When does a patient become a person?

Moving towards a technology-enabled and community-based continuity of supporting services

18th June 2024

Furio Gramatica

Giada Venier

Mac MacLachlan

epr

Learning & Innovating Together

Fondazione Don Carlo Gnocchi Onlus

EPR Annual Event
Malaga, June 2024

From healthcare to long-term care:
an unprecedented challenge for the European ecosystem

Furio Gramatica
Director Development & Innovation, FDG

- **60 years old not-for-profit organization**

- **Health, rehabilitation, education, social**

- **28 centers in 9 Italian regions for in/out-patients, 50 outpatients clinics on the territory**

- **more than 4000 beds and about 6000 operators employed**

- **Around 3,5 millions patients access yearly**

- **2 of them have been recognized by the Italian Ministry of Health as Research Hospitals of National interest at Milan and Florence**

SPECIALIZED IN REHABILITATION AND LONG-TERM CARE

- Chronic and neurodegenerative diseases
- Cerebrovascular disease
- Cardiovascular disease
- Musculoskeletal disease
- Ageing

Fondazione Don Carlo Gnocchi Onlus

«If you can look into the seeds of time,

And say which grain will grow and which will not,

Speak then to me…»

W. Shakespeare, Macbeth Act 1,Scene III.
Banquo asking the witches to speak a prophecy about his future

High hopes. Nothing changed in the final quest for happiness of human beings regarding their future.

Power of tools. What has changed (and new patients know very well) is the way we – healthcare providers – could make forecast: plenty of data.

Hurdles on the way. Data availability/privacy/ownership… are minor.

New medical knowledge is needed to interpret data.
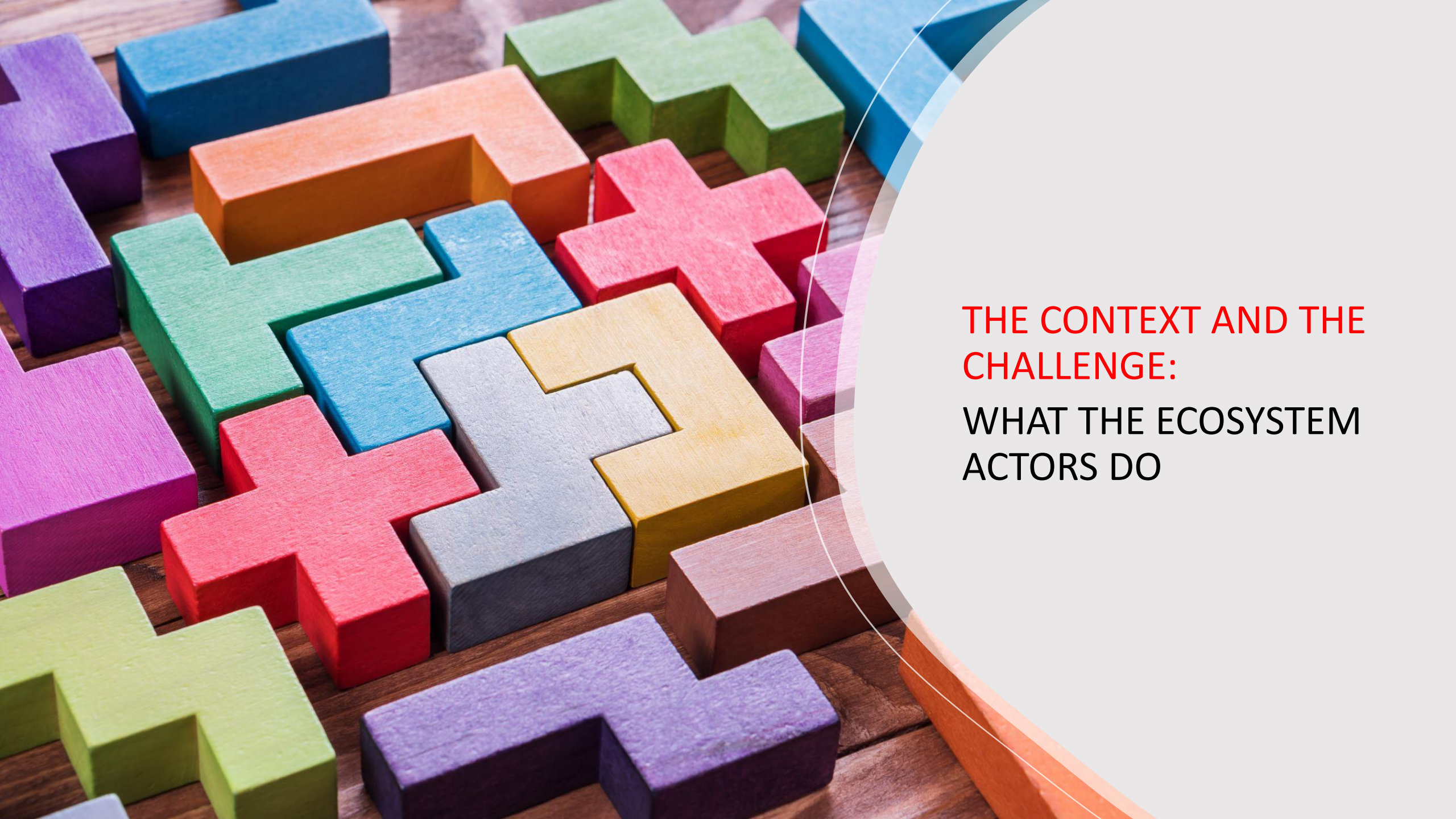New value-based vision is needed to make decisions.

INNOVATION IN HEALTHCARE IS NOT A LUXURY GOOD.

WE NEED IT TO ADAPT TO CHANGING ENVIRONMENTS.

IT SHOULD BE CREATED BY HUMAN MIND
FOR A REAL, LONG LASTING, HUMAN HAPPINESS.

