



**INNOVATION IN SUPPORT TECHNOLOGIES FOR PREVENTION,
BEHAVIOUR CHANGE AND THERAPEUTIC ADHERENCE**

Felip Miralles

Eurecat on healthcare

The **healthcare sector** is one of the most strategic in which **Eurecat** is driving innovation.

We develop **innovative services and products** in open collaboration with research centres, companies, healthcare providers and administrations.

Mission

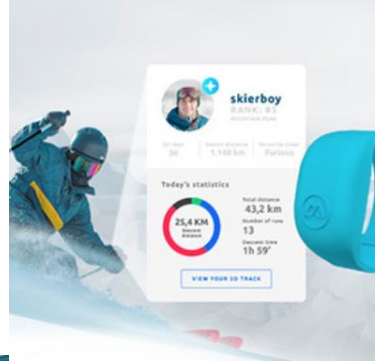
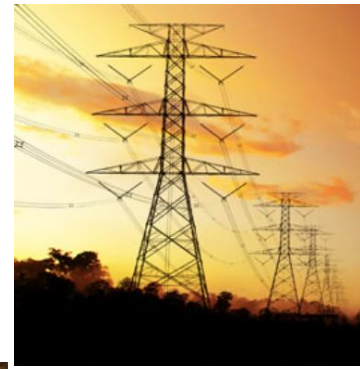
Foster competitiveness of companies and society through applied research, innovation, and knowledge transfer

Vision

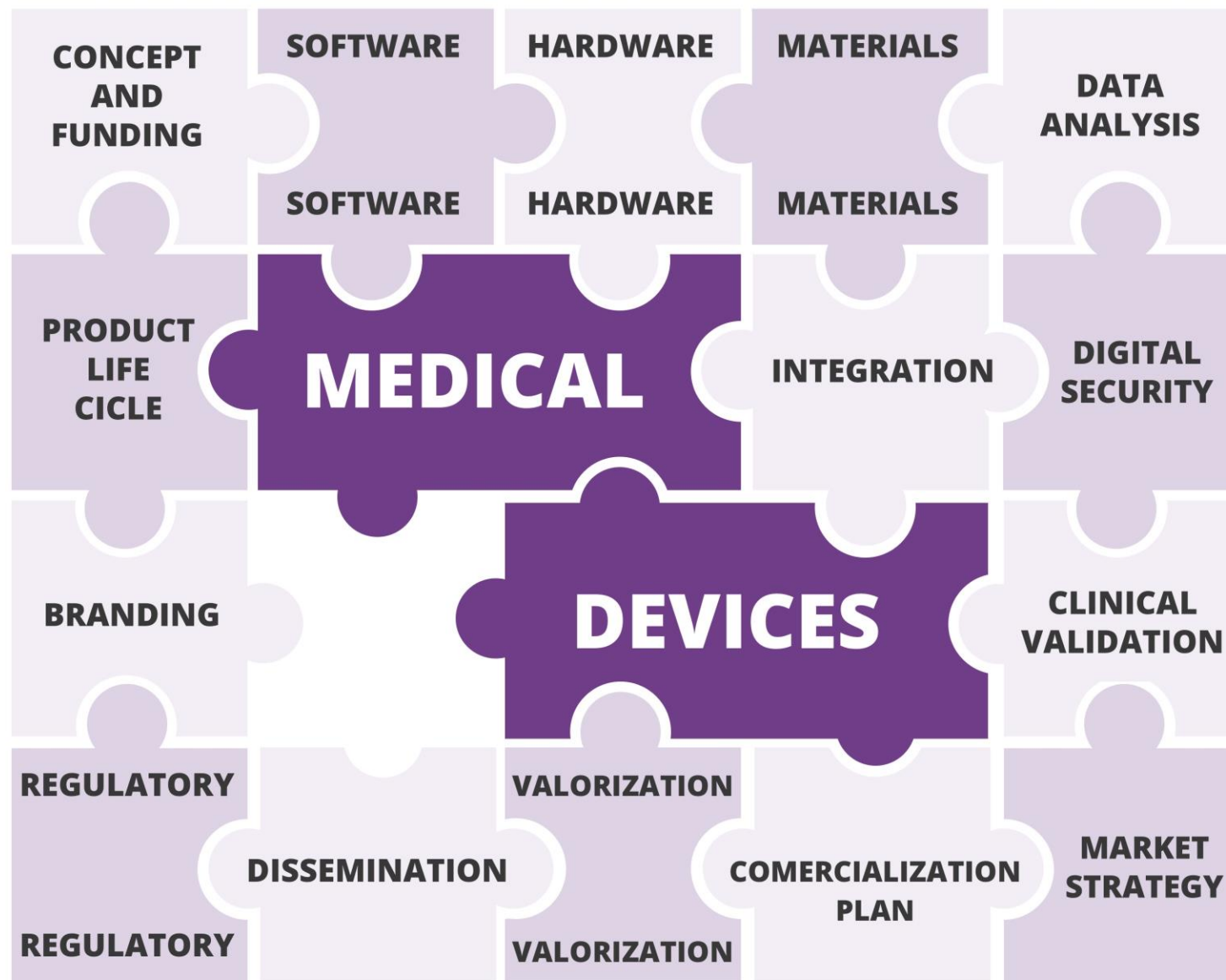
Become the referent on industrial research and technology transfer within the innovation ecosystem



Eurecat



Flagship project in Eurecat



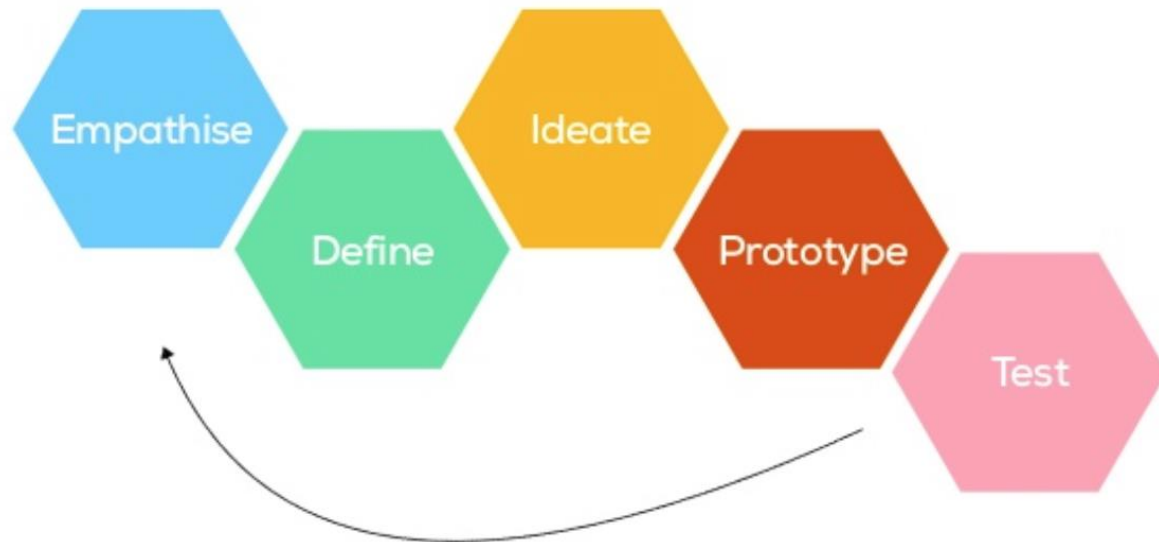


Design thinking In Health

Design thinking in health

Design thinking is a user centred (patient centred) methodology we use to generate innovative ideas which drive efficacy of solutions from the understanding of real unmet needs of users (specially patients, but also caregivers and health professionals)

It is a process which is carried over step by step, but in an iterative way.

