMMES - Home care service providers say, that a lot of the decisions are formally taken at the level of municipalities, but they have little influence on design of operational programme and too little resources to initiate their own regional programmes.

3.5 Hungary

In Hungary, Health Insurance Fund (HIF) covers home care if the service is provided by a specialist service provider contracted by the management of HIF. Informal care provided by a family member is financed by the social care system (not the HIF). Home care activities (‘specialist care at home’ and ‘hospice care at home’) are provided by the insured person's home or residence, the appointment (initiating order) of her/his physician, and must be performed by a qualified nurse.

There are various associations (mainly representing members of one specific industry, e.g. ICT or hospice or health technology) that provide regular possibilities for networking. Generally R+D+I partnerships are not organized by associations, but universities and/or major enterprises. SMEs and non-profit organizations undertake in initiating innovation partnership if a call or a granting scheme fosters to do so.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF KNOWLEDGE OF UNMET NEEDS

- What is formal and informal healthcare providers’ position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In Hungary, in general, neither formal nor informal healthcare providers have been involved in

innovation partnerships and cooperation as a usual, frequent and common solution to develop existing and create new home care services and technical background so far. Those examples which can be considered as good practices for establishing innovation on the unmet needs identified by formal and informal healthcare providers can be rather considered as isolated cases and/or pilots.

The roles in a partnership for innovation have been overlapping: Formal healthcare providers generally have been appearing in innovation partnerships as researchers on the Academia Helix's side. Of course they can define what is missing or dis-functioning, therefore they can transfer the information about real unmet needs too, but in most cases they concentrate on finding evidence that an idea is effective – (1) adequate to accomplish the purpose or produce the intended or expected result, and in good cases (2) efficient – performing or functioning in the best possible manner with the least waste of time and effort. In this function they are rather validators, but users (as it doesn't matter where the need and idea come from, and the need is real and unmet or not).

In home care, innovation activities are led by “technology” in most cases, and influenced by funding/granting opportunities in some cases. It means that producers and traders of smart devices and software/APPs try to sell their products to the patients and care providers. If they succeed, they try to tailor the product to existing procedures, methods and business cases (or have them changed). Integrated development of procedures, methods, business cases, devices and software is rare. Identification and satisfaction of users' unmet needs are mainly led by intuition or in better cases by personal experiences of individuals or smaller groups. Reliable surveys and/or planned and coached involvement of key user groups are rare.

Funding/granting opportunities mainly focus on fostering competitiveness of and cooperation among SMEs and other enterprises and/or higher education institutions (HEIs) and research organizations.

Formal healthcare providers have more professional associations. The membership of these associations consists of NGOs, enterprises and foundations representing business, church and civil sectors and public hospitals. These stakeholders are engaged mainly in local level, some in county or regional level. In addition Hungarian Charity Service of the Order of Malta (Magyar Máltai Szeretetszolgálat - MMSz) is playing a significant role at national level in home care. The associations have not expressed interest or activity to strengthen the presence of formal care providers at innovation partnerships and cooperation so far. There is a lack in assisting activities at association level to help their members (the providers) to enter innovation partnerships as stakeholders who can transfer knowledge of unmet needs. However, individually, some formal providers took part or initiated development of new methods, procedures, ICT solutions and equipment based on recognition and introduction of unmet needs. There are good cases when formal provider individuals realizing a need for innovation elaborate a new solution and try to have it accepted by their hosting institution or the wider market. In most cases they have more chance to succeed if they have existing connection to/in a university or research organization. In many cases they have no experiences, skills and capacities to be able to transfer an idea to a marketable solution, and they rarely have time to get/learn them. Unfortunately most formal provider institutions aren't interested or have no resources to develop their own incubation infrastructure.

Informal healthcare providers have also some associations or other organizations to represent their interests and exchange knowledge and experiences. The umbrella organization of these bodies is

HAPO - Hungarian Alliance of Patients' Organisations (Betegszervezetek Magyarországi Szövetsége - BEMOSZ) which is a member of EPF – European Patients Forum. HAPO (backed by EPF) is more and more active in increasing the level of literacy, empowerment and adherence of patients and their relatives as far as the importance of their involvement and participation in clinical trials and innovation. These initiations are also assisted by some important stakeholders from other helixes, e.g. Association of Innovative Pharmaceutical Manufacturers (AIPM – Innovatív Gyógyszergyártók Szövetsége). This initiation was catalysed by National Institute of Pharmacy and Nutrition (Országos Gyógyszerészeti és Élelmezés-egészségügyi Intézet - OGYÉI) by hosting the event. OGYÉI is one of the most important authorities in licencing new drugs, medicines, devices, etc.

Elderly, patients, families, other care recipients:

- want to be part of innovative projects / initiatives in area of home care and help shape finding solutions to needs of people working with and in general
- want to receive more information about the possibilities, goals and procedure of the innovation, such as complications resulting from taking part in trials
- are ready to participate in POST CLINICAL TRIAL LIVING LAB programmes and projects which threaten with less or no complications, but result easier to use solutions and products

Employers:

- are interested in avoiding or shortening the time they lose because of illness of their employees (or the relatives of their employees) by prevention, quicker rehabilitation and shorter innovative healthcare solutions and procedures;

Payers (social/public/non-profit or for-profit insurance organizations):

- are interested to get more effective (adequate) and more efficient (more value and/or less costs of adequate) solutions, procedure, protocols, products and services than those which they are paying for at the moment;
- are looking new solutions to develop the output of the cash management;

Formal care and medical providers (staff):

- are looking for possibilities to get acquainted with new therapies and equipment
- seeking for jobs that are well paid
- would like to avoid overtime
- would like to travel less among their home, job/cabinet, patients and other places
- however, it is important to them that this work should not cause too much occupation and would not require extra time, for they are exhausted because of the general lack of medical staff and other work force; and they look at this possibility as a way and source for gaining some relief from the general work pressure in longer term

Formal care and medical providers (organizations):

- would like to solve their problems caused by lack of staff
- try to get financial resources for investments, procurement for general operation and be competitive in recruitment and running HR management
- are / should be interested in increasing efficiency and effectiveness of daily activities
- are lobbying for an update of the unit prices of their services paid by insurance system/organizations, and are interested in fast reception of innovative new and/or

innovated (evidence based) drugs, solutions, equipment etc. by insurance system/organizations.

- are / should be interested in shortening “hotel” services (time per capita spent on inpatient care) by developing telecare, homecare and integrated care
- worry about launching pre-commercial procurement or public procurement of innovation, because:
- they are afraid of investing (own resources and/or subsidy) in a programme that might not deliver the satisfactory solution to their unmet need
- they have no experiences in preparing and implementing public procurement procedure/procedures for PCP/PPI (with a special regard on the reactions of bidders and PP authority)

KEY CHALLENGES:

1. LACK OF COOPERATION AMONG ALL HELIXES OF THE ECOSYSTEM (involvement of end users quite rare)
2. LACK OF RESEARCH INFRASTRUCTURES SPECIALIZED IN HOME CARE
3. LACK OF HOME CARE RESEARCH PRACTICES
4. LACK OF COMMUNICATION AMONG END USERS AND OTHER HELIXES
5. LACK OF CAPACITY AND NATIONAL AND REGIONAL RESOURCES TO INITIATE R&I PROJECTS (most resources come from ESIF, not from domestic sources)
6. LACK OF SPECIAL STAFF IN HOME CARE
7. LACK OF OPERATIONAL SOCIAL FUNDING RESOURCES AND/OR PURCHASING POWER FOR LONG TERM HOME CARE SERVICES

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

Funding/granting opportunities in Hungary mainly focus on fostering competitiveness of and cooperation among SMEs and other enterprises and/or higher education institutions (HEIs) and research organizations.

Donors/funding authorities and bodies are more interested in allocating their budget among a wide scale of organizations representing various industries/sectors and then fostering absorption than investing in key markets of subsectors in the priority areas of their programmes (ESIF operational programmes and/or national and local programmes) and strategies or other policy documents. For instance, the first sector development priority of RIS3 in Hungary is fostering health industry. One of its horizontal priorities is strengthening innovation cooperation, i.e. international cooperation targeting innovative knowledge base of excellence. Objectives of the RIS3 (incl. the priority “Healthy society & wellbeing”) are implemented through ESIF programmes, primarily through PA1, PA2, PA3 and PA8 of GINOP (EDIOP - Economic Development and Innovation Operational Programme 2014-2020). Approved projects (subsidized by GINOP actions) must directly or at least indirectly contribute to the sectorial priorities of the National RIS3 (strategy) e.g. Healthy Society and Wellbeing / Inclusive Society, or target one of the smart technologies defined in the National RIS3.

The possibility of delivering 'indirect contribution' has widened the focus: Enterprises and researchers were not really pressed to concentrate on the most challenging issues such as unmet needs in the homecare value chain for instance. Therefore it is occasional if a project proposal is based on unmet homecare needs and prepared in partnership with all key stakeholders (e.g. in quadruple-helix cooperation model). In most cases, identification and satisfaction of users' unmet needs are led by intuition or in better cases by personal experiences of individuals or smaller groups. Reliable surveys and/or planned and coached involvement of key user groups are rare.

However, there are some positive solution as well: Calls for proposals GINOP-2.2.1-15; NVKP_16 and VEKOP-2.2.1-16 (R&D competitiveness and excellence cooperation programmes - Open: 30.11.2015-30.11.2017) provide possibility and encourage cooperation among undertakings, research institutions and universities, and public entities. It builds on the experiences of former call supporting clusters. The call focuses on the cooperation among existing excellences and for resulting new research capacities. Projects gaining support shall deliver new scientific and/or technical results, prototypes and/or intellectual properties in general, therefore could be well used also for home care segment. Furthermore projects must directly or at least indirectly contribute to the sectorial priorities of the National S3 (strategy) e.g. Healthy Society and Wellbeing / Inclusive Society, or target one of the smart technologies defined in the National RIS3. The call supports innovation projects focusing real market needs, but do not restricts its support to some subsectors such as homecare for instance.