IF NOT, IT IS ONLY A COMPLICATED FORM OF BARBARISM.
THAT'S WHY WE HAVE TO LOOK AT INNOVATION VERY SERIOUSLY.
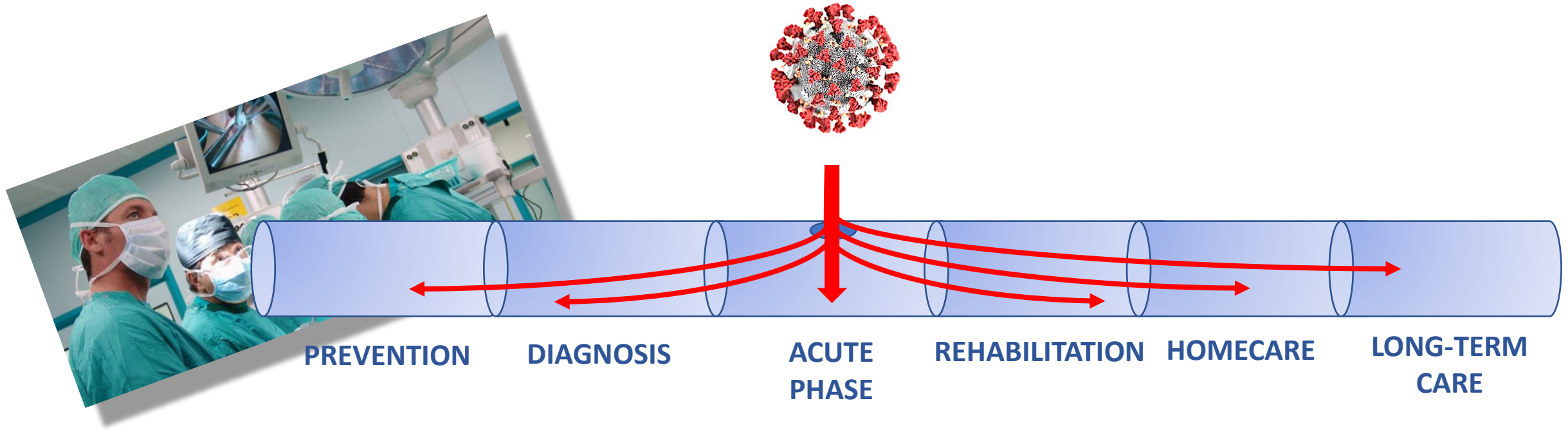
THE CONTEXT AND THE CHALLENGE:
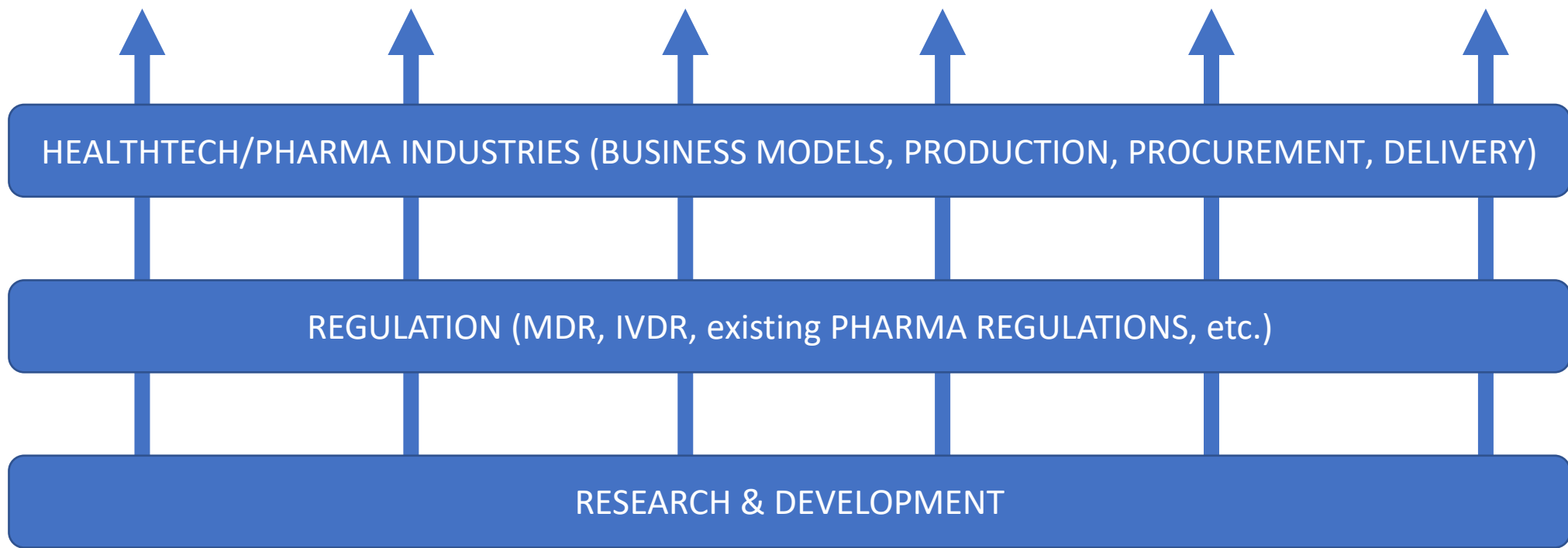
WHAT THE ECOSYSTEM ACTORS DO

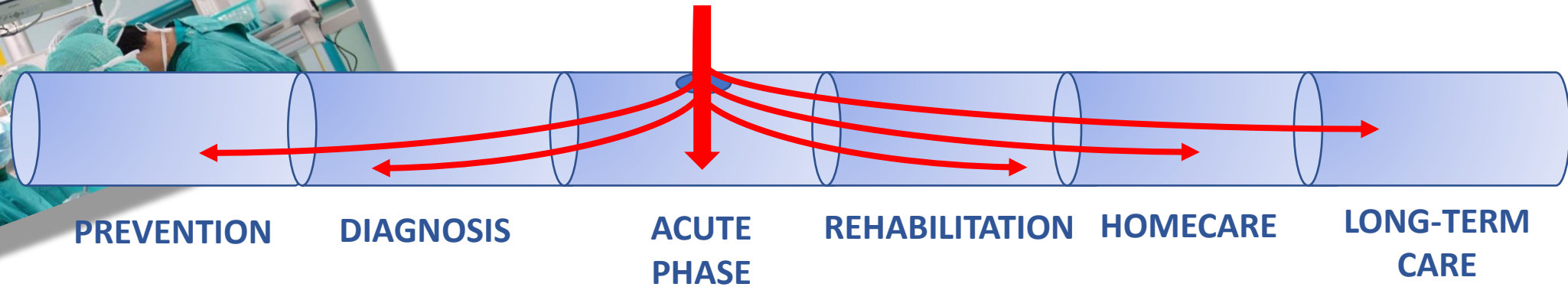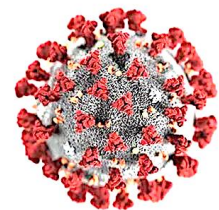**THE CONTEXT AND THE CHALLENGE:**

WHAT THE ECOSYSTEM ACTORS DO

(not a repeated slide...)

PREVENTION **DIAGNOSIS** **ACUTE PHASE** **REHABILITATION** **HOMECARE** **LONG-TERM CARE**

COVID-19 SHOWED US THAT THE
CONTINUUM OF CARE REALLY EXISTS!

PREVENTION   DIAGNOSIS   ACUTE PHASE   REHABILITATION   HOMECARE   LONG-TERM CARE

HEALTHTECH/PHARMA INDUSTRIES (BUSINESS MODELS, PRODUCTION, PROCUREMENT, DELIVERY)

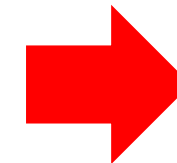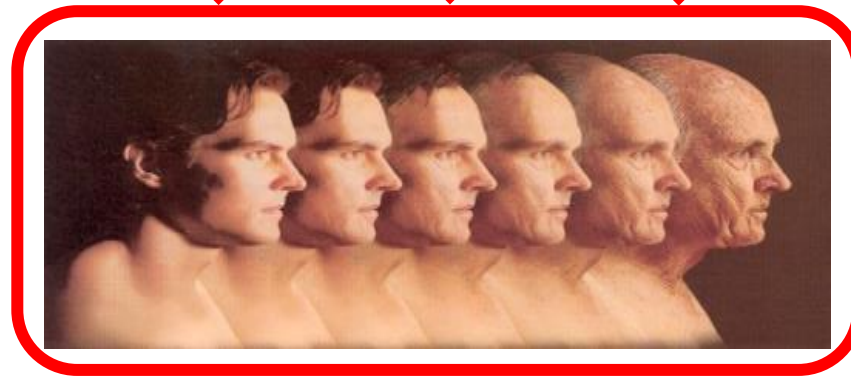REGULATION (MDR, IVDR, existing PHARMA REGULATIONS, etc.)