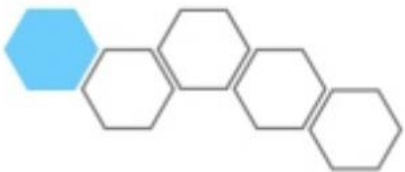


Design thinking

1. Empathise

Understand patient experience, including unmet needs, context and emotions of end users

- Observe
- Research, ask, learn
- Look and listen



Design thinking

2. Define

Filtering out information and stay with that which adds value

- Who is our end user?
- Which are their unmet needs?
- What solutions may solve those needs?



Design thinking

3. Ideate

Generating all the potential alternative options

Translating problems into solutions

Distinguishing generation from evaluation of ideas



Design thinking

4. Prototype

Turning ideas into reality.

Building prototypes conveys tangible assets and helps to visualize ideas and iterative enhancements to reach the final solution.

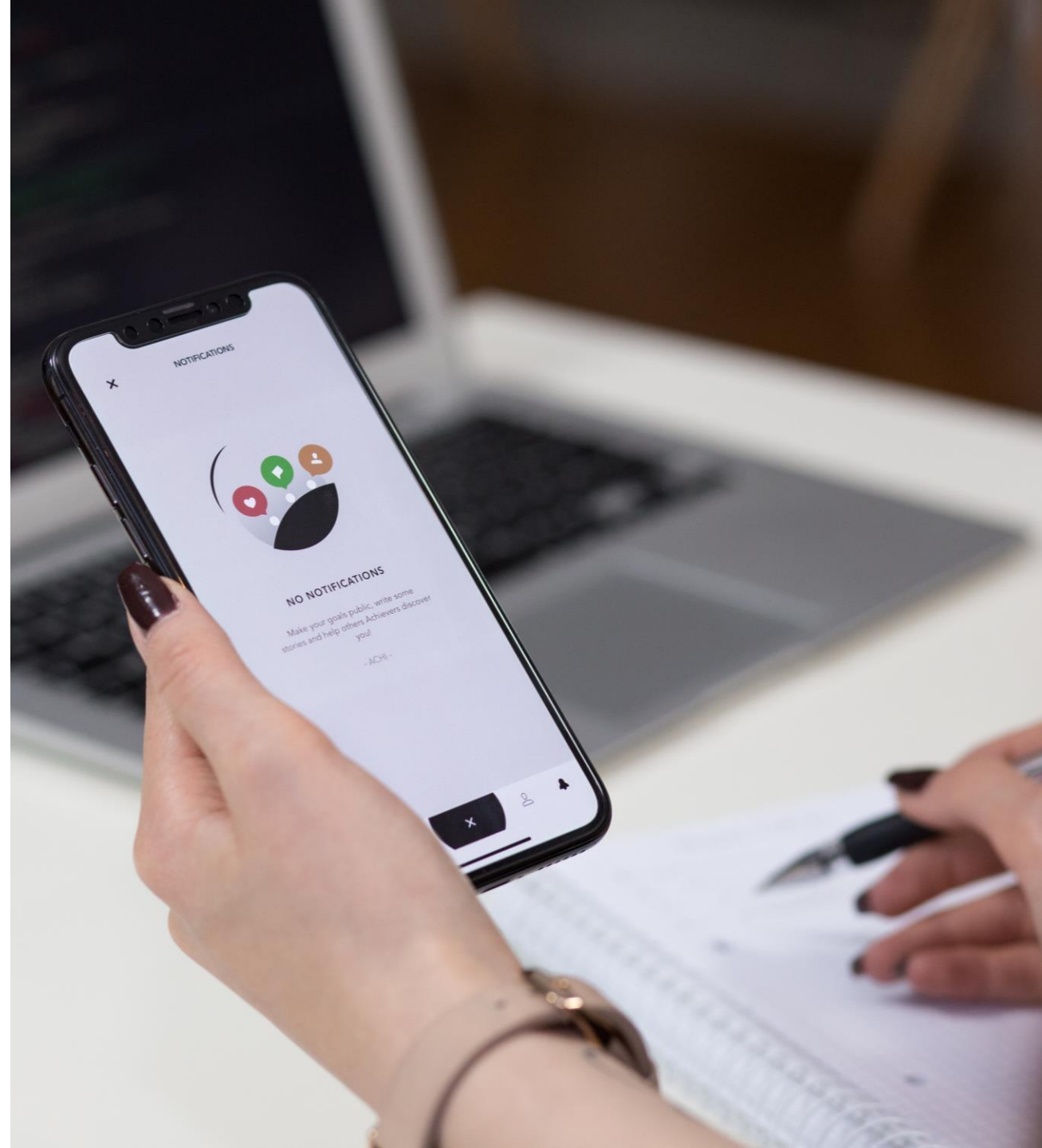


Design thinking

5. Test

Essaying our prototypes with real end users.

Identifying failures, shortcomings, improvements and enhancements to get to next iteration towards final solution



Paprika

A use case



Paprika

The need



Surgical Interventions

Deployment of PreHab as mainstream service at Hospital Clínic de Barcelona (HCB) has already been undertaken



Reduce Complications

The efficacy of PreHab to reduce surgical complications and facilitate postoperative recovery has been demonstrated (Ann Surg. 2018; 267(1):50-56).



Scalability

Need for consolidation of modular digital health tools to address 2 main aspects of service scalability: self-management at community level and collaborative work

Paprika

Actual service

Trimodal approach

Program including supervised endurance training & promotion of physical activity, nutritional balance and psychological support (mindfulness).

Currently delivered through face-to-face visits with physiotherapists, nutritionists, psychologists...Need to be scaled up to reach more people, cost less and impact more.



Paprika Objectives



Modular service workflows

Service accesibility, sustainability and transferability requires modularity of service workflow



Integrated Digital Health Tools

Modular Digital Health tools integrating Adaptive Case Management for professionals and Self-Management apps and devices for patients.



Personalization and Adaption

Service is highly adaptive and individualized by nature, therefore solutions must take into account profile and evolution of patients

Paprika

Solution result of a design thinking process involving all stakeholders



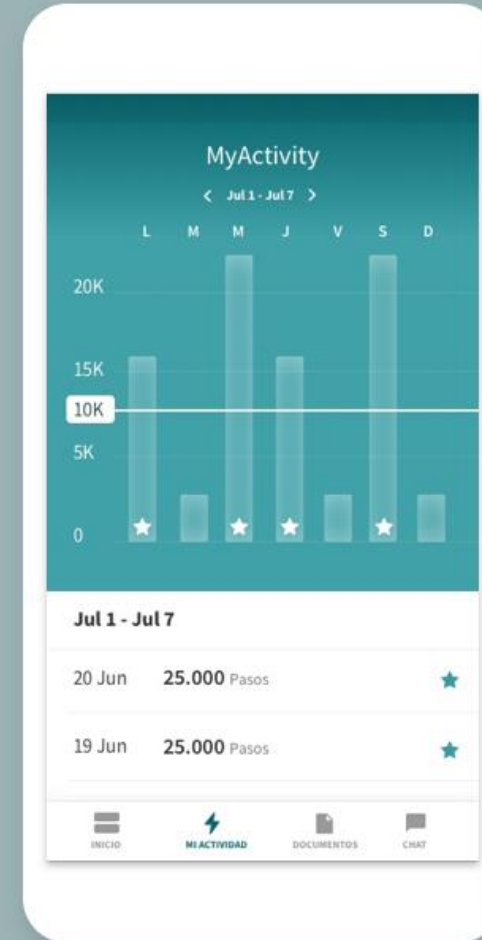
Self-management App for patient

- Follow-up of physical activity through activity trackers
- Prescription of mindfulness exercises
- Nutrition tips
- Chat with professionals
- Questionnaires