KEY CHALLENGES:

1. LACK OF RESOURCES - more funds needed both for project (development and investment) financing and for covering operational (running) costs. While there is a strong trend towards integrated care and deinstitutionalization (move chronic patients out of mental and other health care institutions) determined by the aging society and unsustainable system of long term inpatient chronic care, and despite this trend is based on shifting the burden of paying long term hotel and care services from the social, public or private insurance systems to the individuals receiving the service, unfortunately only a lower percentage of people and families compose real purchasing power for home care solutions, services and products irrespectively whether there is innovation or an unmet need was met or not.
2. SPECIFICITY OF THE AREA IN QUESTIONS – HOME CARE - Is not a Axis of OP due to the OP-system:
 - the OP responsible for supporting innovation and research [EDIOP] does not concentrate on the RIS3 focus areas (e.g. health industry) by special calls for proposals, only evaluation criteria filter the submitted applications;
 - the OP responsible for supporting social development [HRDOP] does not concentrate on home care, however has a horizontal focus on the so called "deinstitutionalization" (transfer of care from institutions to the home of the patient). The actions supported by this OP may support the uptake of technical innovation or the creation of eHealth innovation, however, there is no requirement for co-creation and cooperation.
3. LACK OF CLEAR FUNDING AND ADEQUATE FUNDING SCHEME TO SUPPORT QUADRUPLE-HELIX COOPERATION - Both relevant sector OPs (HRDOP widening home care market and developing human capacities of HEIs and research, such as EDIOP fostering entrepreneurial innovation and research in general) emphasise the significance of quadruple helix cooperation (QHC). However, neither HRDOP, nor EDIOP have opened specific calls for projects or grants for predefined projects for QHC yet. Furthermore there are only few and not too serious conditions among the

evaluation criteria in the project selection processes. Hungarian OPs focus on fostering and supporting cooperation between business and research/HEIs or among international/global corporations, mid-cap companies and SMEs. Involvement of end users or public has minor importance, while co-operation among all the 4 helixes is only marginal.

4. LACK OF STRATEGICAL INITIATIVES - Unfortunately actions strengthening the appropriate environment for generating new solutions efficiently through addressing unmet needs of healthcare providers have not been prepared and launched yet. Considering that innovation should result not only adequate (home) care products, protocols and services, but affordable and accessible ones as well, the required actions should help all the stakeholders to benefit and earn from taking part in the innovation process.

3.6 Madeira (Portugal)

In Madeira, the home care network is growing during last years, but there are still many barriers to overcome for a better involvement, such as bureaucracy or financial rules, that strangle rapidity needed for innovation to happen in a quadruple-helix approach.

It is more common to see research organization developing innovation with actors from citizen/user helix, SMEs and associations in market driven projects development instead of with public organizations. Usually public actors are involved in projects and development mainly with other public actors.

There are currently available several policy instruments with incentive schemes that could be exploited to finance home care innovations. Despite the instruments available, Madeira has not been able to promote this type of initiatives in Home Care compared to other sectors of activity, nor even to create synergies with Madeira's main development sector, which is Tourism.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF KNOWLEDGE OF UNMET NEEDS

- What is formal and informal healthcare providers' position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In Madeira, regional ecosystem main actors in home care research and innovations are mainly represented by governmental institutions in Madeira and some other private providers. Regional ecosystem infrastructures are hospitals, nurseries, elderly homes and other physical infrastructures to support when people are not at home.

The informal health care providers and elderly care recipients are fully available to cooperate in

quadruple helix research and innovation cooperation. However, ss was identified, there are common problems identified namely:

- Lack of money to empower the services needed in the region
- Lack of resources – more funds needed
- Difficult access to homes
- The region needs home health care each time more specialized
- More need for specialized training for health providers
- Customized services are needed then standard
- Creation/recruitment of a health care providers inside each local area and not from outside
- Creation of 3rd sector network involving all 3rd sector organizations

Stronger relevance of industry partners in the quadruple helix might be needed, as sometimes the particular research interests overlap the potential for technology transfer with economic valuation. This means for example better integration of the ecosystem for home care services, and stronger involvement of end users in the design of new solutions. There is a good involvement of researchers and some private companies. However, the communication with the administrations is not streamlined and easy, as well as for end user groups. Most times contacts emerge ad-hoc and bottom up without a general assessment of the regional needs, and the public policies do not seem to be informed by the researchers in the field.

Another particular difficulty is that the end users are many times not the buyers or administrators of new approaches to elderly care. Formal and informal carers need to be added in the discussion because they are determinant to the acceptance of new approaches, technologies, etc. The public actors have low time due to many tasks in hand, and usually don't have research capacities. The private actors' approach varies on case by case basis, with their motivations differing from the public actors, as for them research and innovation is a matter of survival and growth or decline and being surpassed by competitors. Public organizations usually don't have project officers in project departments with decision making capabilities for innovation empowerment which means that projects don't exist in a higher scale and don't move forward as they should in a rapidly and changing world as we have.

With RIS3 Madeira has taken a step forward to empower innovation that serves the needs of the regions.

KEY CHALLENGES:

1. LACK OF COOPERATION BETWEEN DIFFERENT ACTORS OF THE ECOSYSTEM
2. LACK OF RESEARCH INFRASTRUCTURES
3. LACK OF HOME CARE RESEARCH PRACTICES
4. LACK OF COMMUNICATION IN THE HOME CARE INNOVATION ECOSYSTEM
5. LACK OF CAPACITY AND RESOURCES TO INITIATE R&I PROJECTS
6. LACK OF SPECIAL STAFF IN HOME CARE

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation

projects/initiatives from the side of Operational Programmes and their Managing Authority?

Operational programme Madeira 14-20 is supported by RIS3 strategy as well as defined clearly in RIS3 with health and ageing support being one of the main focuses on RIS3 in RAM. Also in Madeira, there are currently available several policy instruments with incentive schemes that could be exploited to finance home care innovations, namely Incentive for Scientific Knowledge Production and Technology of the Autonomous Region of Madeira - PROCiência 2020. A part of this scheme, Incentive for Entrepreneurship of Madeira including the home care activities has been modified.

Among other schemes, there is the Regional plan for active aging (PREA 2016-2019), important network for social support that can serve as incubator for ideas and future home care innovative projects. PREA includes measures with 9 objectives and 3 intervention axes:

- Health and active aging;
- Neurocognitive alterations and dementia disorders with a special incidence in Alzheimer's disease;
- Guarantee of safeguarding.

This plan was implemented in our OP Madeira 14-20, through the priority axis 8 – Promotion of social inclusion and fighting poverty with specific objective 9.b.iv.1 - Improving quality and diversifying the range of services and social responses directed to the autonomy of the elderly and / or dependents, as well as to the prevention and rehabilitation of children and / or young people with higher exposure to psychosocial problems and their families.

The problem is that there isn't any call open for this specific objective, the budget for that objective is too low and the eligible beneficiaries don't include SMEs.

Until now the Operational Programme didn't support any project in home care area, despite the fact Madeira has several good practise projects utilizing cooperation of the quadruple helix actors - e.g. in assisted living, facility, telemedicine, and iMED clinical software.

KEY CHALLENGES:

1. LACK OF RESOURCES – MORE FUNDS NEEDED
2. SPECIFICITY OF THE AREA IN QUESTION “HOME CARE” – IT IS NOT AN AXIC OF OPERATIONAL PROGRAMME
3. LACK OF CLEAR FUNDING AND ADEQUATE FUNDING SCHEME TO SUPPORT QUADRUPLE-HELIX COOPERATION
4. LACK OF STRATEGICAL INITIATIVES

3.7 Czech Republic

In the Czech Republic, there is a rather small network of several strong innovation actors who are already networked and cooperate based on past common initiatives, especially among research actors and business supporting organizations. Several businesses have already reached international success with their home care products and services. Yet, the number of innovation initiatives financed through the Operational programme Entrepreneurship, Innovation & Competitiveness (OP PIK) each year is very small compared to other industries.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF UNMET NEEDS

- What is formal and informal healthcare providers' position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In the Czech Republic, formal healthcare providers are many, but those active in home care services are few – only few regional hospitals and university hospitals which are especially active also on the research side of home care and are part of the core ecosystem in the Czech Republic. There are not so many national level organizations - mainly associations of social or home care providers or charitas - or regional/local level organizations - gerontology centres - in informal care, but these few are active and part of projects. These projects are however not for creating innovative solutions though, as their projects include mostly education and further support.

Formal and informal healthcare providers know the unmet needs from home care very well (elderly, chronic ill patients, patients on distant monitoring and care, informal carers), but are mostly overwhelmed by financial and capacity problems of their standard operations, having no experience of setting up R&I projects and have almost no possibility to be direct partner in any financed project in Operational Programme. As the ecosystem in Home Care in the Czech Republic is small, most actors are known to each other, cooperate from time to time but not strategically, and mainly based on previous initiatives. Most long term cooperation exists mainly between university hospitals and university research teams, so the transfer of needs for innovations is rather isolated via personal linkages.

Members of other helixes (businesses, research and public actors) however see the involvement of Citizen/User helix actors very positive and support quadruple-helix cooperation in research and innovation cooperation for new innovations, not only on the side of needs identification, but also in terms of testing and piloting the developed solutions and helping with kick-off implementation as not always is the problem the knowledge of needs and production of innovation, but to implement all innovations in practise (social offices of municipalities, regions, etc.).

Ministry of Industry and Trade refers to have thousands of innovative projects in general, but almost no in home care with new solutions to implement. Therefore it thinks the transfer of needs between formal and informal carers to businesses and research does not work currently in home care as normally they would imagine more applications received compared to other industries.

Higher participation of mainly informal or regional formal healthcare providers would therefore be needed to reduce chances that technological actor develops something and then it doesn't work, or develops something with one provider of healthcare, but it doesn't work for all.

KEY CHALLENGES:

1. VERY LOW PARTICIPATION OF INFORMAL HEALTHCARE PROVIDERS IN RESEARCH AND INNOVATION
2. FINANCIAL, CAPACITY AND EXPERIENCE PROBLEM TO TAKE PART IN R&I PROJECTS
3. NO POSSIBILITY TO BE A DIRECT FINANCED PARTNER IN R&I PROJECTS
4. WEAK COOPERATION INSIDE HOME CARE INNOVATION ECOSYSTEM
5. HOME CARE SECTOR VISIBILITY COMPARED TO OTHER INDUSTRIES VERY LOW

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

One of the problems of participation of formal and informal healthcare providers in research and innovation projects is simple - somebody comes to providers and asks for information, but doesn't enable any finance as calls do not enable it.

Currently, formal and informal care organizations can become part of clusters or technological platforms and they can set up or become members of associations. This would enable them to be members of direct beneficiaries of research and innovation projects, get connection and networks with other types of actors active in research and innovation field in home care – mainly businesses and research - and also suggest new projects and bring the knowledge on needs to the rest of the partnership. Their higher participation in networks like that would definitely lead to increased transfer of knowledge on needs, higher number of new innovations and their increased cooperation in home care research and innovation – for example via cooperation on user-centred design (UCD) or user acceptance testing (UAT). Alternatively, they can become external service providers purchased by main beneficiaries in selected support programmes providing the above stated services.

The post-paid financing inside of the Operational programmes however is not much in favour of inclusion of mainly informal care providers as they face operational finance and capacity issues as described above.