RESEARCH & DEVELOPMENT

2-D ECOSYSTEM APPROACH NEEDED!

In a long-term-care era, patient is a moving target

TIME-CHANGING: TREATMENT EFFECTS CHANGE ALONG THE 10+ YRS PATIENT'S HISTORY

PERSONALISED: DIFFERENT PATIENTS CAN REQUIRE DIFFERENT TREATMENTS (take even non-clinical factors into account)

LONG-TERM METRICS AND DATA ARE NEEDED TO KEEP APPROPRIATENESS OF TREATMENTS

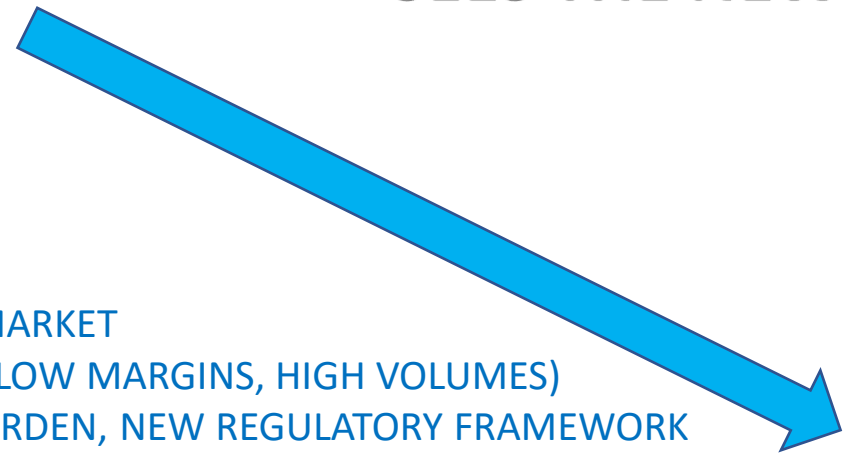TECHNOLOGY-ASSISTED HOSPITAL- AND HOME-BASED HEALTHCARE

- «RED OCEAN», KNOWN, OVERCROWDED MARKET
- MARGIN-DRIVEN
- REGULATIONS ARE CLEAR
- HTA/VALUE MODELS WELL ESTABLISHED
- BUSINESS MODELS WELL ESTABLISHED
- LOW OPPORTUNITY FOR SMEs FOR B2C, LARGE BUSINESS

ACUTE MEDICINE MARKET

HOW WE THINK INDUSTRY SEES THE NEW SCENARIO

- «BLUE OCEAN», NEW MARKET
- PARTNERSHIP-DRIVEN (LOW MARGINS, HIGH VOLUMES)
- HEAVY REGULATORY BURDEN, NEW REGULATORY FRAMEWORK UNSURE (e.g. AI)
- HTA/VALUE-BASED HEALTHCARE MODELS MISS OUTCOME INDICATORS
- NEW BUSINESS MODELS NEEDED
- SMEs ARE THE MAJOR OWNERS OF THE TECHNOLOGICAL KNOW-HOW, BUT MISS ACCESS TO UNMET NEEDS AND SALES FORCE

HARD SHIELD

Proportion of the world population aged 60 years or more

8%   10%   21%

1950   2000   2050

Source: UN report World Population Ageing 1950-2050
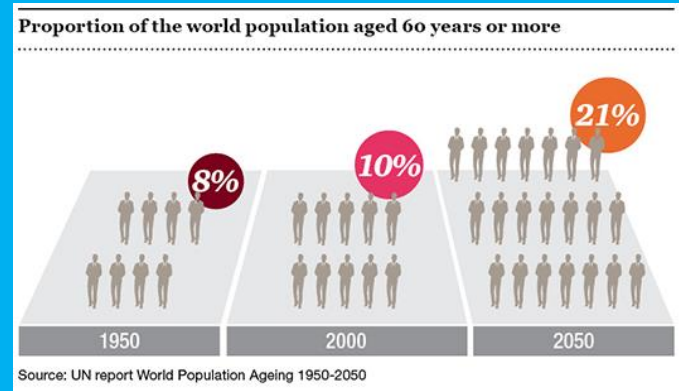
LONG-TERM CARE MARKET

HOW WE – LTC HEALTHCARE PROVIDERS – SEE THE NEW SCENARIO

PATIENTS and HEALTHCARE PROVIDERS

- Long-term-care (post-acute and chronic) is already a major demand in healthcare.

- Tomorrow patients (now 30-40 y.o.) are digital-native and have a participative, outcome-oriented, attitude.

- Healthcare providers have a scarce familiarity with the whole picture of international scenario

COMPANIES

- MedDev industries don't have well-established integrated, sustainable solutions for the long-term care market. However, SMEs have the needed components.

- There is a leakage of intellectual property and production chains of medical devices from Europe to USA and Far East → several good products from SMEs are not yet regulated in EU and cannot be used

POLICY MAKERS / REGULATORS

- Value-based procurement process (Directive 2014/24/EU) shortly unavoidable ?

- Digital-supported (or –driven?) welfare/healthcare regulations still ongoing and badly integrated

- Need for sustainable, ethical, inclusive business models to setup rules for market access and reimbursement of innovative solutions

1. **WITH AN OVERALL VISION ON THE CONTINUUM OF CARE, BEYOND CARE CENTRE SPECIALISATION**

2. **TAKING DATA-DRIVEN DECISIONS**

3. **SPEAKING LANGUAGES OF ALL HEALTHCARE ECOSYSTEM ACTORS**

4. **CONTRIBUTING TO THE HEALTHCARE EUROPEAN POLICY MAKING**

ECOSYSTEM AND RISKS FOR A SMART HEALTHCARE PROVIDER

POLICY MAKERS / REIMBURSEMENT AGENCIES

MEDTECH & IT INDUSTRY

ROI: HIGH VALUE, INNOVATIVE, MARKETABLE, MEDICAL SOLUTIONS

Patient's healthcare ecosystem

Patient's data

MEDICAL DEVICES

THE SMART HEALTHCARE PROVIDER DATA CYCLE

SUSTAINABILITY MODELS

Value-based decisions

Data interpretation

COMPUTING

⚠️ **RISK OF POLITICAL, NOT-OBJECTIVE DECISIONS**

Action scenarios

⚠️ **RISK OF MEANINGLESS INTERPRETATION**

NEW HEALTH ECONOMICS

NEW MEDICAL KNOWLEDGE

ACADEMIA & RTOs

Harvard Business Review

A Better Approach to Fighting Chronic Diseases

by Alan M. Trager

SEPTEMBER 08, 2020

Chronic conditions, like cancer, diabetes, cardiovascular diseases, and chronic respiratory conditions, were responsible for 71% of all global deaths in the years before Covid-19 and will remain problematic long after the pandemic ends.