Backoffice for professionals

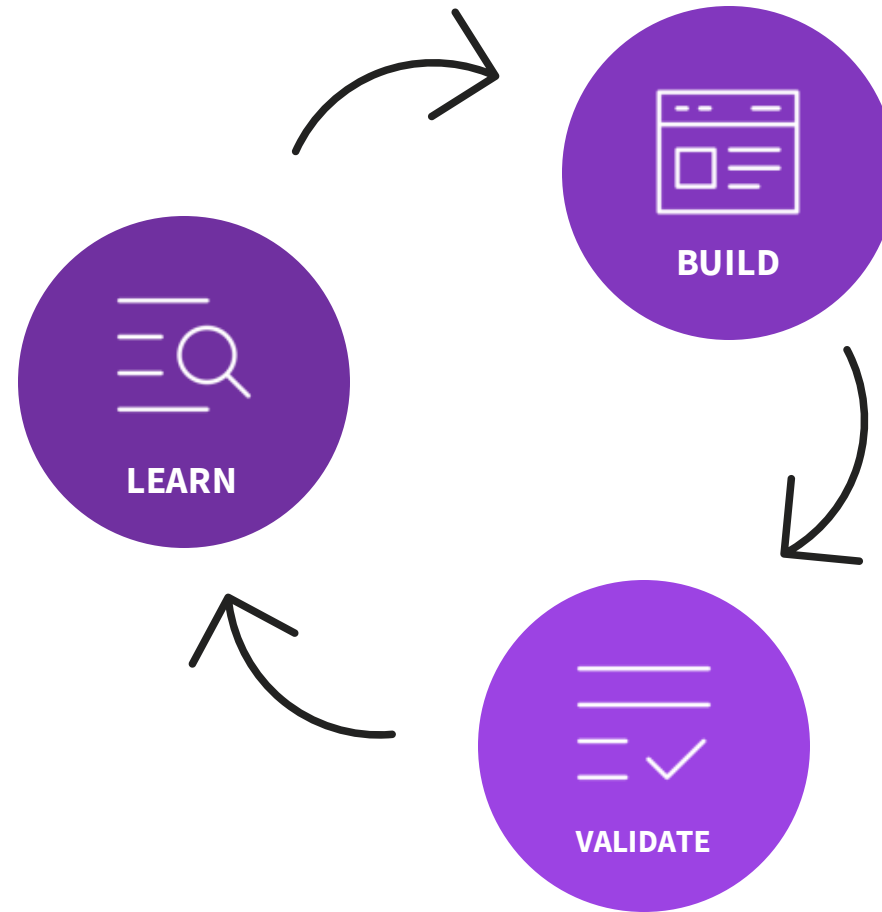
- Prescription of Trimodal program
- Patient dashboard with health status indicators
- Personalized program per patient
- Chat with patients
- Activity graphics

Paprika



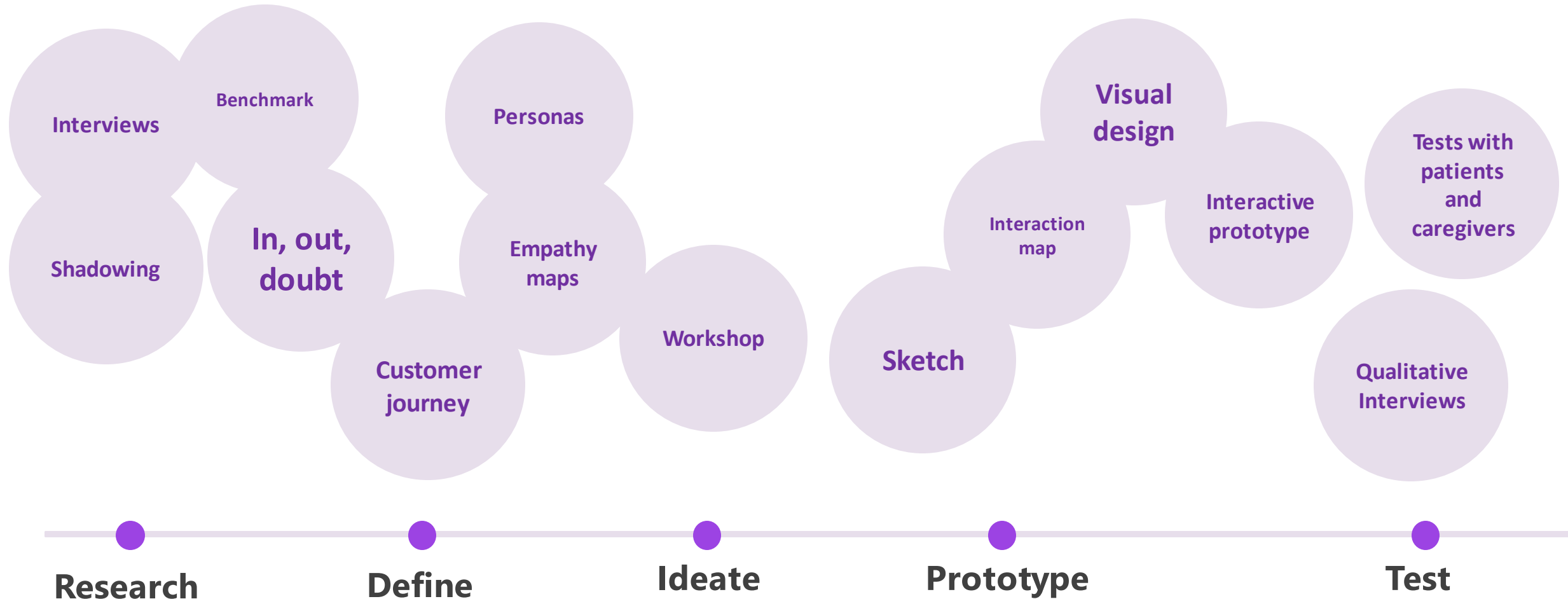
Paprika

How did we reach the solution?



Paprika

How did we reach the solution?