KEY CHALLENGES:

1. LIMITED FINANCE FOR FORMAL AND INFORMAL HEALTHCARE PROVIDERS AS DIRECT PARTNERS IN THE CALLS
2. POST-PAID FINANCING FOR R&I PROJECTS

3.8 Romania

In Romania, the main actors in the sector of R&D&I for home care are spread at several public and private organizations (research institutions, laboratories of technical faculties of universities). Their activities are financed as results of their participation in project competitions organized by three sectorial ministries (Research & Education Ministry, Health Ministry, Ministry of Information Society)

within their R&D&I sectorial Programmes and Operational Programmes, by international programmes (AAL, Interreg, eTEN, SEE), by religious and philanthropic organizations.

There are also other organizations promoting the national and international research results aiming to commercialize them on national market so that the home care domain be assisted by the best innovative solutions. The operational programmes do not present the topic addressing innovation for home care so that innovation for this field is provided tangentially under the more generous topic– health care (Operational Program Competitiveness, Operational Program Human Capital) for the interval 2014-2020.

The whole approach to home care for the elderly is based on the general principle that elderly people should be maintained in their living environment. Consequently, home care for dependent elderly people is the first measure of support for them. The measures applied are regulated broadly by the National Health Strategy 2014-2020. The issue of home care for the elderly is directly supported by the National Strategy for Promotion of Active Aging and the Protection of the Elderly for the period 2015-2020, the Operational Action Plan for the period 2016-2020 as well as the Monitoring Mechanism and their Integrated Assessment.

INNOVATION ECOSYSTEM - FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE OF THE INNOVATION ECOSYSTEM AND THE TRANSFER OF KNOWLEDGE OF UNMET NEEDS

- What is formal and informal healthcare providers' position in the innovation ecosystem of home care research and innovation?
- How are they linked to other actors?
- How are they experienced in projects/initiatives?
- Do they have time, size, capacities and motivation in the ecosystem to cooperate in research & innovation?
- How well does the transfer of knowledge on needs from their side to other actors work?

In Romania, formal healthcare providers (hospitals, healthcare organizations, etc.) and informal healthcare providers in the ecosystem of home care research and innovation are in the position of partners of big project consortiums near the main actors of the R&D&I sectors or even project initiators (through their research laboratory/department where exists) within the main national competitions launched by the 3 Ministries mentioned above under Operational Programmes and Sectorial Programmes targeting R&D&I.

The lack of specialized personell in R&D&I and the lack of time of the existing personnel within most formal carers represent the main limits of their participations in the R&D&I projects targeting health-care and implicitly home care.

Public organizations have all the legal freedom to request/order innovative solutions as purchasers. The formal and informal careers (public or private) have access freely to the ecosystem, to be informed and to cooperate by accessing the funds through project competitions and within the legal framework dedicated to homecare activities. The cooperation with R&I system is implemented via project competitions so that their innovation needs are considered and solved within the project deployment.

The transfer of knowledge on unmet needs from formal and informal healthcare providers to other R&I actors is not clearly stated - being implemented informally, by conferences, by consultation of the public portfolio of R&I project results.

Some Centers of technological transfer were initiated before 2014 but they were not viable due to the lack of funds and competitions organized within the national sectorial and Operational Programmes in which their participation was eligible.

KEY CHALLENGES:

1. **LACK OF CONSULTATIONS BETWEEN SERVICE PROVIDERS, BENEFICIARIES AND PUBLIC AUTHORITIES** - There is a lack of: consultations between service providers, beneficiaries, public authorities, at set up of funds at local level; assessing the needs at the level of the Local Public Authority which is leading to the allocation of funds without taking into account of the real options of the service users; the tariffs for social home services are set without consultation with service providers.
2. **INSUFFICIENT PUBLIC INVESTMENT** - insufficient public investment in social research or in assistive technology for people with complex care needs.

SUPPORT FROM OPERATIONAL PROGRAMME - SUPPORT OF FORMAL AND INFORMAL HEALTHCARE PROVIDERS INSIDE THE RESEARCH AND INNOVATION PROJECTS IN THE OPERATIONAL PROGRAMME

- What are current support and opportunities of their participation on research & innovation projects/initiatives from the side of Operational Programmes and their Managing Authority?

The current Operational Programme Competitiveness (2014-2020) with its Priority Axis 1: Research, Technological Development and Innovation (RDI) in Support of Economic Competitiveness and Business Development (managed by IB - Ministry of Research) and Priority Axis 2: Information and Communication Technology (ICT) for a competitive digital economy (managed by IB - Ministry for Information Society) represents the current support opportunities of formal and informal healthcare providers to participate on R&D&I projects and initiatives.

These opportunities are represented by their involvement alone or associated as partners in the projects proposal for the competition. Currently there are however no competitions under this Operational Programme in which they could be partners. The last competition has approved a project dealing strictly with an alert system for home care of elderly in which a research institution, healthcare providers and elderly people organization are closely cooperating to implement this project results in 2020.

The Project "Raising the quality of medical act in rural areas by implementing a telemedicine information system" idea initiated by the Ministry of Health under the Operational Program Increasing Economic Competitiveness, POSCCE 49472 was a successfully implemented project for 3 Romanian counties under the former Operational Programme and now under the new Operational Programme Competitiveness is in the phase of further implementation for the rest of the country. It is expected that the next Operational Programme will consider better the Home care segment needs for innovation as well as the quadruple- helix cooperation initiatives.

There are not enough funds and clear formulated actions for the health care sectors. Currently, the only possibility for home care topic a stakeholder is the call under Action 1.2.3: Knowledge transfer partnerships is for eligible organizations from Public law research organizations, Priority 1.2. Improve research and innovation (R&I) infrastructures and capacities to develop excellence in R & I and promote competence centers, especially those of European interest, by linking them to existing or emerging clustering structures that aim at innovation and economic development, in a way that responds to the development needs of the communities in which they develop is not clear sufficiently formulated to let homecare providers benefits from R&I funds for their needs.

Action 1.2.1: Stimulate companies' innovation demand through RDI projects undertaken by businesses individually or in partnership with R & D institutes and universities for the purpose of product and process innovation in growth sectors with potential for growth; and Action 1.2.3: Knowledge Transfer Partnerships have not: sufficiently funds allotted so that to attract homecare formal and informal providers be part of consortium of project sustaining their development interest;

KEY CHALLENGES:

1. LIMITED FUNDS AND CLEAR FORMULATED ACTIONS FOR THE HEALTHCARE SECTOR R&I -
2. EVALUATION SYSTEM SUPPORTING QUADRUPLE-HELIX COOPERATION MODEL - a clear evaluation systems of the proposal in which the quadruple helix be considered is missing;
3. LOW STAFF AND EXPERTISE to disseminate OP competitions
4. INTERNATIONAL EVALUATORS - a clear justification for using foreign evaluators and not national evaluators for the proposals is needed

4. COMMON PROBLEMS AND CHALLENGES

Based on the above description of current situations in each country of the HoCare project, the common problem and challenges regarding the generation of innovation in home care through addressing unmet needs identified by formal and informal healthcare providers can be seen in the following table – divided per innovation ecosystem and support from Operational programmes.

4.1 COMMON CHALLENGES / PROBLEMS IN INNOVATION ECOSYSTEM:

➤ **LOW COOPERATION AND COMMUNICATION BETWEEN DIFFERENT ACTORS IN HOME CARE**

- weak communication between different levels of formal homecare healthcare providers
- lack of communication with end-users and informal healthcare providers and their involvement into R&I projects
- motivation of the whole ecosystem is weak
- voice of the ecosystem is weak compared to other industries
- home care is not on the list of priorities as there are more important issues to solve in short term connected with care system
- lack of sustainable business models for all home care actors
- lack of age-friendly design for products/services

- low interest among businesses to be part of publicly funded R&I projects

➤ **LACK OF STAFF, CAPACITY, RESOURCES AND EXPERIENCE OF INFORMAL HEALTHCARE PROVIDERS TO INITIATE R&I PROJECTS**

- lack of special staff in home care at end-user organizations
- no time to invest to R&I initiatives
- very low participation of informal healthcare providers in R&I
- financial, capacity and experience problem to take part in projects
- no possibility to be a direct financed partner in R&I projects
- lack of capacity and resources to scale up services

➤ **LACK OF HOME CARE R&I PROJECTS' GOOD PRACTICES**

- lack of home care research practices
- lack of awareness for advanced cooperation models

➤ **LACK OF RESEARCH INFRASTRUCTURES SPECIALIZED IN HOME CARE**

4.2 COMMON CHALLENGES / PROBLEMS IN SUPPORT FROM OPERATIONAL PROGRAMMES:

➤ **NO SPECIFIC MEASURES FOR HOME CARE R&I SUPPORT**

- no intervention programmes relevant for home care segment
- lack of strategic documents and initiatives specifying priority to home care
- state intervention in this area usually limits to social support
- mostly only horizontal focus on health

➤ **LIMITED POSSIBILITIES FOR FUNDED COOPERATION OF ALL QUADRUPLE-HELIX ACTORS**

- narrow list for eligible organizations for R&I projects
- implementation targeting now mostly 1 or 2 specific helixes only
- Operational programmes do not support as eligible beneficiaries the groups being main providers of home care – NGOs, hospitals, private hospitals
- lack of clear and adequate funding scheme to support quadruple-helix cooperation
- limited finance for formal and informal healthcare providers as direct partners
- clear evaluation system considering quadruple-helix cooperation missing
- post-paid financing for R&I projects limiting informal healthcare providers to take part

➤ **LITTLE INFLUENCE ON DESIGN OF OPERATIONAL PROGRAMMES AND LITTLE RESOURCES TO INITIATE OWN REGIONAL PROGRAMMES**

- most decisions formally taken at the level of municipalities, but they have little influence on design of operational programme and too little resources to initiate their own regional programmes
- lack of consultations at set up of funds at local level without taking into account real options of the service users
- tariffs for social home services are set without consultations with service providers

➤ **FRAGMENTED COOPERATION BETWEEN MAIN RESPONSIBLE MINISTRIES**

- cooperation between various responsible ministries is very fragmented
- insufficient public investment in social research or in assistive technology for people with complex care needs
- lack of capacity and national and regional resources to initiate R&I projects (most resources come from ESIF and other international funds such as H2020 or AAL, not from domestic or regional sources)
- current financing instruments oriented to home care segment are split between Ministries of Social Affairs and Healthcare, R&I support for new solutions under Ministry of Economy/Trade - enhanced risk of conflict between institutions while sharing specific responsibilities and financing contributions

➤ **NO GOOD SUCCESSFUL PRACTICES FOR STRATEGIC FOCUS OR MANAGEMENT OF OPERATIONAL PROGRAMMES SUPPORTING INITIATIVES IN HOME CARE SET UP FROM INFORMAL HEALTHCARE PROVIDERS BEING FUNDED THROUGH OPERATIONAL PROGRAMMES**

5. IDENTIFIED GOOD PRACTICES OF INNOVATION CREATION THROUGH ADDRESSING UNMET NEEDS IDENTIFIED BY FORMAL AND INFORMAL HEALTHCARE PROVIDERS

Unfortunately, there are not many good practices on the strategic focus or management level of the Operational Programmes relevant for the topic of this Study that could be available proved for success from the countries of the HoCare project. The following selected good practices in generation of innovation in home care through addressing unmet needs identified by formal and informal carers are all project based and have been identified during the HoCare project. However, the following project based good practices can provide significant overview and inspiration for

Managing Authorities in regards to types of projects, activities, participants and topics, influencing their potential strategies for opening higher support for creation of innovations in home care.