A potent and underutilized tool for reducing this looming cost lies in public-private partnerships.

But to succeed, these entities must have credibility or trust. This is especially true in the health realm where the public might be especially skeptical of the introduction of private profit-making into health care.

Harvard Business Review

ARTICLE
HEALTH CARE

Managing the Most Expensive Patients

A new primary-care model can lower costs and improve outcomes.
by Robert Pearl and Philip Madvig

Members	Hospitals	Medical offices[1]
12.6M	40	618

Physicians[2]	Nurses[3]	Employees[+]
23,982	68,218	215,932

Annual operating revenue

$ in Billions

(bar chart, years 2013–2022)
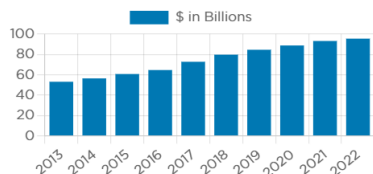
One of the authors is the former CEO and associate executive director of ← Kaiser Permanente (KP)

The **sickest 5% of the population accounts for 50% of all health care spending.**

Many of these patients have **multiple chronic conditions**, and the hope is that through **disease-management programs that use registered nurses and social workers** to monitor and help them, we can care for them better and achieve big savings.

But these programs are **expensive**, each focuses on just one disease, which means that **many patients deal with multiple teams**.

The programs also operate **outside primary-care practices, so they often duplicate doctors' work as well**.

KP approach: providing **coaching and support to patients through IT and inexpensive assistants who are integrated into primary-care** practices—avoiding duplication.

This strategy has not only led to **better medical outcomes** but cut costs so much that KP has been able to offer millions of members premiums that are **10% to 15% lower than competitors'**.

There is a big effort around the world to understand the inter-relation among

- Chronic increasing condition
- Humans becoming older
- Technology offer
- Digital tsunami

and…

Our deep-rooted need to stay humane

A More Humane Model for Eldercare in the U.S.

LEADERSHIP & MANAGING PEOPLE RESEARCH by Leonard L. Berry, Mary Kummer Naber, Sunjay Letchuman, and Peter Fitzgerald

How one integrated, community-based care program lets vulnerable seniors continue to live at home for as long as possible.

Save   Share   Buy Copies   JUNE 15, 2023

How Algorithms Could Improve Primary Care

TECHNOLOGY & OPERATIONS DIGITAL ARTICLE by J Hunter Young, Kyle Richardville, Bradley Staats, and Brian J Miller

Done well, automation can maximize the quality of health care and enhance operational efficiency.

Save   Share   Buy Copies   MAY 06, 2022

The Telehealth Era Is Just Beginning

STRATEGY & EXECUTION MAGAZINE ARTICLE by Robert Pearl and Brian Wayling

Contrary to what many people think, virtual health care, also known as telemedicine or telehealth, is much more than a cheap digital knockoff of in-person…

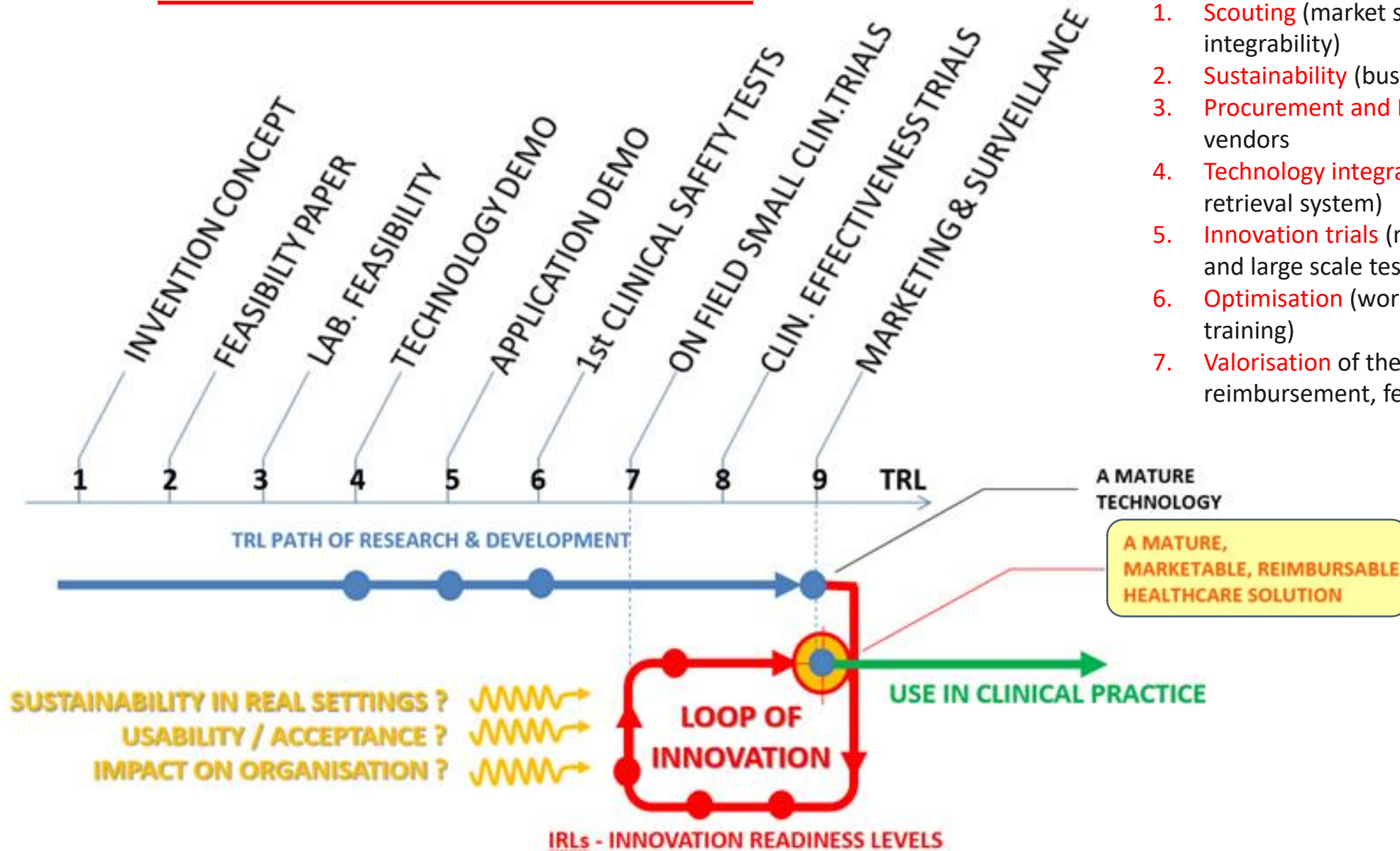Save   Share   Buy Copies   FROM THE MAY–JUNE 2022 ISSUE

