

Challenges

Rehabilitation care is under great pressure because of aging of the population and the increase in illness-related healthcare costs. Solutions are sought through improvement of the (cost-)effectiveness of treatments. This can be achieved by e.g. the use of new technologies in rehabilitation treatment, like robotics, sensors, new materials and new production processes for tools & etc. Aims are: a) to increase therapy provision and to make therapy more attractive, b) to increase training time & intensity for patients, c) to increase the contact time between patient-practitioner, d) to improve results from treatments and assessments.

Companies often contact rehabilitation centres to ask for help to develop their technological products, to test them, to buy them or to prescribe them to clients. The range of novel technologies (to be developed) is wide. The potential added-value for rehabilitation treatment is high and challenging. However, **the innovation and implementation of new rehabilitation technology is (too) slow.**

Problem 1: ‘Valley of Death’

Many initiatives and potential innovations concerning rehabilitation technology (RT) do not mature and are not implemented in rehabilitation. Causes are:

- Poor transparency: lack of a single route for RT-providers to contact the healthcare facility.
- Poor cooperation: lack of structured cooperation between RT-companies & rehabilitation experts.
- Poor patient involvement: RT-development often happens without the involvement of patients.
- Poor financial transparency: lack of clarity (at patient care institution level) about the affordability of new technology.
- Poor market entry: technology developments often go so fast that a) treating physicians cannot follow this; b) a thorough effect evaluation is too slow in terms of time & execution; c) for healthcare facilities is not clear which technology to purchase; d) technologies are not integrated in care processes.

Problem 2: Wrong use & Patient safety

- RT is potentially harmful for patients if used wrongly or at the wrong time during treatment. A correct indication for RT is often missing. Also missing is a) structured testing of effectiveness with input from patients; b) internationally uniform descriptions of fields of application for a product in rehabilitation treatment; c) certification as to the use of the product in treatments.

Global goals

i2-CoRT involves 2 closely related routes, namely a) a **procedural & infrastructural route** (i.e. the development of 3 clinical testing centres in the vicinity of rehabilitation centres with a network of cooperating knowledge institutes and companies) and b) a **concrete product-oriented route** (in this case 5 so called innovation ‘model projects’ in which concrete RT innovation ideas are elaborated and which will serve as examples to test and improve the procedures from route 1). i2-CoRT tackles this as follows:

1. Development of 3 clinical testing centres for complex rehabilitation technology (RT)

i2-CoRT creates 3 clinical test environments, in the immediate vicinity of rehabilitation centres, where RT innovations can be developed and tested as to their safe application in care.

Goals: a) innovation-friendly infrastructure; b) protocols; c) trans-disciplinary knowledge sharing; d) innovation acceleration; e) co-creation.

2. Development of knowledge axis on rehabilitation technology

i2-CoRT extends the Euregional knowledge-axis ‘Rehabilitation Robotics’ into a knowledge-axis ‘Rehabilitation Technology’ and strengthens this with existing and new companies.

Goals: a) attraction of RT innovations; b) attracting of business activity; c) broadening of market supply and demand beyond national markets; d) facilitating cooperation between Euregional partners, each with their additional expertise and capabilities; e) trans-disciplinary improvement of knowledge; f) knowledge assurance.



3. Euregional comparison

i2-CoRT facilitates Euregional comparison (concerning e.g. content, legislative framework, market differences) and exchange of success elements/best practices, leading to a) improvement of procedures and processes (SOP's) in the test centres; b) cross-border guidelines for correct indication and proper use of RT.

Goals: a) quality assurance; b) rehabilitation indication; c) Transnational certification.

4. New rehabilitation technological products

i2-CoRT develops and evaluates, through so-called 'model projects' new RT products which, together with companies, will be valorised and implemented transnationally in rehabilitation settings and other markets.

Goals: a) development of new RT products through intensive co-creation; b) evaluation of new RT products; c) cross-border rehabilitation implementation and care innovation.

5. Cross-border activity

i2-CoRT encourages cross-border activity regarding a) RT development; b) commercialization of RT products developed; c) innovative rehabilitation treatment concepts; d) new RT rehabilitation concepts for (former) patients at home.

Goals: a) Creation of jobs; b) market launch of new RT products; c) market widening.

i2-CoRT partners

The i2-CoRT consortium consists of the following project partners:

- Adelante Rehabilitation Centre & Adelante Centre of Expertise in Rehabilitation and Audiology, Hoensbroek, the Netherlands (lead partner)
- Maastricht University, dept. of Human Movement Sciences & dept. of IDEE, Maastricht, the Netherlands
- Eindhoven University of Technology, Faculty of Industrial Design, Eindhoven, the Netherlands

• Zuyd University of Applied Sciences, Research Centre Technology in Care, Heerlen, the Netherlands



- Aachen University Medical Faculty, Institute for Applied Medical Engineering, Aachen, Germany
- Hasselt University, Expertise Centre for Digital Media, Hasselt, Belgium
- PXL University College, Centre of Expertise in Care Innovation, Hasselt, Belgium
- Jessa Hospital & Rehabilitation Centre Herk-de-Stad, Hasselt, Belgium
- Liege University Hospital Centre, dept. of Physical Medicine, Rehabilitation and Sports Trauma, Liège, Belgium
- University of Liège, dept. of Physical Medicine, Rehabilitation and Sports Traumatology, Liège, Belgium
- Pôle MecaTech ASBL, WeLL, Wallonia E-Health Living Lab, Namur, Belgium