The following good practices show quite wide array of inspiration for transfer, starting from general innovation idea transfer initiatives (5.1, 5.2) and methodology to design and develop products/services (5.3), through more simple innovations for end-users (5.4, 5.5), informal carers (5.6, 5.7), and innovations using telemedicine services (5.8, 5.9), to more robust technological innovations using latest technologies such as sensors and wearables, human machine interaction, robotics and augmented reality (5.10, 5.11, 5.12).

GOOD PRACTICE SHORTCUT	GOOD PRACTISE OF ...
InTraMed-C2C (5.1)	Good practice of gathering and transferring innovation ideas from formal healthcare providers and their various employees to SMEs via innovation workshops, pilot projects and medical innovation database
ATHealth Centre (5.2)	Good practice for setting up joint research infrastructure for applied research and networking for solution testing and new ideas generation and ideas transfer
Digital inclusion and active ageing (5.3)	Good practice of iterative methodology for involvement of end-users and informal and formal carers to design, development and implementation of new consumer technologies for elderly people
Elderly-friendly housing model (5.4)	Good practice of very simple measure initiated by charity service to support home care continuation for elderly people
Gurulo workshops and logistics networks (5.5)	Good practice for creating innovative network of personalized service including rental of assistive technology products
Webnurse (5.6)	Good practice for simple innovative information and guidance support to informal carers via internet training portal
CarerSupport (5.7)	Good practice for cooperation among academia, clinics, SMEs, large business entities and other relevant stakeholders during both development and testing stage of product/service targeting informal carers
Tele-Rehabilitation (5.8)	Good practice of user/citizen helix actors being engaged to public initiated and lead project in telemedicine (as one of the main R&I field in home care) through user-centred design to help define real patient needs
DITIS (5.9)	Good practice of patient association being the main initiator of the product/service solution in virtual collaborative telemedicine (as one of the main R&I field in home care), with its role in solution definition and development process in cooperation with numerous other technological and research stakeholders
GRACE (5.10)	Good practise for product validation process by end-users and carers for using web platform and non-intrusive wearables for health monitoring
RehabNet (5.11)	Good practice of user/citizen helix actors being engaged to research initiated and lead technological project using robotics (as one of the

	possible future main R&I field in home care) through user-centred design to help create specific content of the service and its automatization process
AHA (5.12)	Good practice of user/citizen helix actors being engaged to research initiated and lead technological project through user-centred design to help validate the proposed solutions using augmented reality innovation as one of the possible future main R&I field in home care

These good practices enable to target and reduce mainly the following identified challenges as they might provide inspiration for potential transfer to other territories or segments of home care:

- **LOW COOPERATION AND COMMUNICATION BETWEEN DIFFERENT ACTORS IN HOME CARE**
- **LACK OF STAFF, CAPACITY, RESOURCES AND EXPERIENCE OF INFORMAL HEALTHCARE PROVIDERS TO INITIATE R&I PROJECTS**
- **LACK OF HOME CARE R&I PROJECTS' GOOD PRACTICES**
- **LACK OF RESEARCH INFRASTRUCTURES SPECIALIZED IN HOME CARE**

5.1 InTraMed-C2C - INNOVATION TRANSFER IN THE MEDICAL SECTOR FROM CLINICS TO COMPANIES

Category	Project
Country of origin	Czech Republic
Keywords	Knowledge for innovation available at clinics, Innovation transfer to SMEs, Regional innovation workshops, Pilot generation of new solutions
Participants	medical technology network, regional public authority, public hospital, regional development agency, university, RDI centre
Reasons for selection for the Study	Good practice of gathering and transferring innovation ideas from formal healthcare providers and their various employees to SMEs via innovation workshops, pilot projects and medical innovation database

Introduction:

Clinics have a high potential for innovations in product, process and service development in the overall medical industry. Yet, the transfer of innovation ideas from them to companies in Central Europe was weak. This project has been funded from Interreg Central Europe programme.

Problem:

Knowledge for innovation is available in clinics, not only referring to medical staff, but also to the scientific and technical employees. The problem is to encourage and extract the knowledge out of

people's mind. There is a significant lack of transfer of ideas to marketable products, because often no efficient incentive schemes exist to stimulate clinical employees to discuss identified innovations. The clinical sector is largely dominated by global players on the supply side. If innovations are identified in clinics, they are discussed first with representatives of these clinics suppliers. In the past, they were however only interested in this discussion, if these ideas for innovations fit to their company and product strategy. SMEs are highly interested to get access and to be involved in the innovation transfer process and they have certain advantages and flexibility in developing labtypes, prototypes and SME solutions for bottom-up innovation approach.

Solution:

Firstly, analysis of key players in each region was carried out as well as evaluation of clinics concerning their potential and motivation for inventions and innovations. For those identified and interested, several regional innovation workshops with (A) healthcare providers, B) SMEs, C) R&D, D) healthcare insurance companies, healthcare decision makers and political groups were organized to gather innovative ideas or requests based on the needs from the clinics. Consequently, a pilot generation of new products, processes and services was initiated by cooperation of clinics and participating SMEs as well as transnational matching plan of clinical innovations with SMEs. At the end of the project, deployment strategy of the Innovation transfer from clinics to companies was developed.

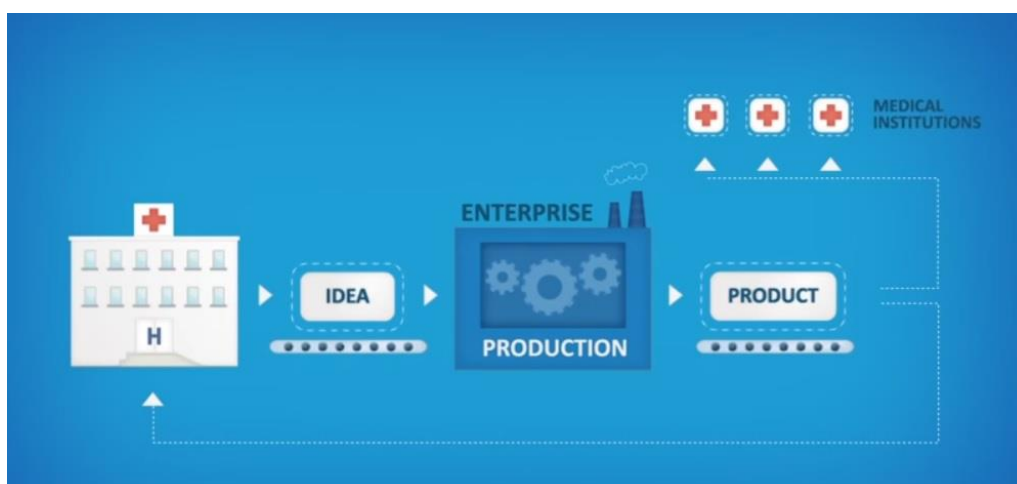


Figure 3 – InTraMed-C2C project rationale

Main phases of the project

- Identification of clinical ideas
- Evaluation of the ideas in regards to their innovative potential
- Pilot workshops and innovation transfer workshops with SMEs
- Development of medical innovation database
- Local steering groups set for sustainability of database operation

Formal and/or informal healthcare providers' role in creation of this innovation

Formal healthcare providers - Clinics/hospitals and their employees - were part of regional innovation workshops to identify needs for new innovative ideas – and became the needs' experts

for transfer to SMEs developing pilot projects. Formal healthcare providers therefore acted as feed for innovation initiatives by SMEs and also took part in the following pilot projects.

More information at:

- Project illustration video: <https://www.youtube.com/watch?v=3Qx7DhQSQEO>
- Project basic information: [http://www.central2013.eu/nc/projects-2007-2013/approved-projects/funded-projects/?tx_fundedprojects_pi1\[project\]=73](http://www.central2013.eu/nc/projects-2007-2013/approved-projects/funded-projects/?tx_fundedprojects_pi1[project]=73)
- Project good practice in full details available at: <https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.2 ATHEALTH CENTRE

Category	Project
Country of origin	Bulgaria
Keywords	Applied research centre, virtual laboratories for remote and mobile monitoring, cloud services, education on distance monitoring of health, scientific conferences to support innovation idea transfer
Participants	University, SMEs, formal healthcare providers
Reasons for selection for the Study	Good practice for setting up joint research infrastructure for applied research and networking for solution testing and new ideas generation and ideas transfer

Introduction:

This project responds to the need for developing the capacity of faculty interdisciplinary center for applied research and innovative technologies related to health. As a result of project activities the previously missing environment for the deployment of virtual infrastructures, remote sensing and mobile applications was ensured in an university in cooperation with local business. The center became the basis for building a network of virtual laboratories for remote monitoring at national level. The use of mobile devices allows access to the information and equipment at the principle of availability 24/7, which is crucial for the effectiveness of continuous monitoring. This project has been funded through Operational programme "Development of the competitiveness of the Bulgarian economy" 2007 – 2013.

Problem:

Applied research centers in Bulgaria face serious limitations in their activities due to lack of funding to expand the extent of the research programs of applied nature. There are not enough funds for investments in modern equipment, or for upgrade existing infrastructure to optimize the technology to carry out research and development. The need for technological equipment was the major constraint to the continued expansion of the innovation center in the direction of remote and mobile monitoring is.

Solution:

As a result of project activities the center provides opportunities for the realization of cloud services. Thanks to their base and applying virtual infrastructures it became the basis for building a network of virtual laboratories for remote monitoring. The use of mobile devices is allowing access to information and equipment to implement the principle 24/7, which is crucial for the effectiveness of continuous monitoring in home care. The project created capacity for continuing education nationally in the field of providing distance monitoring of health in home care. The Center organizes annual scientific conferences «Innovation & Business», an event which brings together professionals from the academia, high-tech business, and organizations involved in healthcare services towards the creation of innovative tools, services, and solutions in support of healthcare activities, improving the quality of life of patients with special needs, and facilitating the activities of organizations that provide support to patients in their homes as well as to their families. The center offers open access of scientists, scientific groups and partners from universities, medical centers and the private sector with the aim of developing joint projects in the field of home care.

