



# Symposium I<sup>2</sup>-CoRT Rehabilitation technology in clinical practice

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*DG Research and Innovation*

# Rehabilitation under Horizon 2020



- Close to 350 mio € of funding
- From fundamental research projects funded by the European Research Council such as (non-exhaustive list):
  - **BCINET:** Non-invasive decoding of brain communication patterns to ease motor restoration after stroke
  - **MRI4DEEG:** An EEG calibration toolkit for monitoring rehabilitation of stroke patients
  - **ImpHandRehab:** The development and validation of a hand-based stroke rehabilitation product
  - **SoftHand Pro-H:** A Soft Synergy-based Hand Prosthesis with Hybrid Control
  - **BrainVisionRehab:** Seeing' with the ears, hands and bionic eyes: from theories about brain organization to visual rehabilitation
  - **Natural Bionics:** Natural Integration of Bionic Limbs via Spinal Interfacing
- To close to market solutions funded through the SME or the Fast track to Innovation instruments, in diverse fields of rehabilitation, such as cognitive neurorehabilitation, motor, neuromuscular, gender violence rehabilitation,...
- With the bulk of funding allocated to collaborative grants

# Robotics in rehabilitation (1)

*Based on the definition of a new concept, the "memory of motion", it will lead to a new technology for robot control*

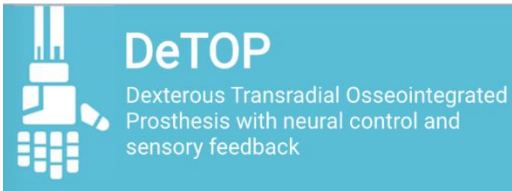


*WANDERCRAFT in Paris has designed one of the most advanced exoskeleton for paraplegics, targeting, for the first time, rehabilitation centers like those handled by the Center for Physical Medicine and Rehabilitation of APAJH, based in Pionsat, France.*

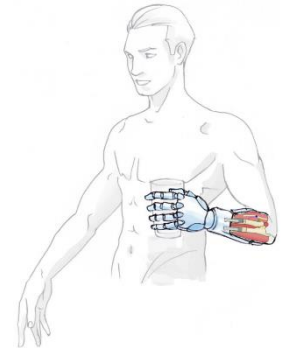
<https://www.memmo-project.eu/>

<https://www.wandercraft.eu/fr/accueil-2/>

# Robotics in rehabilitation (2)



**Ambition:** To develop a novel prosthetic hand with improved functionality, smart mechatronic devices/features for safe implantable technology <http://www.detop-project.eu/>



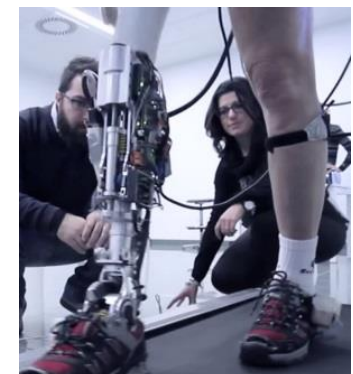
**Ambition:** To develop an hybrid exoskeleton that can communicate, assess, and proactively adapt to users. <https://rehyb.eu/>



CYBERnetic LowEr-Limb CoGnitive  
Ortho-prothesiS Plus Plus

**Ambition:** Validate the technical and economic viability of robotic ortho-prosthesis

<http://www.cyberlegs.eu/>



# Robotics in rehabilitation (3)



Intuitive Natural  
Prosthesis Utilization

**Ambition:** Transfer results from laboratory settings to facilitate a clinically and commercially viable medical product  
<http://www.input-h2020.eu/>



## RETRAINER

REaching and grasping Training  
based on Robotic hybrid  
Assistance for Neurological  
patients

**Ambition:** Use robot-based technologies to speed up the rehabilitation (arm and hand mobility as soon and as much as possible)  
<https://www.ab-acus.eu/retrainer/>