ACTiCON members

The ACTIVE i2-CoRT Company & Organisation Network (ACTiCON) is the group of companies and institutions who, in addition to the project partners, actively participate in specific work packages, but who do not receive direct financial support from Interreg-V-A. Active participation means ACTiCON members themselves contribute in providing rehabilitation technology innovation ideas and / or rehabilitation technology products and / or other in-kind ‘contributions’. Participation in the i2-CoRT project by the ACTiCON members is interesting for several reasons, e.g.:

- They can have their innovative ideas or innovative products developed, tested/evaluated for rehabilitation in collaboration with other experts from the i2-CoRT consortium.
- By their own active participation they have access to knowledge and development ideas in the field of rehabilitation technology and access to the expertise of other parties within the i2-CoRT project.
- They have access to the i2-CoRT project networks and the ‘Knowledge-axis Rehabilitation Technology’. Participating as an ACTiCON member is therefore not without obligations.

Added value for cross-border cooperation

Complementarity

All actors in i2-CoRT contribute their indispensable, unique and complementary knowledge and expertise regarding (the development of) rehabilitation technology and (clinical) application in a variety of patient populations and problems. Clinical expertise and problems regarding (regionally different!!) rehabilitation treatments, regulations and practices are provided by the German, Flemish, Walloon and Dutch clinical centres. Knowledge institutions bring in their specific expertise in the area of research methodology, technology, process, product development and evaluation. This creates a Euregional clinical test environment that fosters open innovation and user-centred innovation through co-creation.

Adherence size and scaling advantages

Adelante, Jessa Hospital, and the Liège University Medical Centre (CHU) bring in trans-disciplinary knowledge and expertise on specialist rehabilitation treatment, use of aids, assessment and implementation. These centres are, with their affiliated clinical network partners, complementary and cover a very large, and, in terms of diagnostic groups, comprehensive rehabilitation adherence area. This allows for innovation products to be evaluated quickly, adequately and with a statistically relevant target group-size. The clinical networks also offer excellent opportunities to (regionally different) input of experience experts by active participation and input from patients. Along with Maastricht University, Hasselt University, Aachen University (RWTH), PXL University of Applied Sciences, Zuyd University of Applied Sciences, Eindhoven University of Technology, University of Liège, and WeLL, this creates a huge clinical / technical knowledge network in the broad Euregion.

Cross-border comparison

The RT innovations are tested and evaluated under both German, Flemish, Walloon and Dutch law-regulations and treatment practices, whereby Euregional comparison and exchange of success elements and best practices may take place. This will lead to:

- cross-border care, quality assurance and exchange of care expertise;
- greater success rate on marketing of products tested in both Germany, Flanders, Wallonia and the Netherlands (also covering a larger market);

- cross-border guidelines for correct indication and correct use of RT. This, again, can lead to rehabilitation certification for RT (not only in the Euregio, but also EU-wide);
- possible development of new funding models (‘ best of both worlds ‘).

Main output

The i2-CoRT project encompasses 20 work packages.

Work packages T1 through T4 involve the development of so-called ‘Standard Operations Procedures’ (SOPs) concerning:

- The standardized and reliable testing of rehabilitation technology during RT development activities.
- The active involvement of SMEs in co-developing and testing RT, and how they are supported by the clinical test centres.
- Rehabilitation certification of RT products, e.g. for CE marks and clinical indication / certification for RT and protocols regarding the use of RT for specific subpopulations.
- The (supra-regional) implementation of RT products to reduce the risk related to the launch of a new product on the market in the field of rehabilitation.

Work packages T5 through T9 involve the development of new RT technologies and concepts, i.e.:

- The development of a new dexterous robot concept with which so-called client-centred, task-oriented arm-hand training may be provided to patients suffering from a hemiparesis. New robot steering concepts will be developed, based on ‘remote-handling technology’ concepts.
- The development of sensor-based technology for identification and assessment of arm-hand skill performance and to objectively measure the quality of arm-hand skill performance.
- Sensor technology and applications to prevent sitting and seating problems in wheelchair-bound people.

- Technical aids and concepts to assist training of complex (bimanual task oriented) skills in rehabilitation.
- An innovative hand / wrist orthosis (splint) will be developed which will actively support the opening and closing of the fingers.

Work packages T10 through T14 are aimed at:

- Implementation and valorisation of clinical test centre concept.
- Implementation, valorisation and market introduction of new innovations from work packages T5 through T9.
- Development of a business plan for the continuation of the clinical test centres after the project.
- Development of a strategy for the continuation of the i2-CoRT network after the project has finished.
- Stimulating entrepreneurship and to optimize the business climate together with concerned local and regional governments and other expert organizations.

Work packages I1 through I3 will focus on the development of 3 new innovation-friendly infrastructures in the vicinity of Adelante, rehabilitation centre Herk-de-Stad and the rehabilitation infrastructure of the Liège University Medical Centre in Esneux.

Finally, work packages C, M and T15 concern all communication and management activities of the i2-CoRT project.

Funding

The i2-CoRT project is funded by the Interreg V-A Euregio Meuse-Rhine program of the European Union (www.interregemr.eu), and its affiliated Euregional governments.

More information

Additional information on the i2-CoRT project may be obtained via the lead partner of the i2-CoRT project, and the project website:

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