Main phases of the project

- Purchase of new equipment
- Purchase of materials and supplies
- Commissioning of equipment, conducting R & D activities
- Informing and attracting target groups

Formal and/or informal healthcare providers' role in creation of this innovation

Formal healthcare providers were important part of innovation ideas generation process carried out mainly via the ATHealth centre conferences and joint projects organized with research and business actors as part of regular centre activities. Here formal healthcare providers acted again as indirect feed of innovation ideas to research and business actors.

More information at:

- Project good practice in full details available at:
<https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.3 DIGITAL INCLUSION AND ACTIVE AGEING: DEVELOPING A USER-CENTRED METHODOLOGICAL APPROACH TO INVESTIGATE THE USE MOBILE PHONES AMONG OLDER PEOPLE

Category	Project
Country of origin	Slovenia
Keywords	ICT assistive services, user involvement, consumer technologies, active ageing, mobile phones, ICT, user-centered design, lab tests, real environment test
Participants	public research agency, telecommunication operator, university
Reasons for selection for the Study	Good practice of iterative methodology for involvement of end-users and informal and formal carers to design, development and implementation of new consumer technologies for elderly people

Introduction:

Co-financed by Slovenian Research Agency and the second largest Slovenian telecommunication operator Simobil as an applied research project run by Centre for Social Informatics, Faculty of Social Sciences, University of Ljubljana. The project was not funded through Operational Programme.

Problem:

The need of older adults to live at home for as long as possible, increasing costs of long-term care (leading to unsustainable health and social care systems), and burdened informal carers can nowadays no longer be ignored. These characteristics of an ageing society are pressuring policy makers, industry, researchers, and civil society organizations to develop and mainstream ICT-based assistive services (ASs). Despite the growing body of evidence about ICT-based ASs’ positive effects, Slovenia is in its infancy regarding the adoption of smart solutions for active and healthy ageing.

Solution:

Development of an original iterative and mixed-methods methodological approach to design, development and implementation of consumer technologies for older people, which is based on principles of user-centred design, participation and integration. This robust model is titled „three stages of user involvement “ and is involving end users – older adults and informal carers – in three stages of the research and innovation process: (1) eliciting user needs and generating design ideas; (2) evaluating selected mobile application in lab setting and real environment and generating redesign ideas; and (3) evaluating redesign ideas. The project is closely connected to the home care through studying the ATs integrated in smartphones that can improve the quality of life of older adults and enable them to live in their own homes as independent and as long as possible.

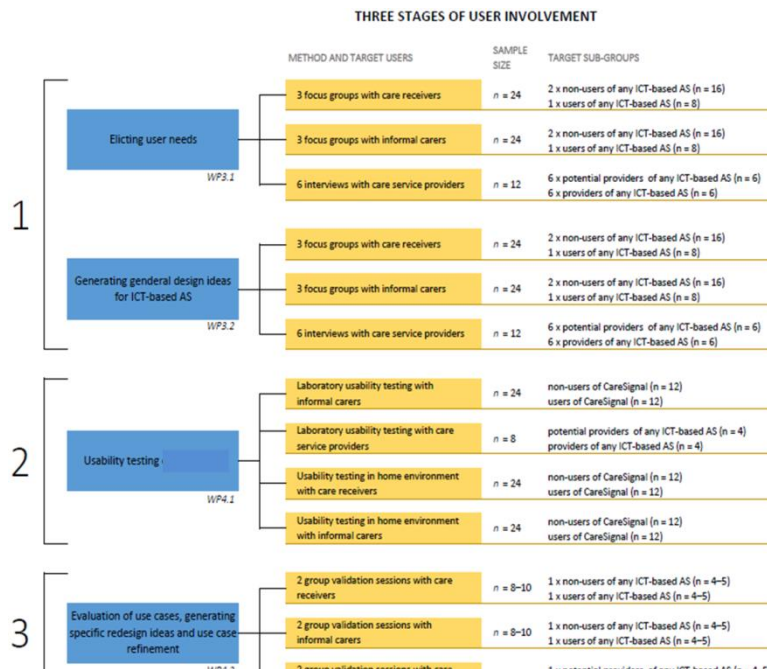


Figure 4 – Digital inclusion and active aging – methodology for design and development of new mobile products for elderly people

Main phases of the project

- Ecogerontechnological conceptual model
- User-centred methodological approach
- Needs assessment analysis and generating design ideas
- Applications selection and generating and evaluating redesign ideas

Formal and/or informal healthcare providers' role in creation of this innovation

The 3-staged model of user involvement is developed to be used by companies (mobile service providers) and researchers through co-creation process involving the main target group of the project - elderly as end-users and their informal carers. During the iterative process, the approach also works with feedback from formal carers. All groups are involved directly to the development process of new consumer technologies via user-centred design.

More information at:

- Project good practice in full details available at:
<https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.4 ELDERLY-FRIENDLY HOUSING MODEL

Category	Project
Country of origin	Hungary
Keywords	Obstacle free housing re-construction, home care with or without support of technological innovations, charity
Participants	Hungarian Maltese Charity Service, Ministry of Social Affairs and Labour
Reasons for selection for the Study	Good practice of very simple measure initiated by charity service to support home care continuation for elderly people

Introduction:

The elderly-friendly housing model programme has been elaborated and carried out by the Hungarian Maltese Charity Service with the aim to show that frail elderly people can continue living at home safely and independently despite their changed functions and the deterioration in their health, if obstacles are removed from their homes and their immediate environment is adapted to the loss functions of the elderly. The government provided funding in 2003-2004. In 2009 applications for state funding were announced for recipients of home care to create obstacle-free housing. Out of 2700 applications about 675 were accepted.

Problem:

Many of the elderly persons in the sample had one or more falls at home before the alterations were made. In more than a quarter of the cases these were caused by obstacles in their homes and not by their state of health.

Solution:

In the first year (2003) the project eliminated the obstacles from the flats of 20 elderly persons (over 75) in the capital (Budapest) and a large town (Debrecen). All of these persons were receiving one of these types of care: home care; home care with social alarm; family carer with a care allowance. In the second year a further 20 flats in the same two locations and 10 flats in a micro region (Tiszavasvári) were made obstacle-free. The 50 homes represented various housing types: apartments made of prefabricated panels, detached family houses, old brick buildings in the city centre, village or village-style houses. The great majority of the alterations were made in the bathrooms that represented the greatest obstacle for the elderly persons and where the most falls occurred (solutions e.g. bath replaced by a shower cabin, objects moved). Other typical alterations involved eliminating differences in level (e.g. removing the threshold), eliminating slippery surfaces, installing safety grips, adjusting the height of the work surface in the kitchen as well as numerous other solutions not restricted to a single room. The alterations to the flats were made in three different ways: a) with technically modern solutions (if they were accepted by the elderly person); b) with a solution adapted to the knowledge and earlier demands of the elderly person but one that was not up to date; c) with mental help, explaining the technical solution (often a time-consuming procedure). In the course of the alterations it was often necessary to apply solutions falling in category b).



Figure 5 - Elderly-friendly housing model key information

Main phases of the project

- experimental Pilot model programme
- publication "Elderly people at home"
- initiation of an elderly friendly housing programme by the Ministry
- call for applications by beneficiaries

Formal and/or informal healthcare providers' role in creation of this innovation

The charity service (a formal care provider) has been initiator and developer of this simple innovation measure based on end-user needs knowledge from their carers. Based on the persons' technology acceptance for alternative possibilities, different solutions have been made and implemented.

More information at:

- Project basic information: <http://www.eukn.eu/e-library/project/bericht/eventDetail/elderly-friendly-housing-programme/>
- Project information in publication: https://ec.europa.eu/eip/ageing/sites/eipaha/files/library/51d2e3f6e671c_Challenges_of_Aging_Societies.pdf (page 130)
- Project presentation: <https://prezi.com/epyxexuvzlek/copy-of-elderly-friendly-housing-model/>
- Project good practice in full details available at: <https://www.interreurope.eu/hocare/library/> - Good Practices folder

5.5 GURULO WORKSHOPS AND LOGISTIC NETWORKS

Category	Project
Country of origin	Hungary
Keywords	Rehabilitation for physically disabled people, assistive products, service network and workshops, service infrastructure, personalization and rental
Participants	Rehabilitation centre, local/regional hospital teams (formal healthcare providers), patients' relatives (informal care providers) and patients (beneficiaries / end users)
Reasons for selection for the Study	Good practice for creating innovative network of personalized service including rental of assistive technology products

Introduction:

Rehabilitation Centre for Physically Disabled People (MEREK) is operated and financed by the General Directorate for Social and Child Protection, which organization is operated by the Ministry of Human Capacity's. MEREK provides complex rehabilitation services for its clients. The rehabilitation time, i.e. residential accommodation, is limited to a maximum of 3 years, with a maximum of 140 people. The Institute's services are aimed at improving the physical condition of the residents, improving their autonomy, promoting their education, vocational training and employment. MEREK's goal is to achieve the highest degree of autonomy. However, the assistive products are not personalized and frequently need repair, therefore, MEREK decided to establish a sports- and life aids workshop (a small factory and repair shop). During the previous programming period for Structural Funds (2007-2013) MEREK carried out two projects in order to settle the organizational and physical infrastructure for improving its capacities: (1) Service Network and Workshop for developing equipment assisting employment and independent living of people with reduced mobility supported by Social Renewal Operation Programme, and (2) Development of Social Services Providing Supportive Technology Devices in Home Care supported by Social Infrastructure Operation Programme. The project "Guruló" started in 2008 had the main goal to enhance the labour market integration and independent living of people with physical disabilities through the establishment of a national network (GURULO NETWORK) of assistive tool development workshops and services. As a continuation of (and building on the outputs and results of) the "Guruló" project, MEREK developed

its service infrastructure and to provide rental of home care assistive products for the persons in need through the creation of a logistic network, starting from July 2013. In addition this project targeted social integration and collaboration with a health or social institute as well.

Problem:

The first project (supported by SROP) aimed to tackle the following needs: the assistive products are not personalized, providing and using of inappropriate products, lacking proper service the products and devices quickly go wrong, or fail, untimely replacement is needed; the waiting time for repair is long, services hard to reach in the countryside; supply and service for children's products is rudimentary; the number of sports assistive products is low, lack of high cost support; the rental of products temporarily needed is less secured or accessible. The second project, (supported by SIOP), aimed to tackle the following needs: the people in the service feel bad, the quality of the service they consider is low; Family members, friends or relatives who have seriously and / or severely disabled people or those who are in need of temporary care living in their family are also subject to a huge load of nursing care.