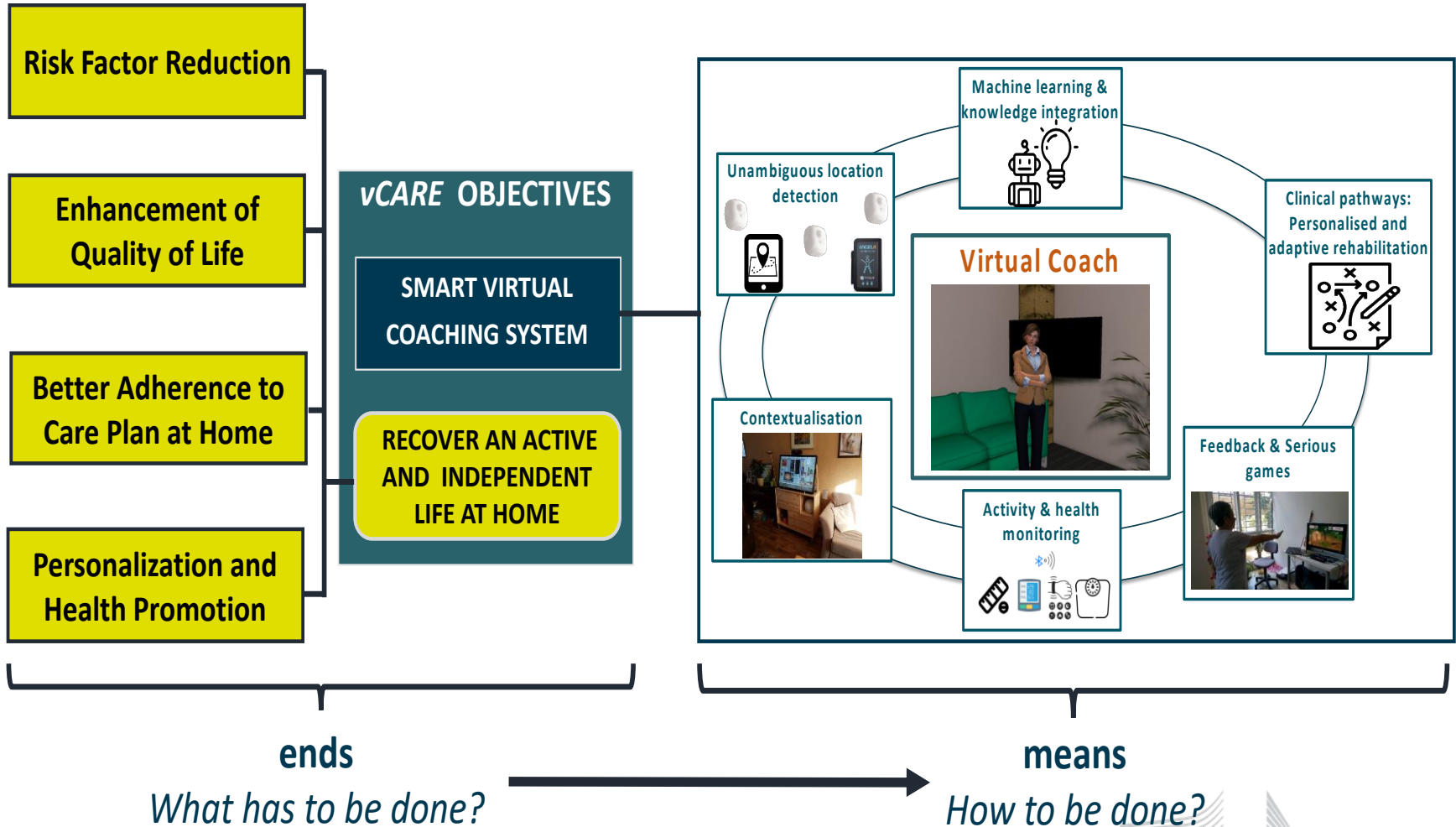


Synergy-based Open-source  
Foundations and Technologies for  
Prosthetics and Rehabilitation

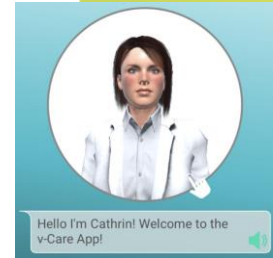
**Ambition:** Increase the impact of robotic rehabilitation solutions for people with real needs in the real world  
<https://softpro.eu/>



# vCare project: Virtual coaching activities rehabilitation in elderly



# Virtual Coach as a support for the Rehabilitation



Set up by the  
physician

Habits

Preferences

Condition

Context

Consider and Evaluate

motivate

suggest alternatives

provide feedback

remind

track activities

...