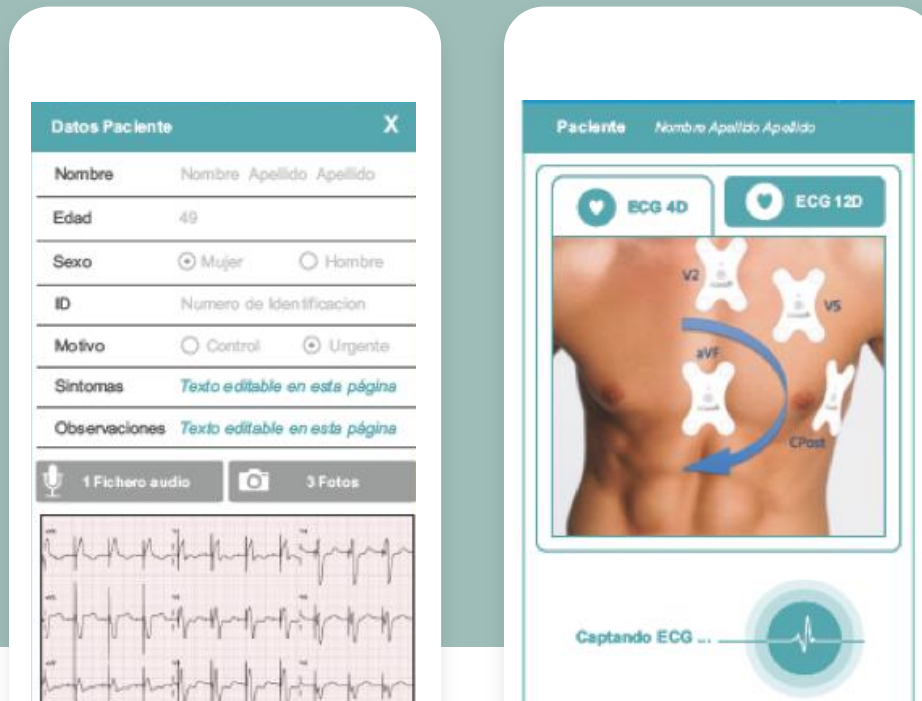
Other success stories



iCardio

iCardio, the portable electrocardiogram.

A medical device that shows what Eurecat may offer, from hardware design and development, materials, electrodes, signal processing to mobile and cloud applications to enable an offering of tele cardiology services.



i-Cardio
You personal ECG system



Vincles

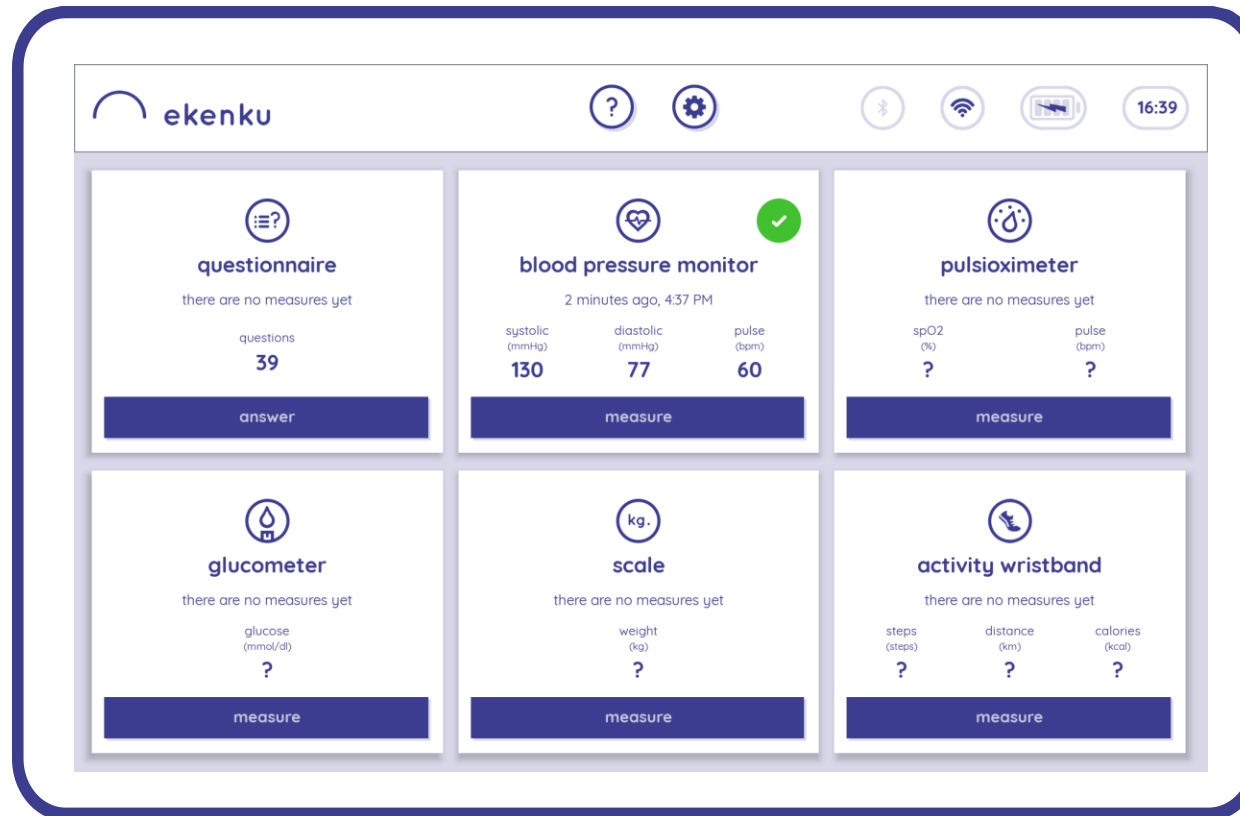
Avoid exclusion and social isolation and increase social activity of elderly through

- **Videoconference**
- **Sharing pictures**
- **Book**
- **Platform backoffice**
- **Chat space**

Ekenku

Solution for the remote follow-up of patients at risk of exacerbation from clinical providers.

ActivAge Project allows large-scale deployment of remote care IoT for monitoring and management of vital parameters for elderly and parkinson's patients



Connecare

CONNECARE is implementing a new organizational model for Integrated Care, enabled by ICT tools, which allow smart adaptive case management for professionals and self-management for complex chronic patients

A large clinical study in 4 European regions is currently conducted for the evaluation of technology acceptance, efficacy, cost-efficiency, risk stratification and potential for scalability and transfer to other regions.

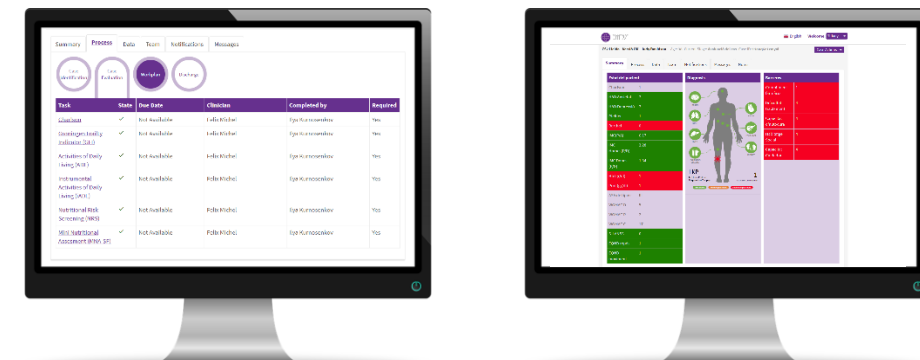
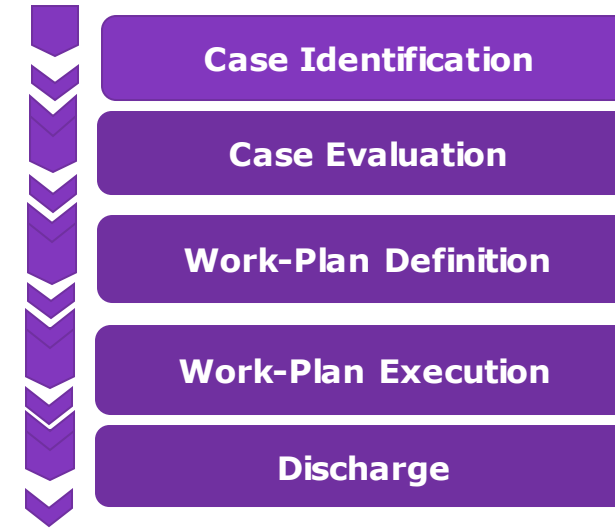


European
Commission

Horizon 2020
European Union funding
for Research & Innovation



- **Case Management (by Professionals)**



Preventomics

A biomarker and ICT-based system which provides personalized dietary and lifestyle advice with behavioral stimuli to engage users to improve their health habits and help them prevent the onset of diet-related diseases.