Solution:

MEREK established a national network of developing workshops and services for assistive products and assistive sports tools and aids. The workshops were intended for the repair and maintenance of the assistive equipment produced in series, personalization and rental after a proper assessment, and were organized in strong collaboration with healthcare professionals. Locomotor physicians and physiotherapists carried out surveys with the involvement of technicians on the basis of the FNO (Functional Ability, Disability and Health International Classification) methodology with the aim to fully serve the clients' needs - to co-operate with their therapists - personalization of their aids - to return to the labor market. The logistics rental centers were designed to provide tools assisting home-care and day-to-day living in a cost-effective rental system to those who need mobility aids in the short-term. Within the framework of the development - in cooperation with the Guruló Workshop Network – on six points of the country, such logistic units have been created that enable the storage, release, delivery and retrieval of these devices, as well as re-delivery to clients.



Figure 6 – Gurulo workshops and logistics networks

Main phases of the project

- establishing logistics rental centres to design and provide mobility tools and sports assistive products, operating as a nation-wide network in 6 regions of Hungary.

- providing personalized quality services by way of cooperation in Team work (physiotherapist, orthopaedist, mechanics of the repair workshop) to fully serve clients' needs and enable them to return to the labour market.
- developing services like: rental, repairing, maintenance and customization of assistive products and assistive sports tools and aids to satisfy clients' needs
- preparing case studies on the project in order to disseminate results at national and international conferences
- establishing, maintaining and monitoring relationships with healthcare institutions, social services and clients

Formal and/or informal healthcare providers' role in creation of this innovation

Informal healthcare provider initiated and developed a new solution service for their clients (end-users) and included formal healthcare providers and their employees to the definition and development of new service and personalization of their aids via user centred-design. Rolling Service Network and Workshop has established relationships with city and county hospitals, rehabilitation institutes, old age homes, sports clubs, medical devices and sports aids manufacturers and distributors. Active and solid relationships has been built with clients' family members and friends to fulfil the goal of providing comprehensive personalized services.

More information at:

- Project information:
http://www.merek.hu/sites/default/files/angol_anyagok/about_gurulo_projekt_en.pdf
- Project website: <http://gurulo.hu/few-words-about-merek>
- Project good practice in full details available at:
<https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.6 WEBNURSE

Category	Project
Country of origin	Hungary
Keywords	Internet training portal, videos, informal carers, professional help to nursing tasks
Participants	Charity service, elderly people, elderly care institutions
Reasons for selection for the Study	Good practice for simple innovative information and guidance support to informal carers via internet training portal

Introduction:

The Hungarian Charity Service of the Order of Malta (HCSOM) provides various services in the field of elderly and disabled care, as well as health care. As HCSOM truly promotes quality ageing at home, so it has been seeking innovative tools to support informal carers in their everyday care and nursing tasks by way of launching and running an online internet portal (webnővér.hu) containing video

training materials and other information sources tailored to their needs. The WebNurse as a pilot project (through implementation, development and its maintenance is managed by the project team of HCSOM assigned to this task. The professional background of the site is partially also provided by HCSOM's own staff. Besides several external experts have been involved in content development (webdesign, programming, filming) and updating the website. Special emphasis is put on obtaining feedback from target groups, elderly people, elderly care institutions, professionals, as well as the members of HELPS project. Building on these reflections HCSOM attempts to make the site even more useful and user friendly. Users' feedback means a lot has been and will be incorporated in the future development of the site. The WebNurse pilot project cost cca. EUR 65,000. This amount has been financed by EU/ERDF (85%) and from own resources (state: 10%, Hungarian Charity Service of the Order of Malta (HCSOM): 5%). Costs of maintenance and further operation of the site will be fully covered by HCSOM.

Problem:

Informal carers are of crucial importance in promoting independent, quality domestic life of elderly and/or disabled people (in some cases for sick children or adults). Informal carers providing home care hardly get any practical support in Hungary. Regarding simple care tasks (like feeding, personal hygiene) or more difficult errands (like treating decubitus or changing diapers), there was no simple, easy-to-access training material (including audio-visual elements), which could be offered to informal carers as a basis source of support.

Solution:

Support informal carers in their everyday care and nursing tasks by way of an online internet portal (webnővér.hu) containing video training material and other information sources tailored to their needs: supporting carers in carrying out their day-to-day tasks, preventing burn-out and physical injuries, providing professional help to carry out voluntary work, making every day errands easier by way of an easy-to-search database, and building up and enhancing capacities of informal carers.

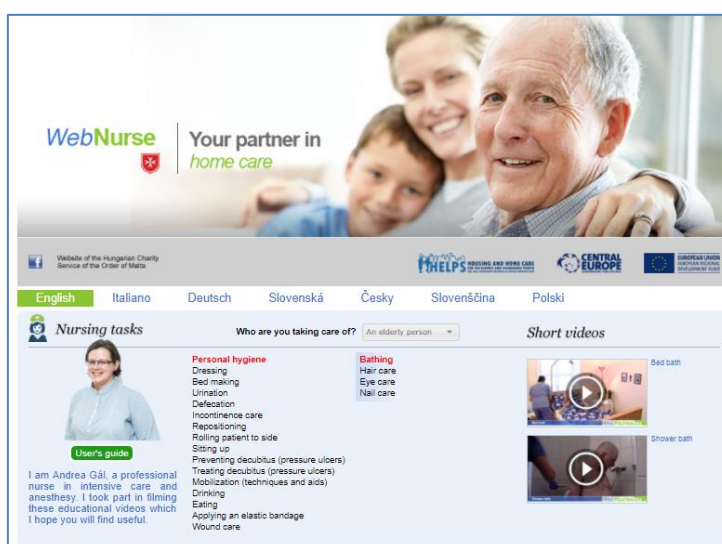


Figure 7 – Webnurse project website

Main phases of the project:

- Setting up pilot team
- Elaboration of web site structure
- Procurement of experts
- Webdesign, website programming
- Development and uploading of the content of various menu points of the website
- Maintenance and updating of the website
- Translation of certain features of the website
- Promotion of the website, including media campaign

Formal and/or informal healthcare providers' role in creation of this innovation

A charity service itself initiated and developed the new service for informal carers, basing the content and format of the portal on feedback from target groups, including elderly people, elderly people institutions and formal healthcare provider professionals. All were part of both user-centred design for the portal development, as well as its testing through user acceptance testing (UAT). The Hungarian Charity Service of the Order of Malta has involved the employees, volunteers and clients of its own institutions in the design of this innovation during the preparation phase. Certain experts and institutions have been invited to the Local Support Group set up in the frame of the project. By way of the LSG, these institutions (also representing target groups and healthcare providers) were involved in the planning, implementation and evaluation of the pilot action.

More information at:

- Project website: <http://www.webnurse.eu/>
- Project good practice in full details available at:
<https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.7 CARERSUPPORT – PLATFORM PROVIDING COMBINED SERVICES FOR INFORMAL CARERS

Category	Project
Country of origin	Italy
Keywords	integrated support for informal carers, Tele-consultations, Forums, Psychological tools for decreasing carer's burden
Participants	Large Industry, SME (Industry and Consultancy), Research organizations, Academic and End-User organizations
Reasons for selection for the Study	Good practice for cooperation among academia, clinics, SMEs, large business entities and other relevant stakeholders during both development and testing stage of product/service targeting informal carers

Introduction:

Development of an innovative support platform for informal carers (notably family members) who are nowadays the backbone of long-term care systems in European and beyond, and who are

themselves at risk for developing neurodegenerative diseases on long-term if not supported properly to cope with chronic stress related to caring. Main activities in the project: platform content development, pilot testing, cooperation between business and universities. This project has been funded through National Plan for Research, Development and Innovation II 2007-2013 in close cooperation with EU, through the FP7 – AAL (Ambient Assisted Living) Joint Programme (Call 5).

Problem:

Although EU and national policies for long-term care acknowledge the role of informal carers and in several cases provide them with incentives and financial benefits, there is still no adequate support to informal carers in terms of their training towards improving their skills, as well as in terms of alleviating their psychological stress. Nowadays informal carers receive learning, orientation and psychological support according to a variety of ad-hoc models, which usually involve the active participation of a care services provider (such as hospital, care centre or patients advocacy group).

Solution:

Carer Support aimed at reducing the fragmentation of existing service models, based on the introduction of a centralized ICT platform, which serves as a single entry point to a wide range of services for secondary users (i.e. informal carers) including training services, psychological support services, as well as a range of tele-consultation and collaboration services (with the involvement of formal carers and health professionals).

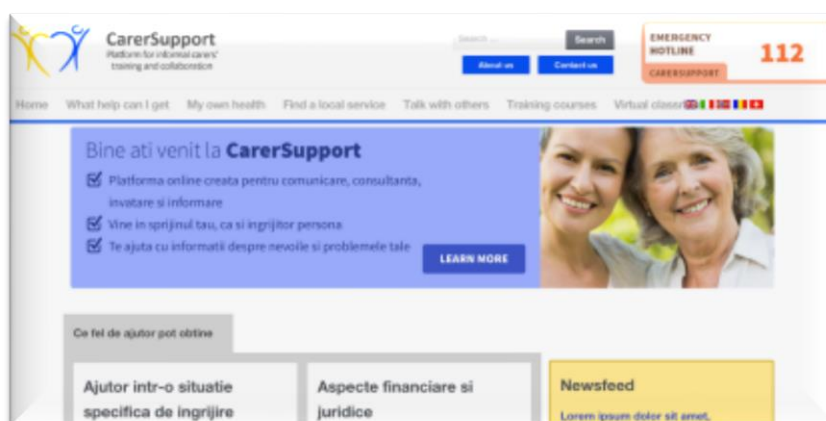


Figure 8 – CarerSupport platform screenshot

Main phases of the project

- User Requirements & Platform Specifications
- Platform Development (including 3 iterations)
- Services / Content creation (in 2 iterations)
- Pilot Testing / Evaluation

Formal and/or informal healthcare providers' role in creation of this innovation

Formal healthcare providers as well as informal carers were part of the user requirements and platform specification process (user-centred design – UCD) as well as Pilot testing (user acceptance testing – UAT) once developed.