HOW WE ARE MANAGING THE CHALLENGE
AT FONDAZIONE DON GNOCCHI

SMART HEALTHCARE PROVIDER: THE INNOVATION FUNNEL

RESEARCH
(new solutions)

INDUSTRY
(existing solutions to be integrated)

POLICY
MAKERS

SMART HEALTHCARE PROVIDER

CLINICAL EFFICACY TESTS

BIG DATA

X

THE VALUE MULTIPLIER «LOOP OF INNOVATION» from technology to solution

1-2 yr process to:
- scout building blocks
- integrate them into a solution
- test it on field (**innovation trials**)

Value before/after

THE VALUE FILTER value-based is the «new HTA»

Larger scale, real-world-based value assessment –>
- decision to purchase or not (under which conditions)
- advise to policy makers for market access

€

ACCELERATION INTO CLINICS

HOSPITAL & HOMECARE

WHERE HEALTH INNOVATION PROVIDERS GUIDE INDUSTRY TO SUCCESS:
# THE «LOOP OF INNOVATION»

1. **Scouting** (market survey, match with needs, integrability)
2. **Sustainability** (business and workflow modeling)
3. **Procurement and Partnership agreement** with vendors
4. **Technology integration** (different technologies, data retrieval system)
5. **Innovation trials** (new clinical protocols, small scale and large scale test)
6. **Optimisation** (workflow, patient journey, operators' training)
7. **Valorisation** of the final solution (money for value, reimbursement, fees)

INVENTION CONCEPT
FEASIBILTY PAPER
LAB. FEASIBILITY
TECHNOLOGY DEMO
APPLICATION DEMO
1st CLINICAL SAFETY TESTS
ON FIELD SMALL CLIN.TRIALS
CLIN. EFFECTIVENESS TRIALS
MARKETING & SURVEILLANCE

1 2 3 4 5 6 7 8 9 **TRL**

TRL PATH OF RESEARCH & DEVELOPMENT

A MATURE TECHNOLOGY

A MATURE, MARKETABLE, REIMBURSABLE HEALTHCARE SOLUTION

USE IN CLINICAL PRACTICE

SUSTAINABILITY IN REAL SETTINGS ?
USABILITY / ACCEPTANCE ?
IMPACT ON ORGANISATION ?

LOOP OF INNOVATION

IRLs - INNOVATION READINESS LEVELS

Robot Assisted Rehabilitation – The Robots

WE WENT THROUGH A HTA PROCESS TO RANK AND CHOOSE THE INITIAL SET OF ROBOTS

«LOOP OF INNOVATION» APPLIED TO ROBOTIC REHAB
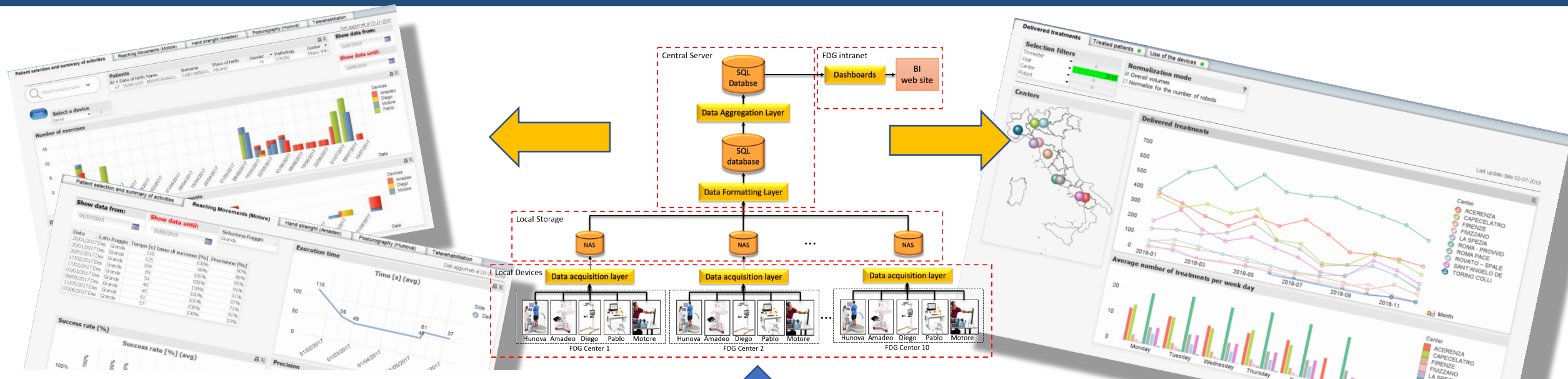
DASHBOARD FOR CLINICIANS (OUTCOME)