Analyse and Adapt

...

Physio

Games

Walking

Treatment phase  
1

Treatment phase  
2

Treatment phase  
3

regular rehabilitation plan

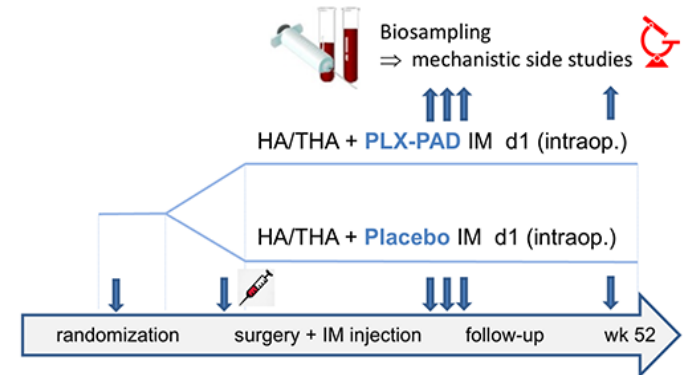


# Regenerative medicine

# hipgen

- Randomized, double-blind, multicentre, placebo-controlled phase III trial for restoring muscle function, mobilisation and reduction of post-operative stress in hip fracture patients treated with placenta-expanded adherent stromal cells
- HIPGEN partners are world-leading experts in orthopaedic surgery or rehabilitation, clinical immunology and performing innovative clinical studies, 3D-cell manufacturing, preclinical and clinical cell therapy and biomarker analyses.
- The HIPGEN consortium includes Be the Partner that has developed a app for patient data management and engagement giving an added value by filling the gap between science and patients.

<https://www.hipgen.eu/>



Welcome to Be the Partner!



European  
Commission



# Innovation procurement

R&D / Pre-commercial Procurement (PCP)

Public Procurement of  
Innovative Solutions (PPI)

## Phase 0



Curiosity  
Driven  
Research

## Phase 1



Solution design

## Phase 2



Prototype development

## Phase 3



Original development  
and testing of limited  
volume of 1<sup>st</sup> test  
products/services

## Phase 4



Deployment of commercial  
volumes of end-products  
Wide diffusion of newly  
developed solutions