More information at:

- Project good practice in full details available at:
<https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.8 TELE-REHABILITATION

Category	Project
Country of origin	Cyprus
Keywords	patients discharged from intensive care unit, mobility difficulties, tele-rehabilitation, cost reduction, increased access to rehabilitation, video communication, remote monitoring, increased quality of life, avoidance of re-hospitalization, cardiovascular rehabilitation, group exercise, patient assessment, patient monitoring & alert at home, holistic approach (exercise, nutrition, psychological)
Participants	Ministry of Health, NGOs, Hospitals, Research Actors, Universities
Reasons for selection for the Study	Good practice of user/citizen helix actors being engaged to public initiated and lead project in telemedicine (as one of the main R&I field in home care) through user-centred design to help define real patient needs

Introduction:

Developed under the framework of the Tele-Rehabilitation project funded by the Cross Border Cooperation Programme Greece Cyprus 2007-2013, the Tele-Rehabilitation programme is an innovative home-based rehabilitation service for patients suffering from cardio-respiratory problems provided by the Nicosia General Hospital. It aims to support patients discharged from the intensive care unit during their rehabilitation by using telemedicine tools and tailoring activity according to their morbidity profile.

Problem:

Many of the patients hospitalized in Intensive Care Units return home suffering from reduced functional capacity, exercise tolerance, health related quality of life and social function. Although the evidence demonstrates a clear need for rehabilitation for those patients, it seems that is not often possible for them to join rehabilitation multidisciplinary supported programs. The main reasons are the absence of such programs provided by the public or private health sector, the high cost of participation and mobility problems due to the medical condition of the patient, the community location or the traveling overheads, lack of specialized personnel in each major Cyprus hospitals, and long distances to reach Nicosia's General Hospital.

Solution:

Service that will improve accessibility to health care services, increase adherence to the rehabilitation programme, reduce costs and enable a more efficient provision of high quality telemedicine services. Tele-Rehabilitation is an advanced telemedicine tool that enables home-based rehabilitation sessions, which has a positive impact on patients and health care providers in terms of avoiding further hospitalisations because of missed rehabilitation session.

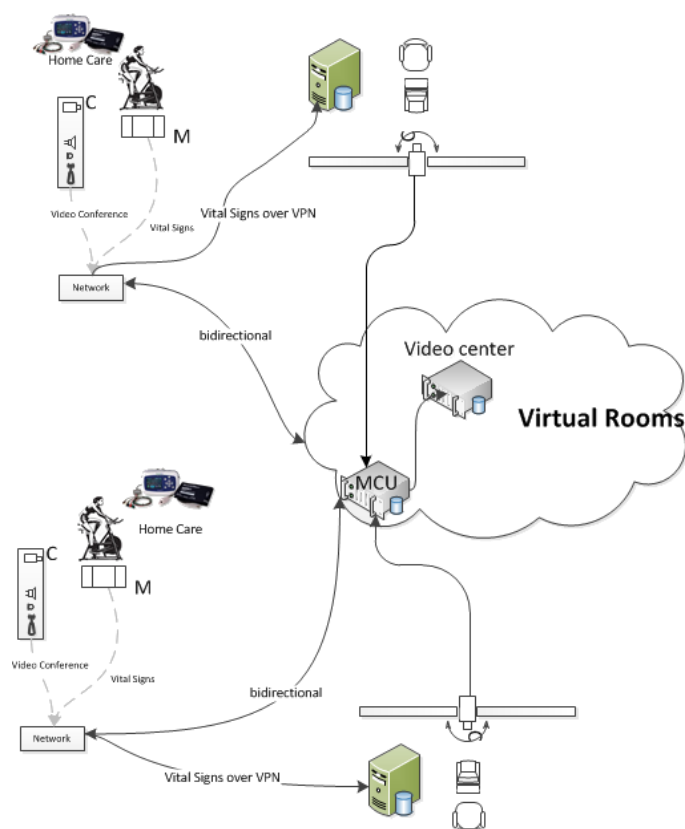


Figure 9 – Tele-rehabilitation scheme

Main phases of the project:

- User requirements (patients, practitioners, operators)
- Platform specifications
- Service specifications
- Patients' health records web application
- Technological Solutions integration
- Rehabilitation programme methodology based on personalized training
- Training (patients, practitioners, technologists) through online platform with interactive courses and videos.
- Standard Operating Procedures (technological, health)
- Pilot Testing and Evaluation
- Cost Benefit analysis and sustainability plan

Formal and/or informal healthcare providers' role in creation of this innovation:

While being a public initiated and lead pilot project in cross-border cooperation, representatives of the user/citizen helix including formal and informal healthcare providers were invited early in the project to define user requirements through the so-called user centred design (UCD) for the newly developed pilot solution. Overall, organizations representing all quadruple-helix system were invited to work together in round table discussions in order to provide their experience and opinion for the definition of a more realistic view of the real needs to be tackled.

More information at:

- Project basic information: www.intensivecare.com.cy/telerehabilitation
- Project good practice in full details available at:
<https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.9 DITIS – VIRTUAL COLLABORATIVE TEAMS FOR HOME HEALTHCARE

Category	Project
Country of origin	Cyprus
Keywords	collaborative home-healthcare virtual teams, computational model and system implementation, multilayer security framework, facility-based care
Participants	Association of patients and friends, research non-profit organization, SMEs, public university, public company, telecommunication authority as semi-governmental organization
Reasons for selection for the Study	Good practice of patient association being the main initiator of the product/service solution in virtual collaborative telemedicine (as one of the main R&I field in home care), with its role in solution definition and development process in cooperation with numerous other technological and research stakeholders

Introduction:

DITIS is a system that supports dynamic Virtual Collaborative Medical Teams dealing with the home-healthcare. It supports the dynamic creation, management and co-ordination of virtual medical teams, for the continuous treatment of the patient at home, and if needed for periodic visits to places of specialized treatment and back home. DITIS is an Internet (web) based Group Collaboration system with secure fixed and GPRS/GSM/WAP mobile connectivity.

Problem:

Care of chronic illnesses (e.g. cancer patients) by a team of health care professionals at home is often necessary due to the protracted length of the illness, the differing medical conditions, as well as the different stages of the chronic illness. More specifically, home care can offer comfort for the patient and their family, in the familiar surroundings of their home, and at the same time being cost effective, as compared to the high cost of hospital beds.

Solution:

DITIS was designed to deliver a product that can improve the quality of the citizen’s life. Contrary to state of the art health processing structure which is, in all practical terms facility-based care, this project aimed to shift the focus into home-based care, where everything is moving around the patient. The virtual healthcare team was able to provide dedicated, personalized and private service to the home residing patient on a need based and timely fashion, under the direction of the treating specialist. The main goal was the chronic and severe patients, such as cancer patients, to enjoy ‘optimum’ health service in the comfort of their home (i.e. a focus on wellness), feeling safe and

secure that in case of a change in their condition the health care team would be (virtually) present to support them.

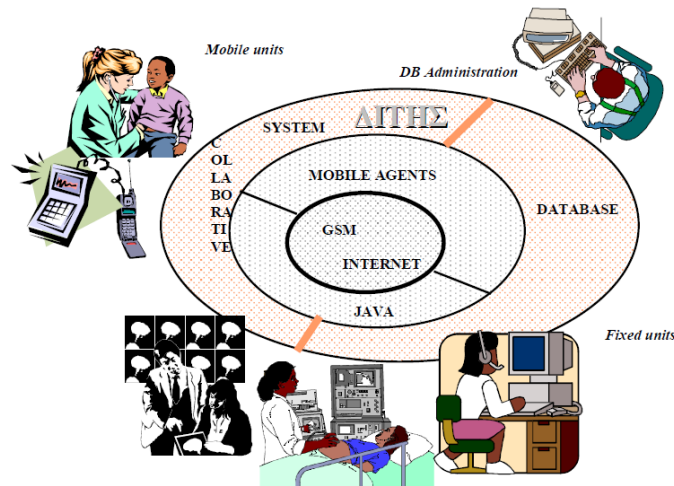


Figure 10 – DITIS infrastructure illustration

Main phases of the project:

- Requirements analysis
- Infrastructure development
- Design of Electronic Medical Record
- Design of collaborative platform
- Design of wireless e-services
- Design of collaborative software agents
- Design and implementation of prototypes
- Design of user interface
- Studies of system functionality
- Implementation
- Testing and Evaluation

Formal and/or informal healthcare providers' role in creation of this innovation

The project and its consortium's composition is a classic example of how the utilization of the quadruple helix approach can provide such accurate and qualitative results that may resolve in a catalytically manner certain problems after identifying real needs. Among others, it included 1 NGO - Cyprus Association of Cancer Patients and Friends (PASYKAF). DITIS was originally developed with a view to address the difficulties of communication and continuity of care between the home health care multidisciplinary team (PASYKAF) and between the team and the oncologist often over 100km away. The real need for the project's development was therefore identified in the area of provision of services in practice. In the design process of the whole idea, more stakeholders were invited to participate in the development of the practice to strengthen the innovation element through the use of ICT. End-user organization has been therefore involved right from the start of the service need definition and development.

More information at:

- Short information about the project: <http://grid.ucy.ac.cy/index.php/projects/7-linc/past-projects/45-ditis-network-for-medical-collaboration8>
- Project good practice in full details available at: <https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.10 GRACE – GUIDANCE AND RECOVERY AGING CARE ENVIRONMENT

Category	Project
Country of origin	Portugal - Madeira
Keywords	Human Computer Interaction, well-being, health, interaction, data mining
Participants	SME, research institute
Reasons for selection for the Study	Good practise for product validation process by end-users and carers for using web platform and non-intrusive wearables for health monitoring

Introduction:

GRACE is a novel health care monitoring platform that combines wearable devices, mobile apps and Cloud solutions in order to bring together patients, families, health carers, emergency services, insurance companies and other players. The GRACE device is offered in the form of a jewel in order to reduce the stigmatization that users might feel towards heavy, ugly, medical devices that they usually are given. However, the platform is conceived in order to support the most used wearables in the market (Apple Watch, Xiaomi Band, Samsung Gear, etc.).

Problem:

One of the main challenges that Europe (and most developed countries) is facing is its ageing population. Nowadays, modern families suffer several dilemmas with their loved ones: in a first stage, the elderly population starts to manifest relevant health issues (including mental) yet, they refuse to upset or interrupt their sons' and daughters' busy lives and refuse to see their own independence as humans to become more limited. On the other side, families' worries increase, naturally, observing this kind of evolution. This puts more stress on the family, both mentally, physically and financially. Families try to cope with this through either contracting nursing/care systems that accompany their loved ones through a significant part of their days and nights. In more severe cases, they need to intern their loves ones in specific care homes and day- care centers. Both solutions are very costly for the families and the alternative is for the family itself to try to manage the problem and take daily direct care of the senior member - which implies quitting a paid job or trying to cope everything and getting burnt out. Moreover, many of the nursing/caring staff don't have a proper complete medical education or all the means in-site to correctly take care in case of an emergency and the majority of accidents - such as falls - occur when the seniors are briefly left alone or unattended. So, after spending quite a lot of money, families still can't feel less stressed about their loves ones' conditions. While at the same time these still feel that they are losing their independence and are being a burden.