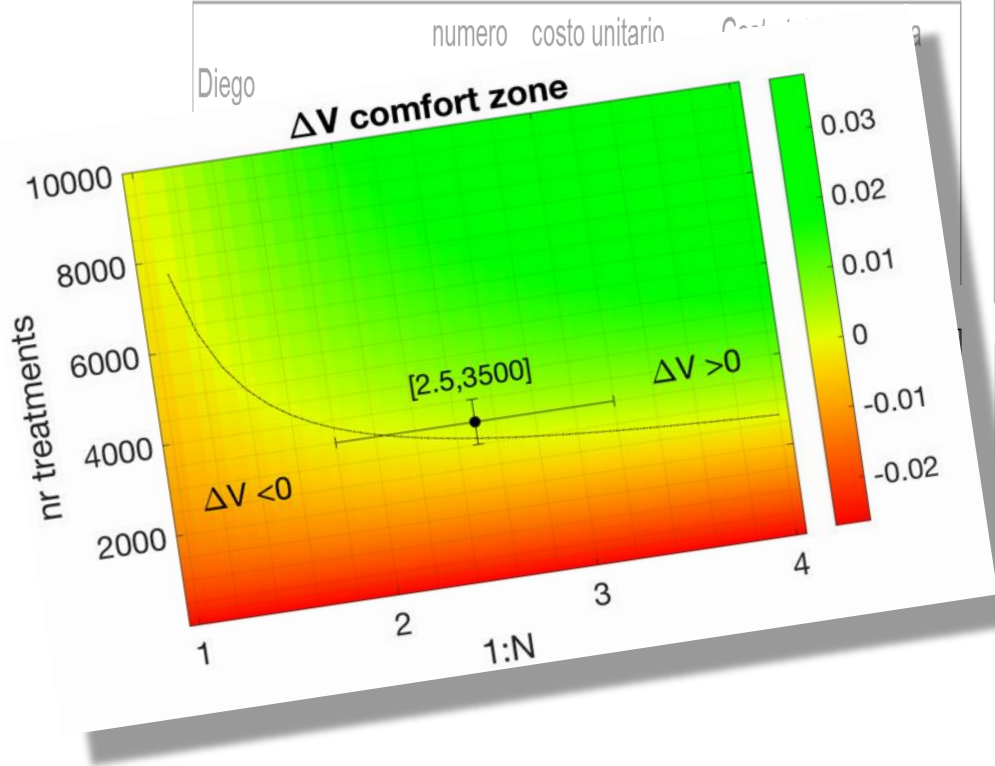**DASHBOARD FOR MANAGERS (COSTS)**

42 ROBOTS IN 10 CENTRES

3500+ PATIENTS
100.000+ TREATMENTS

AI-READY FOR DATA ANALYSIS AND PREDICTIVE VALUE

$$VALUE = \frac{OUTCOME}{COSTS}$$

Costi di investimento

	numero	costo unitario	
Diego			

ΔV comfort zone

[2.5,3500]   ΔV >0

ΔV <0

1:N

Volumi di utilizzo dei robot

	2016	2017	media
numero tratt. robotici ann	5890	6189	6040

Diego
Pablo
Amadeo
Motore

Sostenibilità

Vh robotica	2,55
Vh tradizionale	2,68

Prezzo ticket paziente   €
Rimborso SSN trattamento   €

$$V = \frac{\Omega}{C} = \frac{\Omega_{Clin} + \Omega_{QoL}}{C_{OP} + I} = \underbrace{\frac{\Omega}{P_P}}_{V_P} \cdot \underbrace{\frac{P_P}{P_P + P_S}}_{V_S} \cdot \underbrace{\frac{P_P + P_S}{C_{OP} + I}}_{V_H}$$

FDG VALUE MODEL
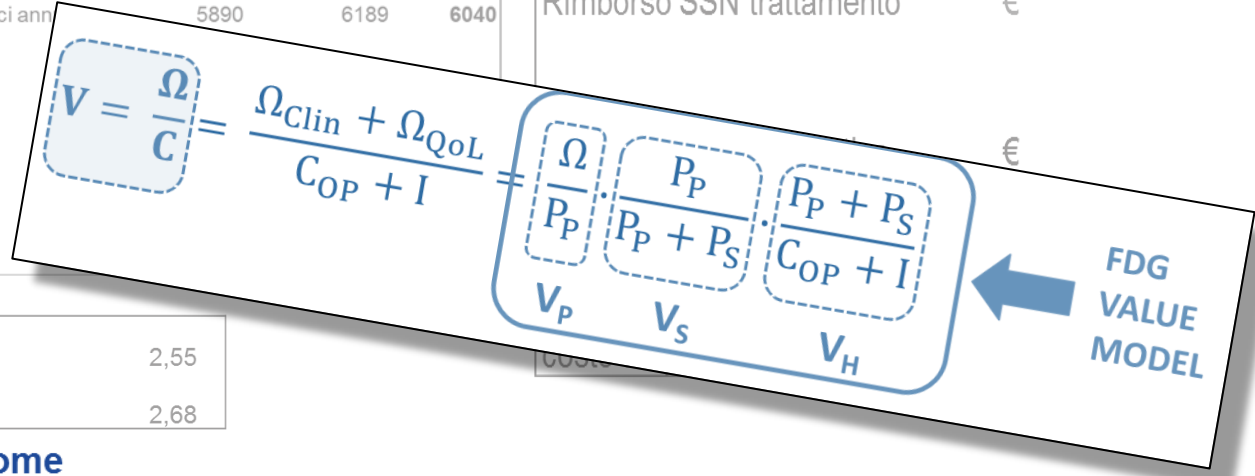
Outcome

peso motricity index	33,0%
peso ARAT	33,0%
peso Fugl Mayer	33,0%

Media Outcome pazienti (variazione score)	Robotici	Tradizionali
	13,02	9,32

Valore (p.ti score/€)		€/p.to score
V robotica (variazione score per euro speso)	0,027	36,?
V convenzionale (variazione score per euro speso)	0,021	48.29
Delta	**+0,007**	**-11,90**

APPROVED

Under proper conditions robotic rehabilitation is a positive added value service (+0,007 score points/€ respect to usual care). Reciprocal of value gives the cost saving of 11,90€ per outcome score point

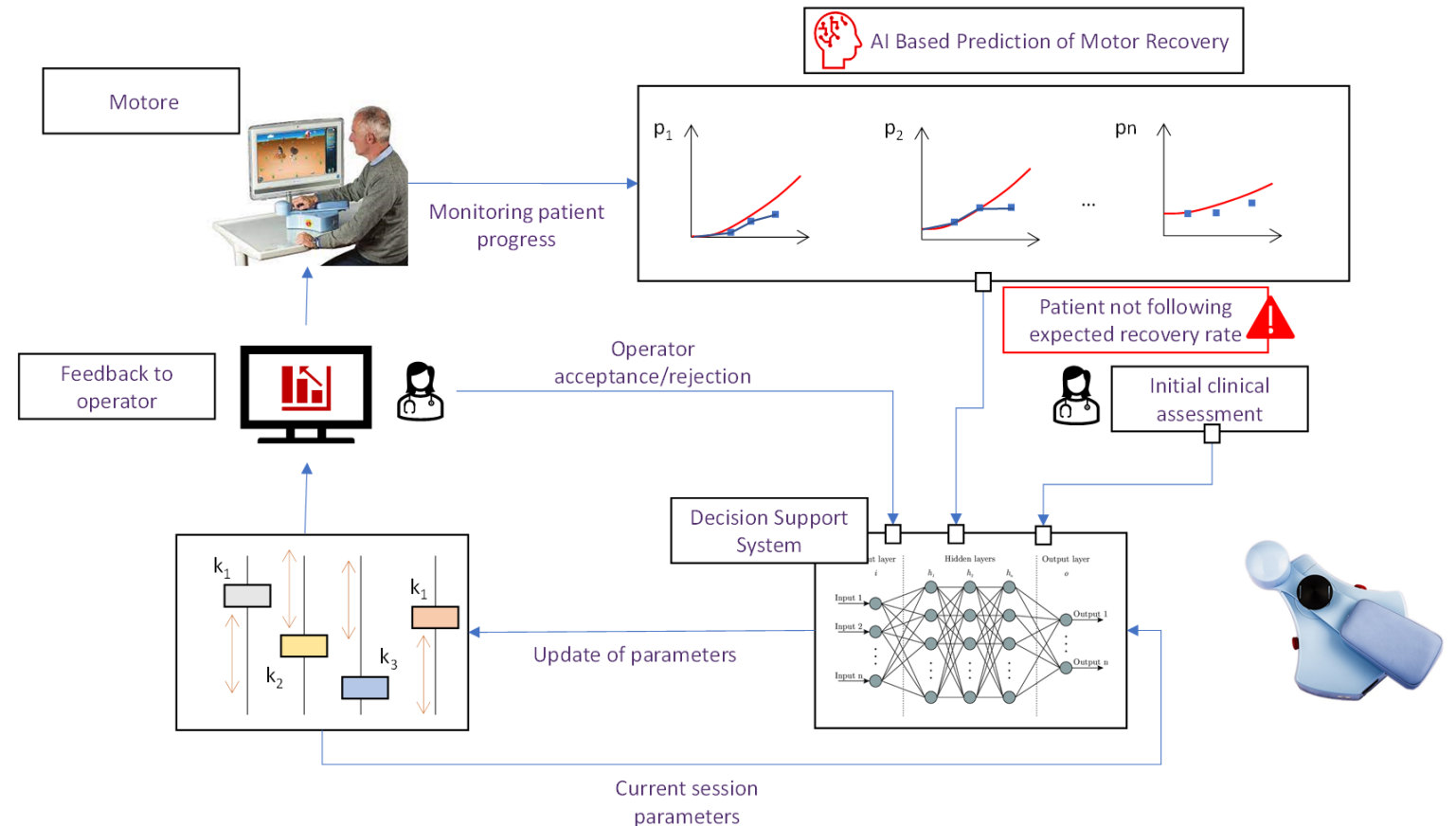# MACHINE-AI DIALOGUE (WITH HUMANS IN THE LOOP)
CO-AIDER - *Clinical validation of an ai-based decision support system for robotic upper limb rehabilitation in post-stroke patients*