European
Commission

Horizon 2020
European Union funding
for Research & Innovation



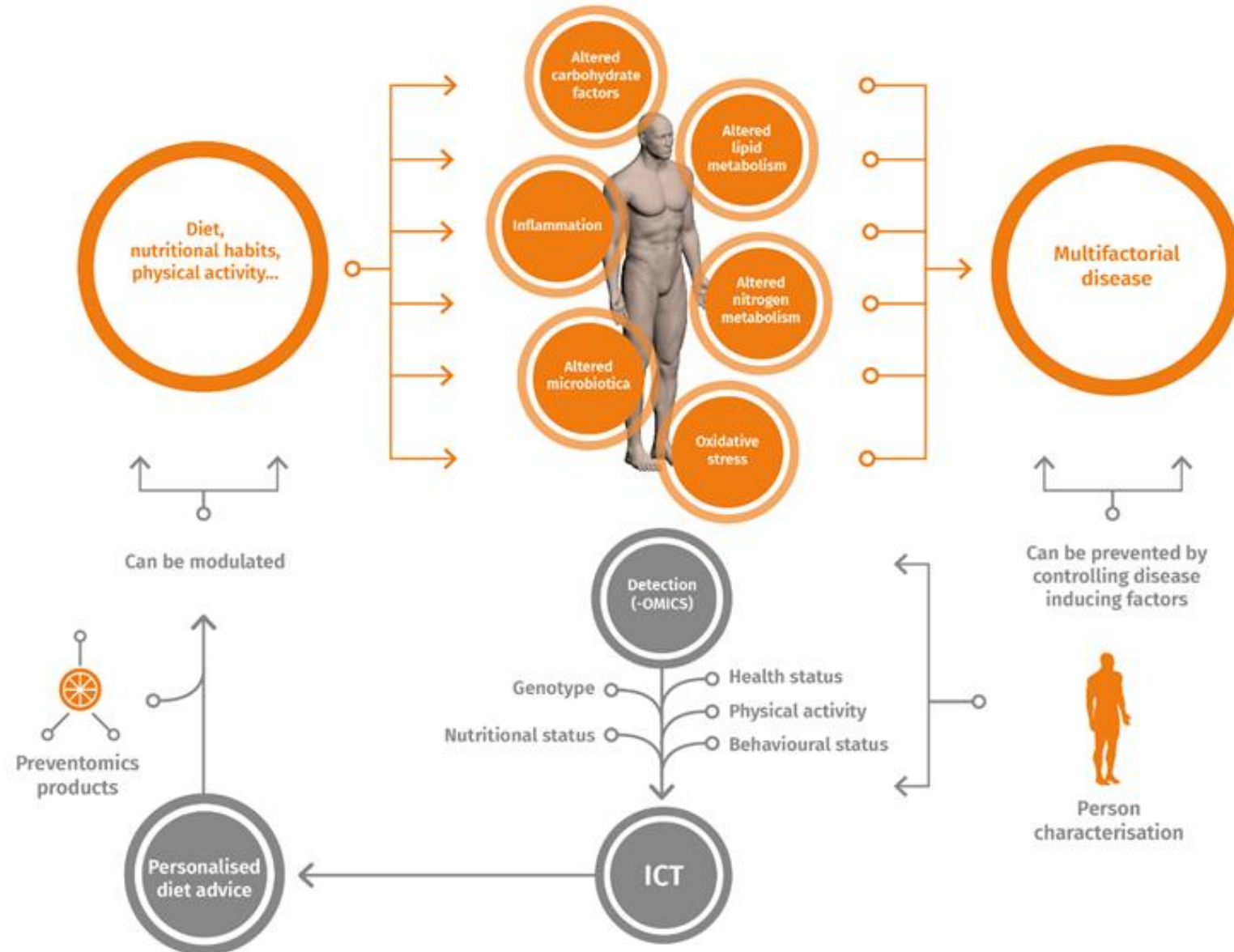
Personalised nutrition service
interoperable with existing
platforms



100% personalised dietary
advice



According to dietary habits and
preferences, level of physical activity,
shopping preferences, possible
allergies and phenotypic
characterisation.