Solution:

Given the above, GRACE - acronym for Guidance and Recovery Aging Care Environment – aims to provide a set of solutions to allow people to age actively and in good health, both physically and mentally, by also reinventing - at the same time - the current system for health and social care through the delivery of an innovative ICT-product that delivers in a more efficient (and cheaper) way health care monitoring services and improves the mental well-being of elderly people and their families, through the use of a tracking web-platform connected to mobile apps and existing wearable devices (e.g. necklaces, bracelets) that monitor health parameters, providing a constant non-invasive monitoring and alert platform, tranquilizing families, offering independence and safety to elderly people and providing important health- data in real-time to doctors, emergency services and carers online.



Figure 11 – GRACE idea

Main phases of the project:

- Requirements and technical draft
- Technical development of the software, sensors implementation, data collection and transfer
- Design. Involves ergonomic studies, 3D design of possible wearable-jewels taking into account the sensors defined to be used by the team
- Prototype implementation. On this stage the team will keep implementing/iterating prototypes, firstly in a skeleton basic form until embedding into 3D prints of the designs
- User testing. Feedback on usability, comfort, problem-solving.
- Final prototype. Deployment and final user-testing of the first two models (yet still prototypes) that will be used for marketing dissemination, investor pitching and polished to be a final commercial product.

Formal and/or informal healthcare providers' role in creation of this innovation

Final users and carers (patients and their families, medical staff, home carers) validated and gave feedback as for their needs, goals, how GRACE responds to these, what is missing – through their medical/clinic/user validation of parameters and needs during product design and development and pilot testing.

More information at:

- Project website: www.grace.care
- Project good practice in full details available at: <https://www.interregeurope.eu/hocare/library/> - Good Practices folder

5.11 REHABNET – NEUROSCIENCE BASED INTERACTIVE SYSTEMS FOR MOTOR REHABILITATION

Category	Project
Country of origin	Madeira, Portugal
Keywords	clinical research, ICT, rehabilitation, upper-limb rehabilitation, robotics, human computer interaction (HCI), neurofeedback and neuroscience
Participants	Research institute of university, universities, centres of research, regional health system actor
Reasons for selection for the Study	Good practice of user/citizen helix actors being engaged to research initiated and lead technological project using robotics (as one of the possible future main R&I field in home care) through user-centred design to help create specific content of the service and its automatization process

Introduction:

RehabNet project has been financed by the EC under the call FP7-PEOPLE-2011-CIG - Marie-Curie Action: "Career Integration Grants".

Problem:

Chronic diseases such as diabetes, cardiovascular and respiratory diseases account for nearly 40% of mortality cases and 75% of health care costs. Obesity alone accounts for an estimated 12 percent of the health spending growth in the U.S. So is the case in Portugal. Wearables and their activity trackers promise a new health care model that stresses patient-driven prevention. The chronic diseases trends make elderly people to stay in danger if not monitored, therefore the goal was to provide support and connectivity from elderly persons to their caregivers not only when they are at home, but especially when outside at streets.

Solution:

RehabNet is a highly interdisciplinary project that addressed several research areas including clinical research, robotics, Human Computer Interaction (HCI) and neurofeedback / neuroscience. RehabNet proposed to develop a novel rehabilitation paradigm, based on low cost technology that can deliver motor rehabilitation for all patients, anywhere they are. An ICT based novel upper-limb rehabilitation system allowed not only to effectively train motor function, but to monitor and collect extensive synchronized brain activity and behavioural data on patient performance during the recovery process. This unique system provided extremely valuable data that allowed to propose a generalization of it to a neurofeedback paradigm that can eventually be used by all stroke patients, either at home or in the clinic. Through different interaction interfaces, RehabNet is accessible to a wide range of patients. Via a user-centred design strategy, it created computational models for the automatic generation of cognitive rehabilitation content precisely adjusted to each patient. Finally, it

combined Virtual Reality (VR) with a gaming approach to allow patients to be active agents in the rehabilitation process by providing a controlled and motivating intensive training targeted to their motor and cognitive deficits. The result of the RehabNet project is an integrative platform for neuroscientists, engineers and clinicians to further study stroke recovery and improve the impact of rehabilitation strategies. During the project, 4 novel rehabilitation scenarios were developed: (1) a bimanual motor training, (2) a dual motor cognitive-motor training for attention and memory, (3) a simulated city for the training of Activities of Daily Living in an ecologically valid context, and (4) a Motor Imagery based brain computer interface (BCI) system that combines VR with EEG based neurofeedback for motor rehabilitation. All scenarios are implemented with state of the art game engines, are platform independent and most of them are freely accessible through a web browser or as an app.



Figure 12 - Rehabnet

Formal and/or informal healthcare providers' role in creation of this innovation

While being a research based initiative, patients as representative of user/citizen helix actors were invited to participate in the design process of the RehabNet solution through their involvement in user-centered design (UCD) during cognitive rehabilitation content specification process.

More information at:

- Portuguese partner information: <http://www.m-iti.org/>
- Project basic information - <http://neurorehabilitation.m-iti.org/lab/rehabnet-2/>
- Project good practice in full details available at:
<https://www.interregeurope.eu/hocare/library/> - Good Practices folder
- Open Rehab Initiative: <http://www.openrehab.org/>
- NeuroRehabLab Youtube channel: <https://www.youtube.com/neurorehablab>
- NeuroRehabLab Facebook: <https://www.facebook.com/NeuroRehabLab>
- Blog: <http://sergibermudez.blogspot.pt/>
- News coverage:
<https://www.youtube.com/watch?v=DrtIG6yvBZM>

<https://www.youtube.com/watch?v=LTlc03DgfNc>
<https://www.youtube.com/watch?v=HcSjXC40SGQ>
<https://www.youtube.com/watch?v=-ThF4du5DaY>

5.12 AHA – AUGMENTED HUMAN ASSISTANCE

Category	Project
Country of origin	Madeira, Portugal
Keywords	robotic assistance, augmented reality, serious games, physical training, biosensors, computer vision system, indoor navigation, virtual couch system
Participants	Research institute of university, universities, centres of research
Reasons for selection for the Study	Good practice of user/citizen helix actors being engaged to research initiated and lead technological project through user-centred design to help validate the proposed solutions using augmented reality innovation as one of the possible future main R&I field in home care

Introduction:

Project developed to tackle assistance and diminishing of isolation in healthcare. The project is supported by the FCT project AHA CMUPERI/HCI/0046/2013. The total budget of the AHA project of the Portuguese partners is approximately 500k euro, which is mainly distributed to the 4 research institutions involved for the implementation of the scientific and technical program.

Problem:

Chronic diseases such as diabetes, cardiovascular and respiratory diseases account for nearly 40% of mortality cases and 75% of health care costs. Obesity alone accounts for an estimated 12 percent of the health spending growth in the U.S. So is the case in Portugal. Wearables and their activity trackers promise a new health care model that stresses patient-driven prevention. The chronic diseases trends make elderly people to stay in danger if not monitored, therefore the goal was to provide support and connectivity from elderly persons to their caregivers not only when they are at home, but especially when outside at streets.

Solution:

A new generation of ICT based solutions that have the potential to transform healthcare by optimizing resource allocation, reducing costs, improving diagnoses and enabling novel therapies, thus increasing quality of life. Novel Robotic Assistance Platform was designed, developed and deployed to support healthy lifestyle, sustain active aging, and support those with motor deficits.

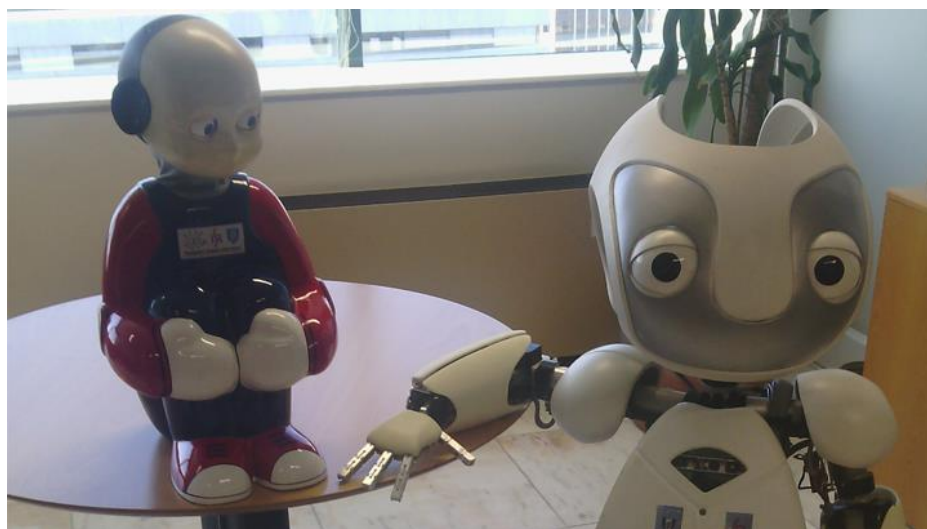


Figure 13 – AHA project

Formal and/or informal healthcare providers' role in creation of this innovation:

While being a research based initiative, end users as representative of user/citizen helix actors were invited to participate in the design process of the AHA solution through their involvement in user-centered design (UCD) involving end-user associations and institutions that are key actors in validating the proposed solutions.

More information at:

- Project basic information: <http://neurorehabilitation.m-iti.org/lab/aha-augmented-human-assistance/>
- NeuroRehabLab Youtube channel: <https://www.youtube.com/neurorehablab>
- NeuroRehabLab Facebook: <https://www.facebook.com/NeuroRehabLab>
- Blog: <http://sergibermudez.blogspot.pt/>
- Project good practice in full details available at: <https://www.interregeurope.eu/hocare/library/> - Good Practices folder

6 REFERENCES AND LINKS TO ADDITIONAL INFORMATION

- HOCARE PROJECT ILLUSTRATION VIDEO AND VIDEO FROM FIRST INTERNATIONAL THEMATIC WORKSHOP (RELEVANT FOR THIS STUDY):
<https://www.youtube.com/watch?v=NWmFF63ua70>
- HOCARE PROJECT WEBSITE: <https://www.interregeurope.eu/hocare/>
- HOCARE PROJECT MAIN OUTPUTS AND DOCUMENTS:
<https://www.interregeurope.eu/hocare/library/>
- CONTACTS FOR MORE INFORMATION ON GOOD PRACTICES:
<https://www.interregeurope.eu/hocare/contacts/>

AUTHORS – PARTNERS OF THE HOCARE PROJECT