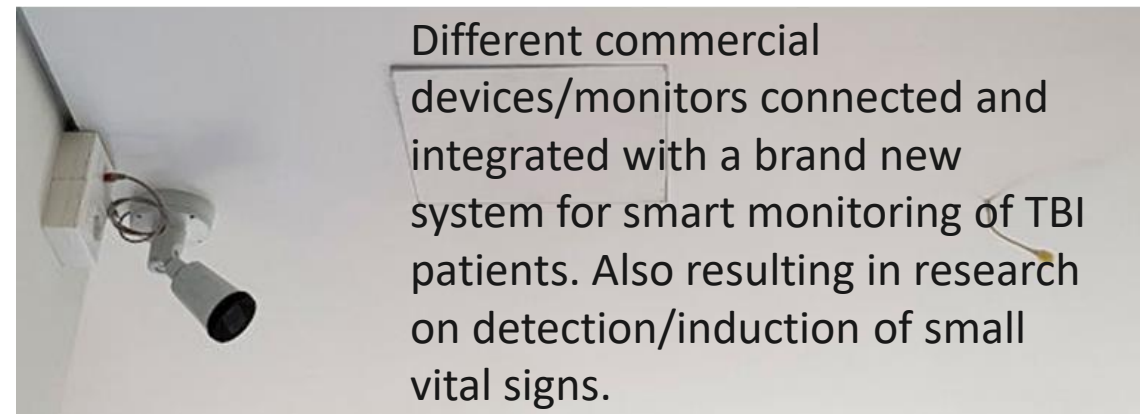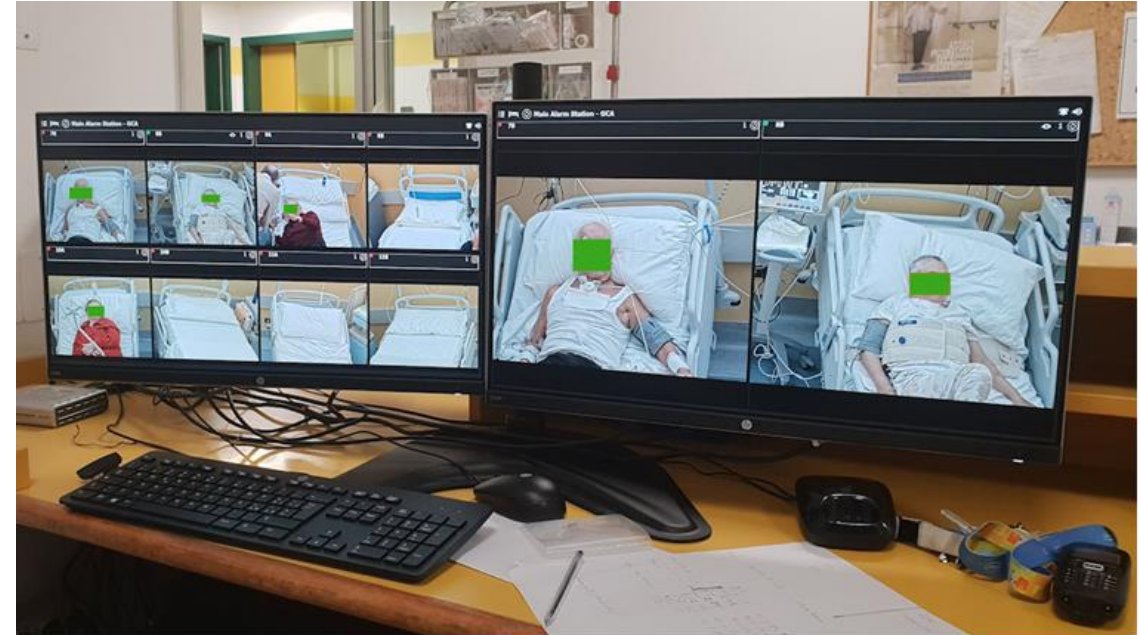Project funded by Italian Ministry of Health (450k€)

Development of a AI-based Decision Support System (DSS) to support clinicians using reehab robots in:

- Choosing exercises and parameters' detailed, personalised setting on rehab robots

- Monitoring patient's evolution and redefining pbjectives and parameters.

- AI-DSS initially trained on the results of a previous FDG robotic rehab multicentric study.

- Validation: RCT (100 pts post-stroke)

- Cost-effectiveness assessment through Value-based Healthcare approach

TBI Dept. Digital Ecosystem

Different commercial devices/monitors connected and integrated with a brand new system for smart monitoring of TBI patients. Also resulting in research on detection/induction of small vital signs.