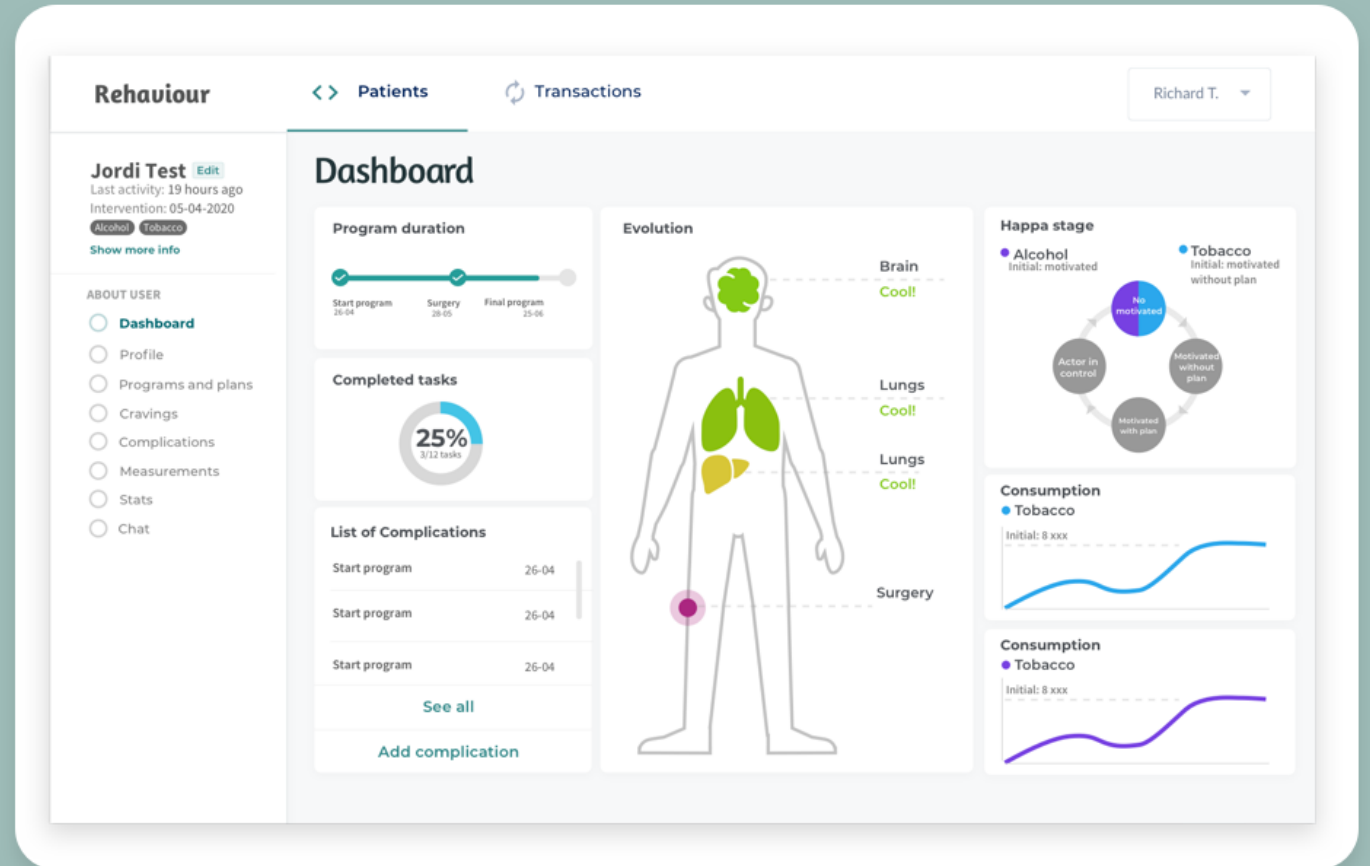
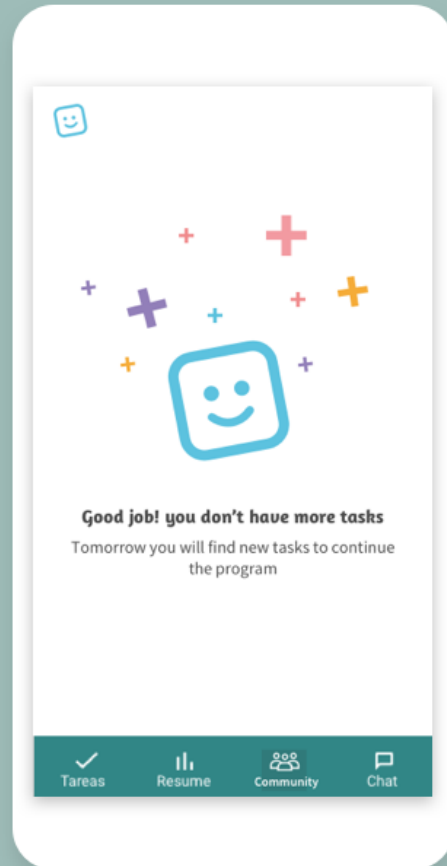
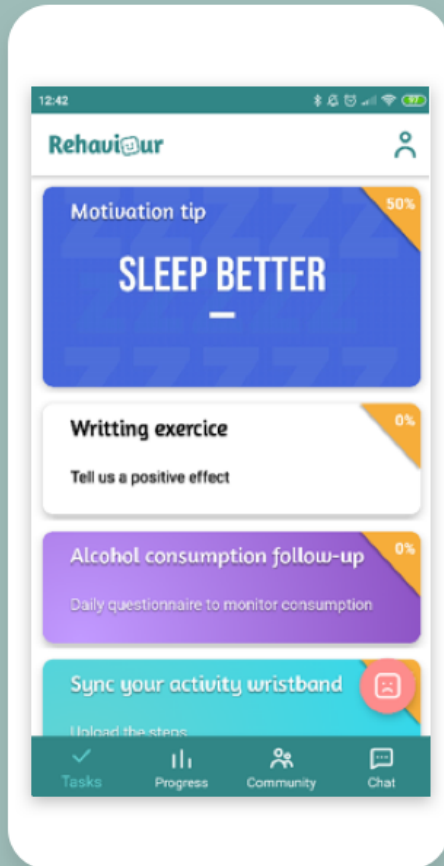
Behaviour

Behaviour change solution for patients before and after a high risk surgery: drop smoke and alcohol intake and adopt healthy habits in order to positively influence complications and mortality .

European Pre-Commercial Procurement, already in its last stage III, being deployed and adopted in 3 European hospitals



Rehaviour



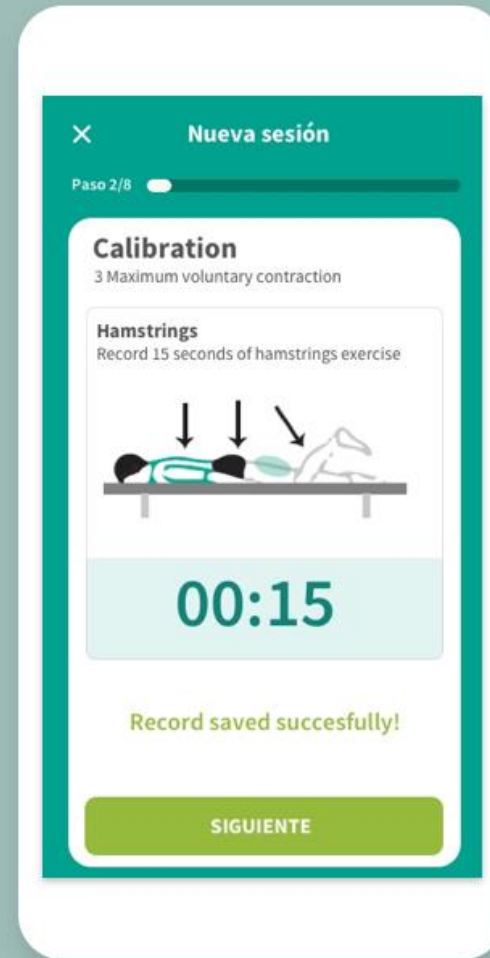
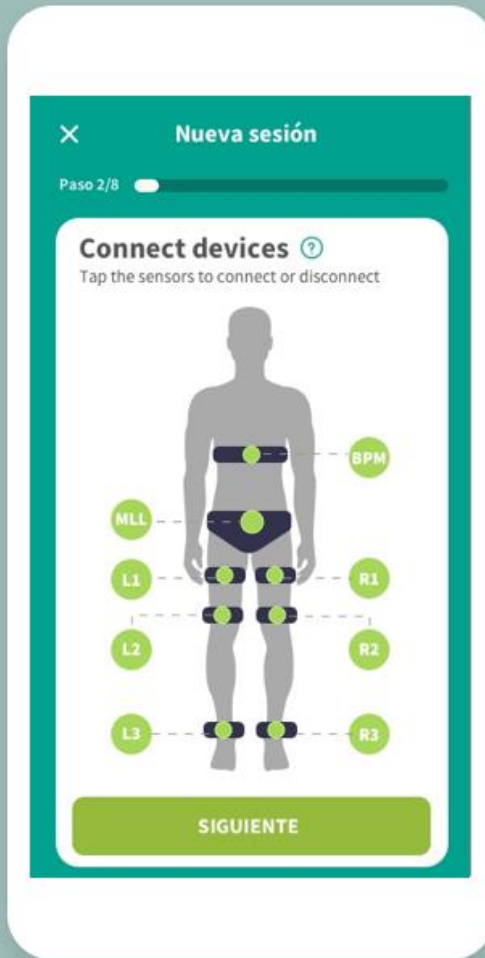
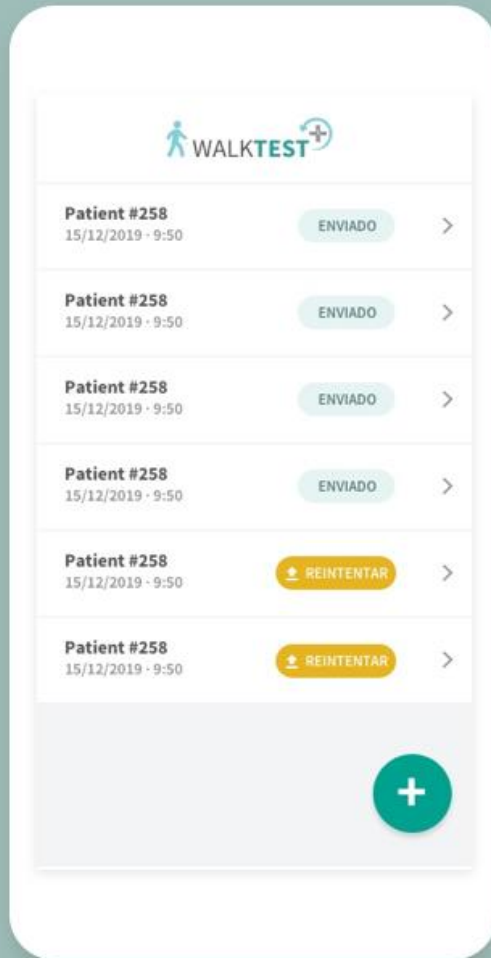
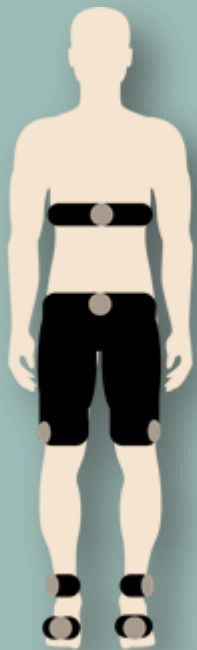