Supplier A

Supplier B

Supplier C

Supplier D

Supplier B

Supplier C

Supplier D

Supplier B

Supplier D

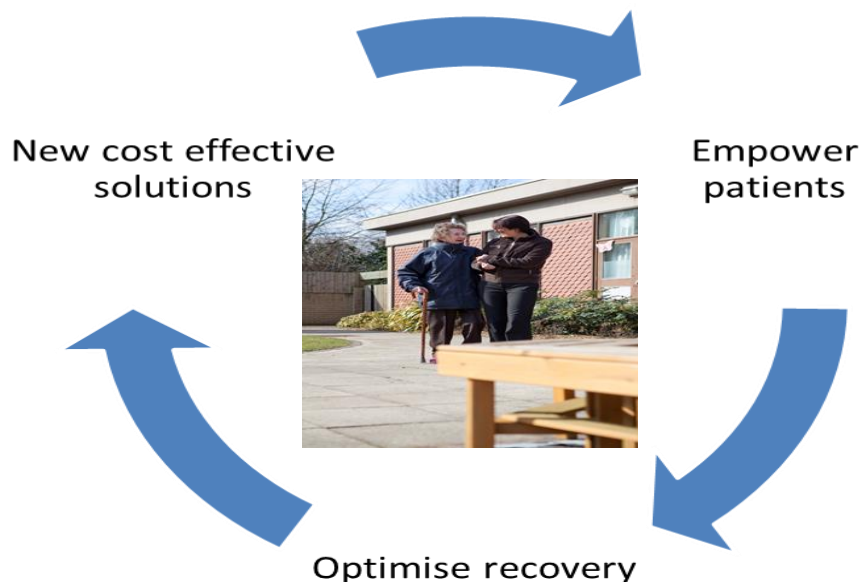
Supplier(s)  
A, B, C, D  
and/or X

# Magic: Pre-Commercial procurement for rehabilitation after stroke



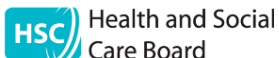
**MAGIC is a European wide Pre-Commercial Procurement (PCP) focused upon creating innovative technology;**

**Transforming services for people post stroke to improve physical function and personal independence**



*magic*

## Buyers Group



## Project support



## Observer states



**Mobile Assistance for Groups Individuals within the Community - STROKE REHABILITATION** cod. 687228 - H2020-PHC-2015 –  
<http://magic-pcp.eu/>

# Magic: Pre-Commercial procurement for rehabilitation after stroke



*magic*

“It was really great to get stroke survivors and clinicians involved with innovation. This will be the first time many of our clinicians have been involved in technology development and they were very excited by it. The need for technological transformation to assist with bridging the GAP between workforce supply and demand remains just as crucial as it was at project inception. There is real hop that a procurable solution will be found by the end of the process”