Telerehabilitation

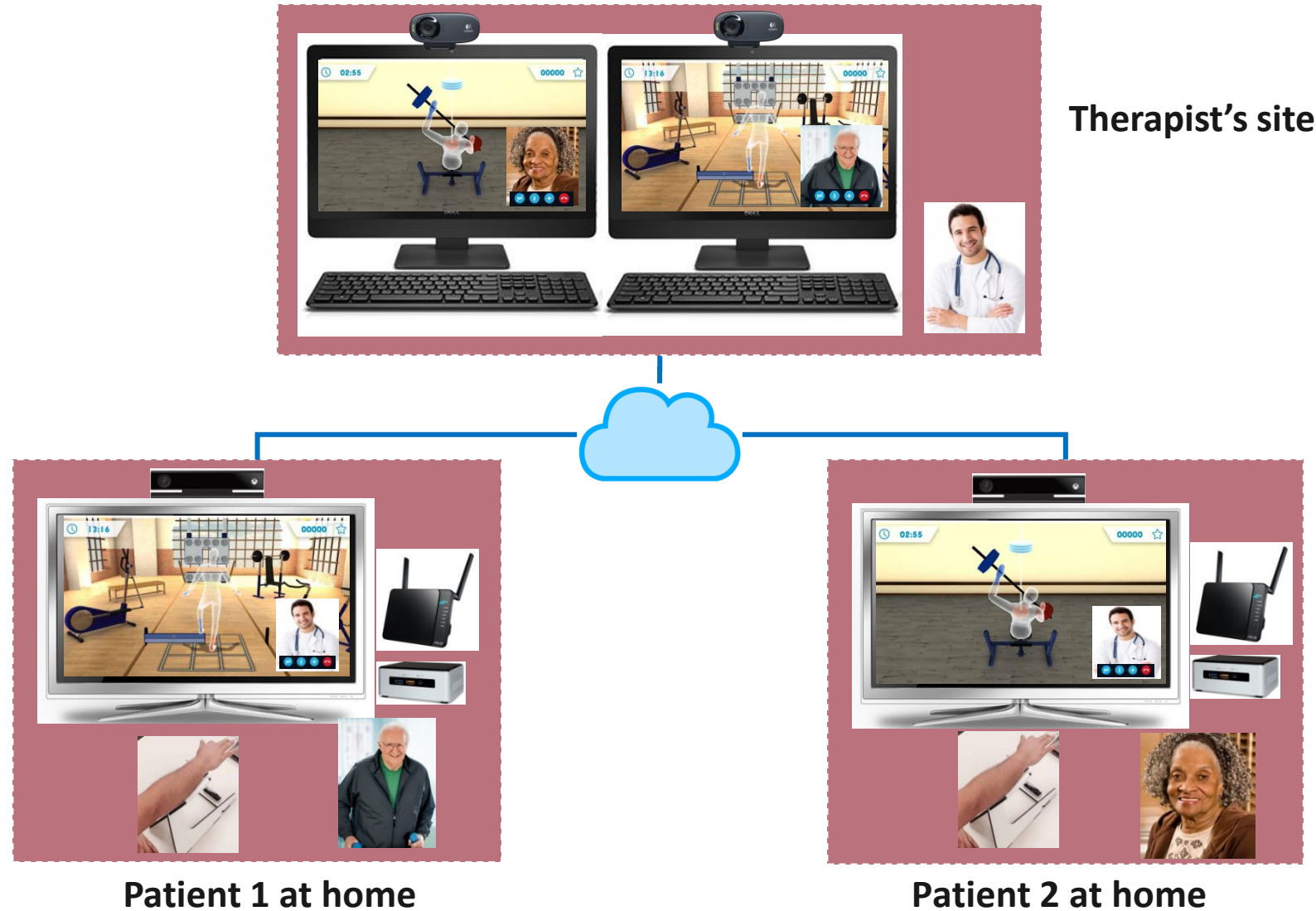FDG AS INITIATOR: knowledge of care need and current practice →
- Sustainability plan
- Technology and partners scouting
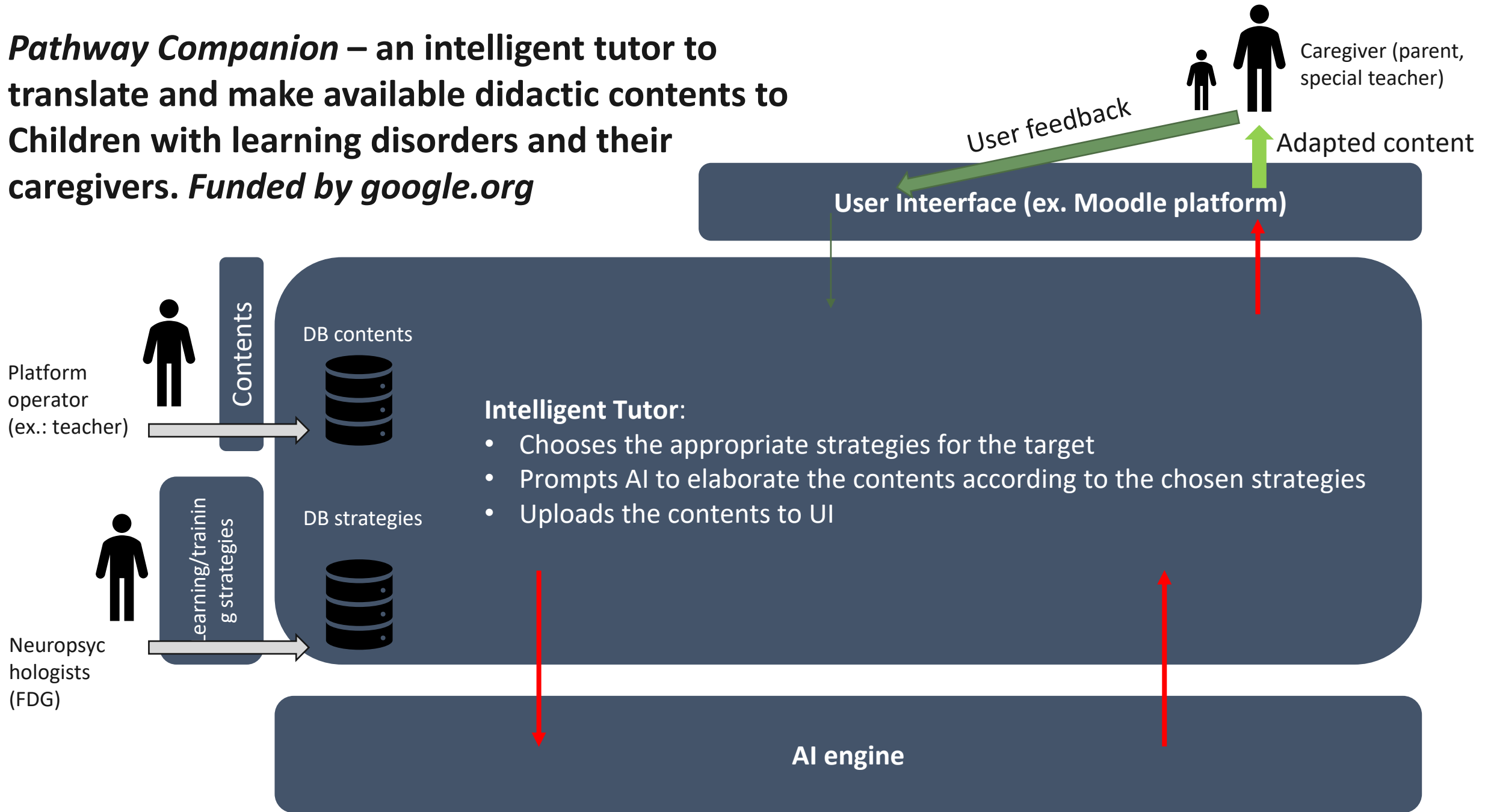- Functional specs integrator

OTHER PROJECT TEAM MEMBERS:
- MICROSOFT – cloud platform company
- A MSFT industrial partner bringing exergames
- A MSFT industrial partner bringing televisit system

RESULTS:
- System integrated by building a thin software layer connecting the parts
- Presented to Lombardy reimbursement authority
- Approved and reimbursed with an experimental fee
- Then introduced in regional rules for reimbursement

Therapist's site

Patient 1 at home

Patient 2 at home