6MWT+ – The Six Minutes Walk Test +

Improvement of diagnosis and follow-up of the Six Minute Walk Test protocol, for instance used in the evolution of chronic neuromuscular diseases, through the integration of biomechanics sensors and data fusion.

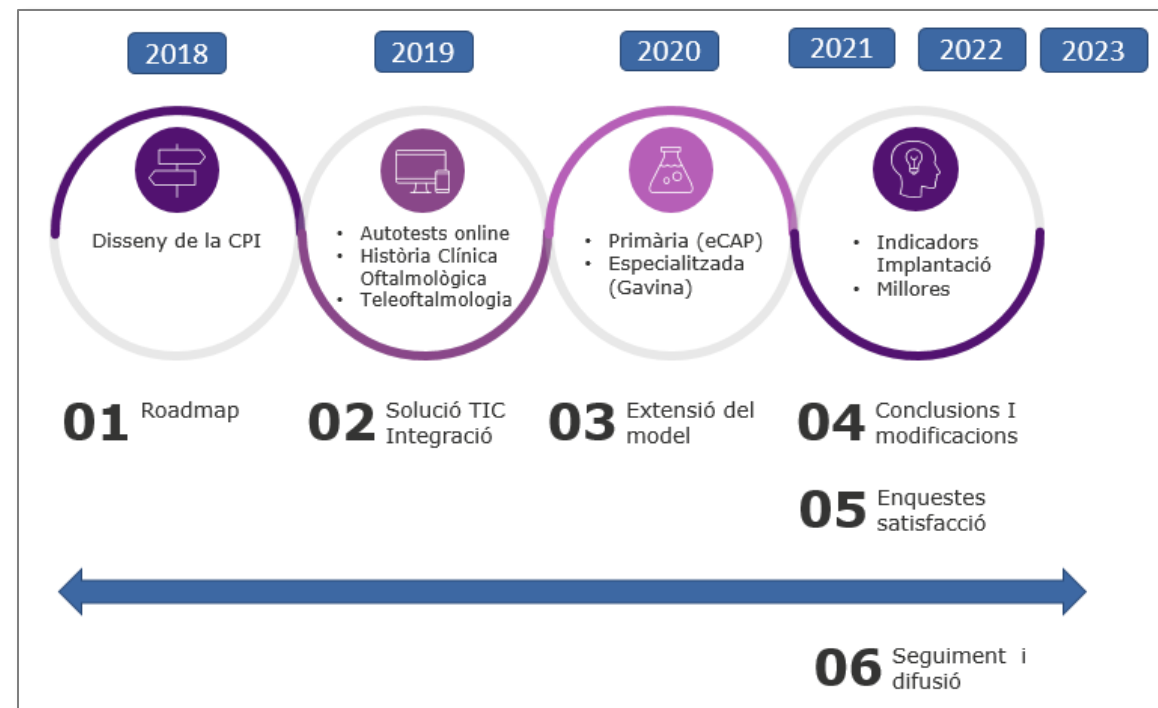


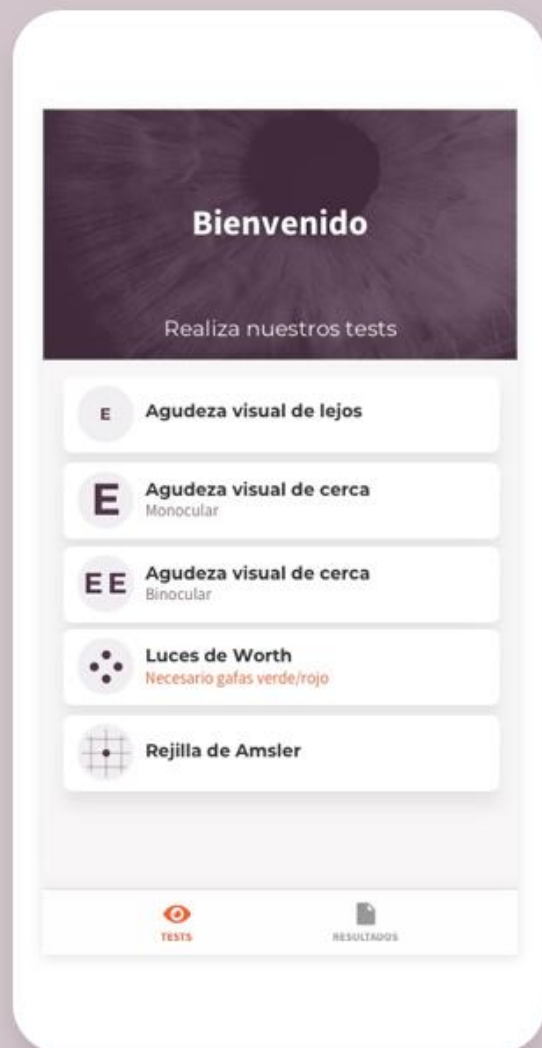
6MWT+





Integrated care to oftalmologic patient





Research
(Low TRLs)