<http://magic-pcp.eu/>



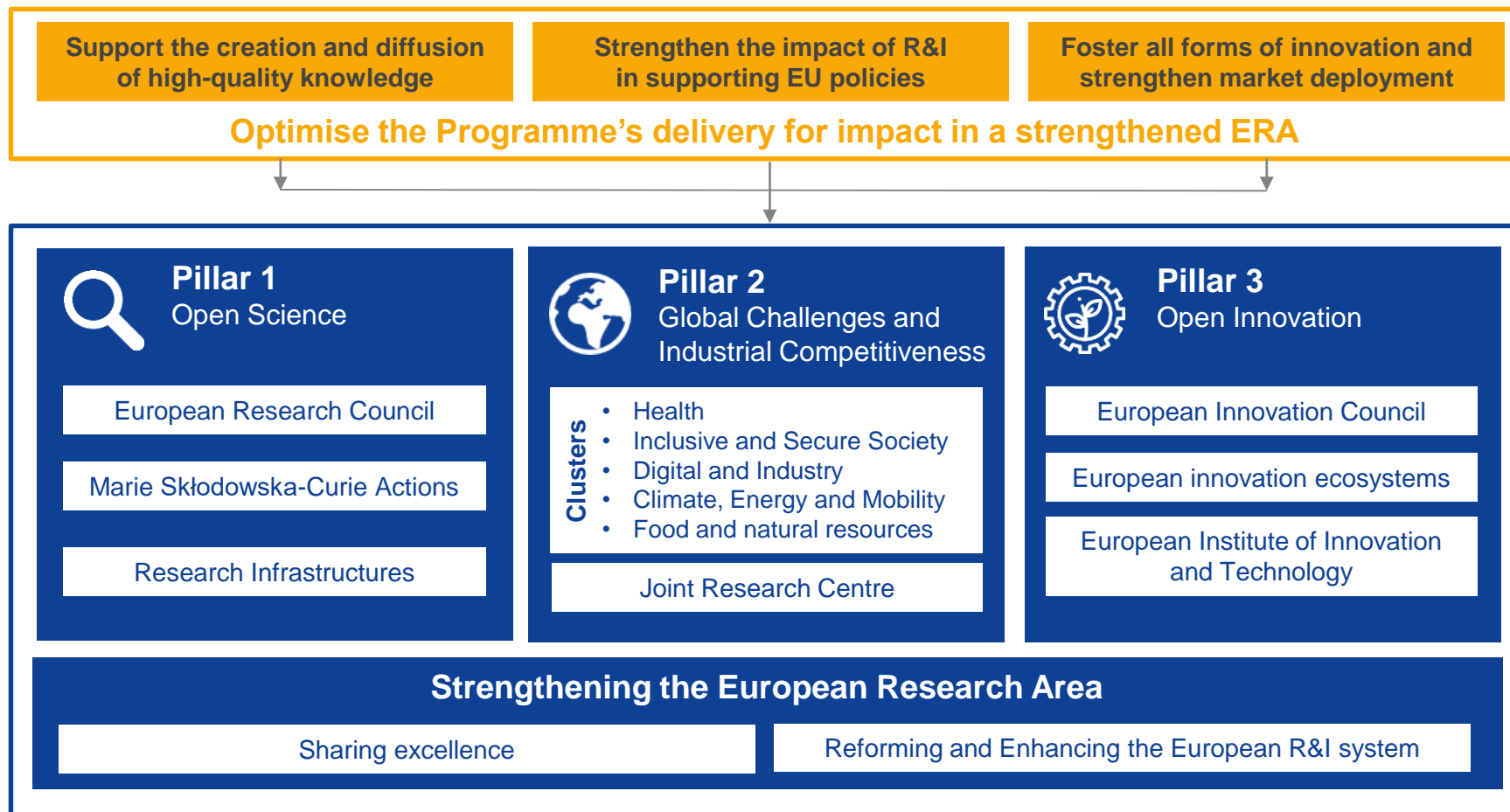


# What is next?

# Horizon Europe: evolution not revolution



## Specific objectives of the Programme



European Partnership for Innovative Health

For more information, visit: [https://ec.europa.eu/info/files/european-partnership-innovative-health\\_en/](https://ec.europa.eu/info/files/european-partnership-innovative-health_en/)