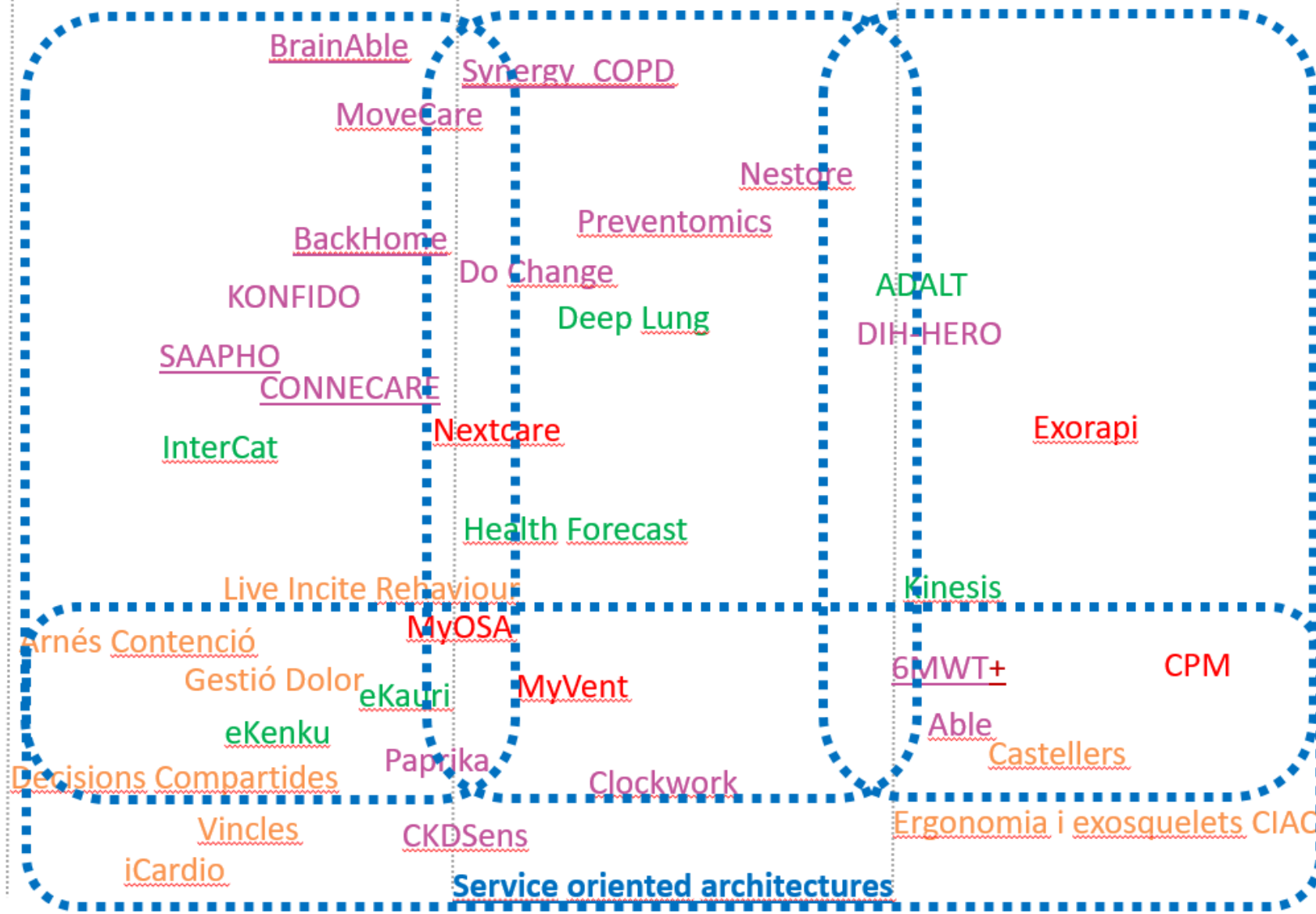
Innovation
(High TRLs)

IoT:
mHealth, Telehealth,
Medical Devices,
Integrated Care

AI

Data Science:
Data analytics,
Predictive modelling
Decision Support

Biomechanics:
Rehabilitation
Ergonomics,
Sport

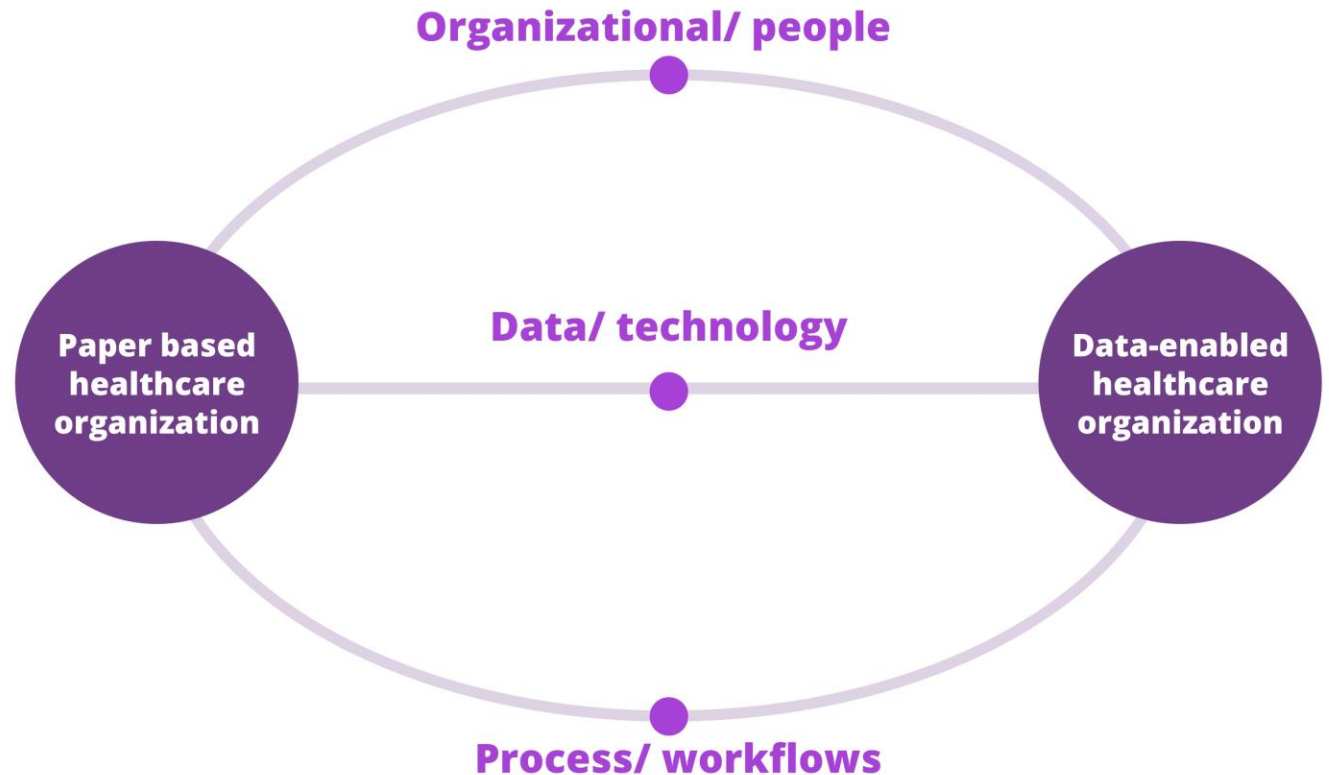


Transformation model

If technology is deployed on top of existing models, it **adds costs** and does not necessarily improve **efficiency** or **quality**

Transformation of model implies:

- **Organizational transformation**
- **Workflows transformation**
- **Legal and ethical issues**
- **Business models**



Technology acceptance – meaning for the end user

Design thinking in Health - Benefits:

- Providing a means to listen to patients carefully
- Improving interaction and communication among healthcare teams
- Rediscovering the patient by the professional
- Redesigning more effective and efficient processes and solutions
- Fostering creativity by joining multidisciplinary profiles





Felip Miralles
Director of eHealth Unit

felip.miralles@eurecat.org
@FelipMiralles