European Partnership on Artificial Intelligence, Data and Robotics

For more information, visit: <https://ai-data-robotics-partnership.eu/>





# Six main areas of intervention



Health throughout  
the Life Course



Environmental and Social  
Health Determinants



Non-communicable  
and Rare Diseases



Infectious diseases



Tools, Technologies  
and Digital Solutions  
for Health and Care



Health Care Systems



# European Partnership on Transforming Health and Care Systems



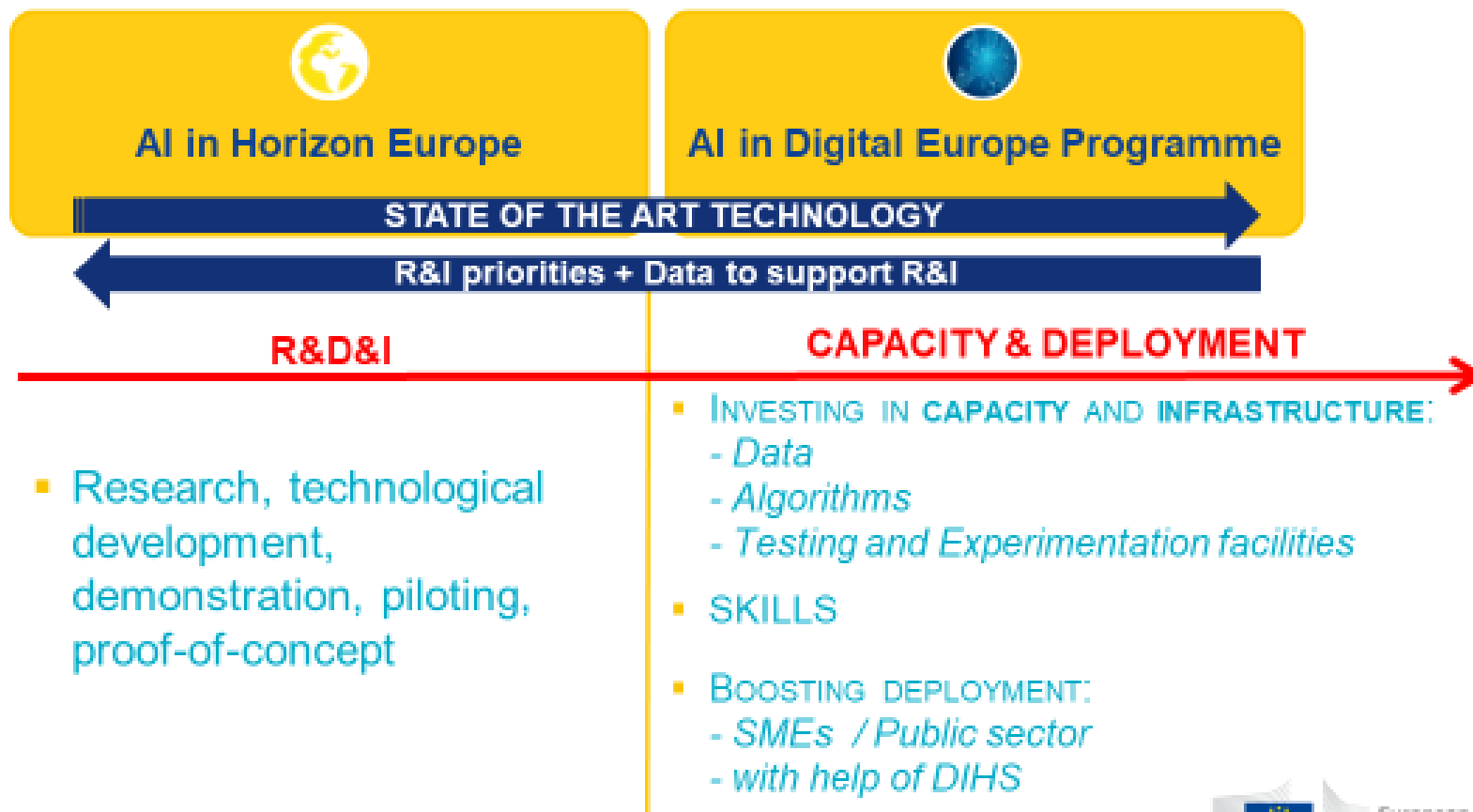
**The General Objective:** to ensure the transition towards more sustainable, resilient, innovative and high quality people-centred health and care systems.

## **Key Specific Objectives to be achieved by 2030:**

1. To provide multidisciplinary research and innovation actions in priority areas of common interest **to fill knowledge gaps, produce evidence and develop guidance on how to transform health and care systems.**
2. To provide applied research/development and innovation actions in priority areas of common interest **to develop new solutions for health and care to support and maintain people's health.**
3. To **strengthen the research and innovation community** in the field of health and care systems across Europe.
4. To improve the ability of relevant health and care actors **to take up innovative solutions, including organisational, service and policy innovations.**
5. To establish a platform for connection and coordination of relevant stakeholders **to develop the ecosystems allowing for a swift scaling up and transfer of successful innovations** to different health and care systems.

# Digital Europe Programme: Complementarity and synergies

## AI in MFF: Complementarity & Synergies



# Digital Europe Programme

## Specific Objective 2. Artificial Intelligence

1. Creation of **COMMON EUROPEAN DATA SPACES**
2. Development of **COMMON EUROPEAN LIBRARIES OF ALGORITHMS**
  - **Toolbox of AI tools → AI on Demand Platform**
3. **WORLD CLASS REFERENCE SITES FOR EXPERIMENTATION AND TESTING** of AI in real settings.

# Digital Europe Programme



**World class reference sites for experimentation and testing**

→ **Co-investment with Member States for reference sites**  
*Building on, developing and networking existing facilities for common benefit*

## 1) Technology-centric:

Testing and experimentation facilities for AI components based on neuromorphic and quantum technologies



## 2) Application-centric :

Reference sites for experimentation and testing AI in essential sectors such as



**SMART HOSPITALS AND HEALTHCARE**



**Agri-Food**



**Smart Mobility**



**Manufacturing**



**Smart Cities (!! Environment is cross-cutting theme)**



Thank you!